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ADENOMYOSIS?

The (Bad) Cousin of Endometriosis
An unsuspected cause of Heavy Painful Periods

All you want to know about this little-known condition &
How to Get Your Life Back without a Hysterectomy.

By Dr Eisen Liang
With Dr Bevan Brown

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To Winnie, my loving wife and partner in my life journey, who is forever supportive of my ventures.

Eisen Liang

♡♡♡

To the women in my life—my wife and daughters—without whom I would never have risen to put pen to paper. With gratitude and respect.

Bevan Brown

♡♡♡

To all our patients
For entrusting us with your body and soul to fight alongside you against this dreadful disease—adenomyosis.

Eisen Liang and Bevan Brown

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Foreword

by The Hon. Emma Hurst MLC

I was holidaying in Noosa when, for the first time in my 39 years of life, I called for an ambulance.

I had a deep pulsating pain that ran through my lower stomach, my back and down my left leg. It felt like something inside me was tearing me to shreds. I had waited too long to call an ambulance- I could hardly construct a sentence, could not stand, had vomited multiple times from the pain, and my body was shaking uncontrollably.

I was told that an ambulance was only for emergencies and that I would have to make my own way to hospital. I knew I could not walk, and I certainly could not get into a cab. So I lay crying on the hotel bathroom floor, until the pain became so bad that I passed out.

This is adenomyosis. But far more shocking than my own story, is the fact that many women are suffering in a similar way, without a diagnosis and without a full range of treatment options being offered to them.

After getting my diagnosis, I read about some of the most shocking stories that women have had to endure—some for many decades.

Adenomyosis, the 'evil cousin' of endometriosis, seems to have additional debilitating symptoms, less recognition, less understanding, and is even more likely to be a 'missed' diagnosis for many years.

Too many women have suffered from this disease for far longer than they should have, because of the difficulty of getting a diagnosis and the lack of understanding of the illness in the healthcare community.

I, like many other women, had to take my health into my own hands after suffering too many painful periods that would leave me on my office floor. It shouldn't have to be this way.

That's why this book is so desperately needed. This pocket of information will empower women with knowledge, as it contains all of the relevant research about the condition and all their treatment options. But this book is also for every healthcare professional—gynaecologists, radiologists, GPs, dieticians, nurses, and anyone specialising in women's health. This book will bridge the gap between healthcare providers and the current lack of knowledge in this space. In fact, every healthcare worker should have a copy of this book on their shelf.

This reference will give professionals the expertise and understanding to explain treatment options and give them a broader understanding of the disease and symptoms.

As a politician, I also see that our government needs to be doing more. We need greater funding for research in this space and a Medicare system that recognises and supports the investigation and treatment of female health issues.

As women, we need health professionals to take our symptoms seriously, to listen, and to help us find answers. This book will help us find those answers together.

The Hon. Emma Hurst
Member of Legislative Council, Parliament of New South Wales

Preface

I'm not a gynaecologist. I'm not a women's health GP. I am an interventional radiologist. Someone who consults and treats women with heavy and painful periods on a daily basis.

It wasn't until I started treating women's conditions like fibroids and adenomyosis, that I realised how these seemingly benign conditions could so severely affect a woman's quality of life. Their heavy menstrual bleeding and period pain could be seriously debilitating. They'd tried and failed with conservative treatments. Sadly, hysterectomy was offered as the only solution, so many women rejected this and started looking for alternatives. They wanted something less invasive and to avoid major surgery. They were career women or busy mothers, who needed a treatment with lower risks and a quicker recovery. So they searched the internet, and Google referred them to me, the medical plumber. I could block the uterine arteries, which would shrink the fibroid and kill off the adenomyosis, by using Uterine Artery Embolization (UAE). It's a simple procedure for me, but the impact on these women's lives was just phenomenal.

- "You changed my life!"
- "I have my life back!"
- "I'm ecstatic!"
- "I've got energy to go to the gym, run, and do pottery again!"

They no longer had to change pads every hour or worry about flooding and leaking. They didn't have to take time off work or avoid social and family engagements anymore. They were so grateful that UAE helped them with their menstrual issues without resorting to hysterectomy.

For over ten years, I worked side by side with Dr Bevan Brown, Obstetrician Gynaecologist. Many women came to us seeking UAE to treat their fibroids. First, we performed MRI to make sure they were suitable for UAE, and to our surprise, many had adenomyosis that had been mistaken as fibroids, while many others were found to have adenomyosis in addition to fibroids. Most women didn't know they had adenomyosis, nor had they ever heard the term before.

When we audited our early UAE experience for fibroids, we found it was also highly effective for adenomyosis. After conducting an audit on the effectiveness of UAE for adenomyosis, we found the success rate was 90%. and we published our results in the 2018 ANZJOG.

After dealing with adenomyosis for almost 15 years, I still come across women with a missed diagnosis. Many of them had been suffering from heavy painful periods for years, some had exhausted conservative treatments, while others had failed many cycles of IVF. Some had even gone through futile surgeries, only to be told that hysterectomy was the only solution.

I feel compelled to raise the awareness of adenomyosis amongst women and healthcare professionals, so as to obtain early diagnosis and appropriate treatments. More importantly, women need to know that UAE is an effective, non-surgical alternative to hysterectomy.

Most of the following chapters contain one or more women's stories to illustrate different aspects of the disease. At the end of each chapter, there's a section called "Conversations with Dr Bevan Brown" in Q&A format, where he gives pragmatic, no-nonsense, matter-of-fact answers based on his many years of clinical experience treating adenomyosis.

Many people don't really know what I do as an interventional radiologist. I often tell them I'm a medical plumber, fixing blocked and leaky pipes. How did an interventional radiologist become involved in women's menstrual issues?

Here's what happened. I was first trained as a diagnostic radiologist in the early 1990s. I enjoyed playing detective, looking at the scans and helping doctors figure out what was wrong with their patients. It was an intellectually stimulating and rewarding experience. I played a vital role in making diagnoses and helping other doctors solve their clinical puzzles.

How often does Sherlock Holmes solve a case? Hey, I was solving cases every day. I had *aha* moments all the time. What medical specialty could I possibly want to be in, other than diagnostic radiology? I was on cloud nine, enjoying the moment when you call the patient's doctor and tell them, "Hey, you know what? I've figured out what's wrong with Mrs Wong!"

After a few years working as a diagnostic radiologist, I'd stare at some of the scans and wonder if perhaps I could do something about what I was seeing and help the surgeons out, so they wouldn't have to do open surgery. Or maybe I could get to the problem area by needles and catheters, using X-rays, ultrasound or a CT scan to guide me there.

This is how I was lured into the world of interventional radiology, a subspecialty of radiology, focussing on using imaging guidance to perform minimally invasive procedures through tiny nicks in the skin under local anaesthetic. It's such a wonderful job, saving lives by blocking leaky pipes (internal haemorrhage from trauma, gastrointestinal conditions, and childbirth), and bombarding liver cancers with chemotherapy and radioactive beads.

I started doing UAE for fibroids and adenomyosis almost 15 years ago and have found the procedure highly effective, yet minimally invasive. With a high success rate of 90% and many happy patients, I naturally wanted to do more and more UAEs to help more and more women with debilitating menstrual issues.

Over the last ten years, I've subspecialised as a women's health interventional radiologist, with my main focus on UAEs, doing clinics, performing procedures, collecting data, presenting in local and international meetings, and publishing in O&G journals and GP magazines.

To date, there's still a rather appalling lack of awareness about this dreadful disease called adenomyosis, amongst not only women, but also many women's health practitioners as well. Therefore, I feel compelled to write this book for women who have just been diagnosed with adenomyosis, and for anyone who is eager to learn more about this condition.

Eisen Liang

November 2020
The Southern Highlands of New South Wales, Australia

CHAPTER 1

What is Adenomyosis, and why should we care?

Chapter 1

What is Adenomyosis, and why should we care?

This book is for you, if

- You, or someone close to you, is suffering from heavy menstrual bleeding and severe period pain.
- You have tried different medications, yet none of them worked to your satisfaction, you've developed side effects, or you hate being a slave to the pills.
- You had an ultrasound and were told there was nothing wrong with your uterus, or perhaps it was just some fibroids, yet your symptoms were so severe that you wondered if something else was going on.
- You knew about your adenomyosis for some time but failed to respond to conservative treatments and were told to have a hysterectomy, which you wanted to avoid.
- You have suffered from endometriosis and had previous laparoscopies to clear it, yet you're still suffering heavy and painful periods.
- You had an endometrial ablation, and now your period pain is worse.

- You had a series of miscarriages and tried a few cycles of IVF, and your periods are heavy and painful.
- You are interested in women's health issues, and you want to know more about adenomyosis.

What is Adenomyosis?

If you haven't heard about adenomyosis, or don't know much about it, you're not alone.

Most people know about endometriosis, which causes period pain. Adenomyosis is somewhat related to it. They're from a similar endometrial tissue that normally lines the inner cavity of the uterus. In endometriosis, the endometrial tissue has gone beyond and outside of the uterus, while in adenomyosis, the endometrial tissue has gone into the wall of the uterus itself.

Adenomyosis is the presence of endometrial tissue within the uterine muscle wall (Figure1.1). "Adeno" means gland, and "myosis" means reactive muscle changes.

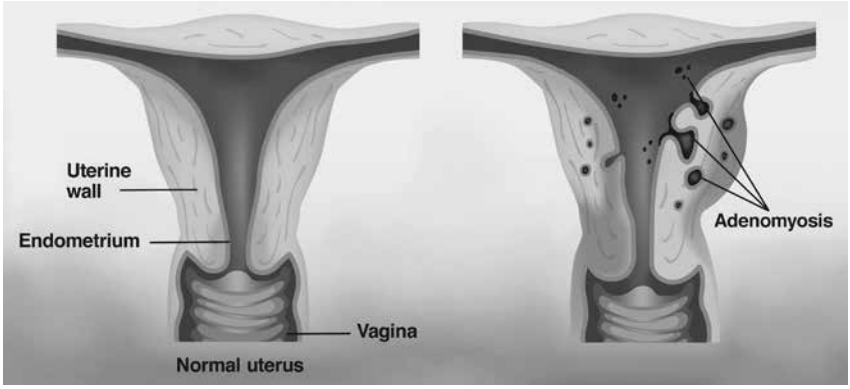

Figure 1.1 On the left is a normal uterus, with normal endometrium lining the cavity. Adenomyosis is on the right, with invagination, trapping of endometrial tissue and reactive muscle thickening.

Endometrial tissue normally lines the uterine cavity and goes through cyclical changes (Figure 1.2). At menstruation, the endometrium (inner lining of the uterus) is shed off with bleeding. Then a new layer is laid, which starts to build up and further thickens during the second half of the cycle. These changes are under the influence of sex hormones (oestrogen and progestogen). The cyclical changes also happen within the trapped endometrial tissue in adenomyosis.

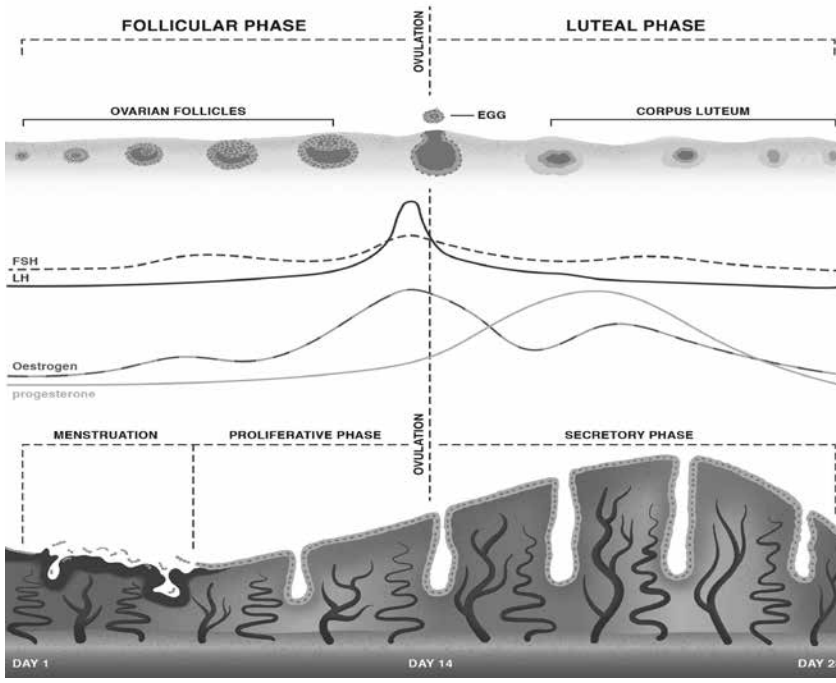

Figure 1.2 Menstrual cycle changes.

Women with endometriosis suffer from period pain; women with adenomyosis suffer from heavy menstrual bleeding in addition to period pain. It's known as the bad cousin of endometriosis.

For endometriosis, due to recent campaigns to raise awareness, more and more people are becoming aware of it. In the past, it could have taken 10 years for a woman to receive a diagnosis.

For adenomyosis, there's an even more appalling lack of awareness and understanding of the disease, not just amongst the general public or women themselves, but also women's healthcare providers, ranging from GPs to imaging specialists, and even some gynaecologists.

Adenomyosis is often hidden or becomes a case of mistaken identity, and may be the underlying concealed culprit of a woman's heavy and painful periods.

The diagnosis is often missed, and this could be due to a combination of factors. First, the symptoms of heavy menstrual bleeding (HMB) and period pain are rather common but non-specific. Also, even if an ultrasound is done, which is the first imaging test for uterine conditions, the sonographic features of adenomyosis are rather subtle and can be easily missed. An MRI is more accurate for the diagnosis but is more expensive and not as easily accessible. An MRI of the uterus isn't funded by Medicare in Australia, unless it's for staging of a confirmed cervical cancer. In addition, although adenomyosis can be found in 40%-70% of hysterectomy specimens, the disease often goes unrecognised prior to hysterectomy.

Why Should We Care about Adenomyosis?

Through our daily clinical practice at Sydney Fibroid Clinic, we've seen too many women who've been suffering from long-standing, severely heavy menstrual bleeding and terrible period pain, but didn't know that adenomyosis was the real culprit. As a result, they'd been put through futile procedures. Focal adenomyosis was mistaken for fibroids, which led to failed attempts to remove them surgically. Mild diffuse adenomyosis had been missed on ultrasound, which resulted in worsening pain after receiving endometrial ablation. Disappointed couples have come to us after being put through many cycles of IVF, frustrated they haven't worked, when an early correct diagnosis would have allowed for more appropriate treatments.

We've also encountered many women who were forced to put up with their dreadful symptoms, because they'd been told the only solution was a hysterectomy, which they wanted to avoid. Had they been told there was uterine artery embolisation (UAE) available as an effective alternative, they would have come forward for treatment much earlier,

instead of facing the hard choice of putting up with debilitating symptoms or having a hysterectomy.

This book aims to help women understand adenomyosis, find treatment options that suit them, and to get their lives back without a hysterectomy.

The following chapters will answer these questions:

- Why has it taken so long to get a diagnosis?
- How related are endometriosis and adenomyosis?
- What are the treatment options, and how do I choose the right one for me?
- How good is Mirena?
- Should I have an ablation?
- How good is UAE as an alternative to hysterectomy?
- Should I avoid a hysterectomy?
- How does adenomyosis affect my fertility?

In a Nutshell

- ♥ Adenomyosis is the invasion of endometrial tissue lining of the cavity into in the uterine muscle wall.
- ♥ Adenomyosis is the bad cousin of endometriosis, causing heavy bleeding and period pain.
- ♥ There's an appalling lack of awareness and understanding of adenomyosis, resulting in delayed or incorrect diagnoses, which leads to failed treatments and futile procedures.
- ♥ New, effective treatments as an alternative to hysterectomy are now available.

Women's Stories

May's Story

I am a 42-year-old registered nurse. For over 20 years, I'd suffered with heavy periods, bleeding so much that I would use super-sized tampons and maternity pads to avoid soiling my clothes. I would be lethargic and weak. The frequent tampon and pad changes, as well as the lethargy, made working very difficult.

In my early 20s, my gynaecologist recommended a myomectomy to surgically remove several large fibroids that had been found littering my uterus. He hoped this would reduce my blood loss, but unfortunately it did not. The surgery was invasive, and I had to take 4 weeks off work to recover.

The bleeding continued unabated, each cycle, all through my 20s and 30s. Unfortunately, none of these interventions were successful and resulted in me spending thousands of dollars on procedures, invasive surgeries, and ultrasounds.

May had been suffering for two decades, and until her recent MRI, she didn't know her underlying adenomyosis was the real culprit of her heavy periods.

Removing "bystander" fibroids was not going to resolve her symptoms. The lack of a correct diagnosis resulted in futile surgeries that were ineffective and unnecessary.

In our day-to-day practice, we've seen this time and time again.

Karen's Story

I'd been suffering from heavy periods since my early thirties. Every couple of years or so, I would have a procedure (either a hysteroscopy or a curette) to remove fibroids, but these procedures didn't ease the amount of bleeding I was experiencing each month.

Living with heavy periods over many years took its toll. I was anaemic and depleted of energy. I would drag myself to work each week, and due to exhaustion, would spend most of my weekend in bed. I was too drained to have a social life. I also suffered from anxiety and depression.

The GP suggested I stick with the Primolut, until I reached menopause. With no real solution in sight, and feeling disillusioned with my GP, I decided to try natural therapy. I went on a course of herbs, but there was no change. However, the naturopath suggested that I might have adenomyosis and explained to me what it was, because I'd never heard of it before.

My concern is the lack of awareness about this disease. Over all the years I'd been suffering, I'd sought help from several doctors and gynaecologists. Why hadn't anyone considered that I may have had adenomyosis? Why wasn't it picked up on the many ultrasounds and procedures I'd endured?

There really needs to be more awareness about the uterine artery embolization procedure, so that women aren't just told, like I was, that the only options are to have a hysterectomy or put up with it until menopause.

I really believe that there are many undiagnosed cases out there, and I feel very sorry for all women experiencing what I went through. It shouldn't have to be like that.

I would also like mention that because an MRI is vital for diagnosis, it should be covered by Medicare.

This is another example of the frustrating experience many women have. What a convoluted path to a diagnosis suggested by a naturopath! Something is wrong in the provision of women's health. The lack of awareness of adenomyosis has led to delayed diagnoses, ineffective medications, and futile procedures.

A Conversation with Dr Bevan Brown

How did you become an obstetrician and gynaecologist?

I came into women's health the long way.

I graduated with the ambition of becoming a general practitioner, so I looked at how a great GP could become engaged in the community around them and make an impact on the well-being of all its members.

During my GP training, I did a stint in women's health and paediatrics, driven by the fact that the majority of GP work involves caring for these two patient groups. Working on call every second night, on top of a standard 5-day roster (oh the luxury!), and being the first doctor on call for any woman's problem coming through accident and emergency, I realised I had found my niche. I also understood how poorly served women were by the health system. Accident and Emergency Department inboxes were the graveyards of women's problems. Even a child with a splinter in a finger would be seen before a woman with a miscarriage, pelvic pain, or anaemia from flooding periods.

How do you change this?

You do better. My career opened.

What is your area of interest?

I am a generalist obstetrician and gynaecologist. When I open the door to my consulting suite, I might see a pregnant woman, an older patient with prolapse, a young woman with an abnormal Pap smear, a young couple anxious to conceive, or a pale-faced woman with pain and anaemia. It's for this last group that this book is written.

How did you become interested in adeno?

Ten percent of the female population of reproductive age have endometriosis. It's the most common source of pelvic pain in women and a cause of great misery.

Looking at my patient group, I realised that there were a number of women who came to me with severe pelvic pain, and when they had their laparoscopy, there were no deposits of endometriosis to be seen. Their uterus often looked big and swollen, but their ultrasounds said that there were no fibroids present, and that they were normal, even though it didn't look normal through my scope.

They would describe flooding periods and passing clots, humiliating accidents at work, social isolation due to bleeding, and wardrobes dominated by black trousers. I'd heard about these women dragging themselves through life with half the amount of oxygen-carrying haemoglobin in their bloodstream that their normal sisters had. These were women in what should be their best years, such as those on the cusp of a promotion and mums with one or two young kids. They were also going through tight economic times, so they couldn't afford to have anything done about their problem.

Overwhelmingly, they were women who felt that they had no voice. Nobody would listen to them, and when they screwed up their courage to present to a doctor (often after many years), they were offered a major surgical procedure they often couldn't afford, did not have time to recover from, would scar them, and in most cases, was something they didn't want.

The uniting thread for all these women? Adenomyosis.

Why is there such a lack of awareness about adeno?

Adenomyosis is not a "sexy" disease. Nobody wants to talk about periods. Any woman who does, is seen as abnormal or weak.

During my years in training, the medical establishment, in scholarly articles, still debated whether adenomyosis existed. Now that we have MRI imaging, a diagnosis can be made more certainly and without requiring a hysterectomy.

It took generations to achieve recognition of endometriosis as a REAL problem. Adenomyosis is just as common, and arguably more debilitating. Now is the time to speak about adeno.

CHAPTER 2

How is Adenomyosis Diagnosed? Why Are We Still Missing it?

Chapter 2

How is Adenomyosis Diagnosed? Why Are We Still Missing it?

Women's Stories

KLB's Story (Pharmaceutical executive and mother of four)

For more than 15 years, I suffered with heavy periods, which caused me to have low iron that resulted in a number of other issues. I saw numerous doctors during this time, including specialists, GPs, and even homeopaths, trying to understand why my period was causing such disruption to my life. I wasn't really aware of what my "normal" was. In fact, I didn't realise I was "not normal", until I had a discussion with my friend in my late twenties.

For me, bleeding through a super tampon and super pads together, and then my clothes, was a normal period. I can recall a number of situations when I had to leave work due to excessive bleeding and had used so many sick days, because I literally felt I couldn't leave the house without severe embarrassment.

For my husband and family, they had to schedule activities around my period, I wouldn't be able to take my kids on weekend activities, due to the excessive bleeding. During my period, it was not unusual to wake three or more times a night to change my pad, and I'd purchased a waterproof mattress protector. I would get tired, grumpy, and hyper emotional.

I'd sit on a towel on the couch to try and minimize the risk of staining.

The pain was another issue, and I regularly had to take prescription painkillers to deal with it.

My menstrual issue controlled my life for such a long time, and I developed a number of strategies to try and reduce possible embarrassment at work. I'd obviously only wear dark, heavy pants and tuck my legs under me, so that if I did have a bleed-through, it was onto my own pants, not the chair, which still happened on a number of occasions.

I was prescribed mefenamic acid and tranexamic acid at different points during this journey. I tried hormonal birth control pills, including an injection that made me bleed for months on end, and an implant that I would later need removed due to the continued bleeding whilst it was in place. The oral contraceptive pills caused some other issues, such as weight gain, etc.

I saw two different specialists who both recommended a hysterectomy, despite my being under forty. I found this extremely distressing.

My regular GP was away, so I saw a different one who looked at my file and noted that I'd been taking an iron replacement for a number of years. I broke down in tears, so she did the iron test again and found it was still low. After we discussed it, she sent me for iron injections and an ultrasound. I now have staining on my buttock from the iron injection. It looks like a nasty bruise that I was told will remain for several years.

The ultrasound showed a 'fibroid', so she referred me to another specialist, but I was reluctant to go, as I didn't want to once again be told I needed a hysterectomy. I attended the joint clinic and spoke with a gynaecologist and an interventional radiologist. They listened to my story, and after looking at my ultrasound scan, said they suspected adenomyosis and suggested that I should have an MRI, which confirmed the diagnosis. Finally, someone had found the cause of my fifteen years of suffering and offered UAE as an alternative to hysterectomy.

I had the UAE, and my periods have never been so light. I had to get rid of all my maternity pads and purchase normal ones. I even stared swimming during my period.

If it took 15 years for a pharmaceutical company executive to sort out her heavy menstrual bleeding and finally reach the diagnosis of adenomyosis. Something isn't right with our medical care for women. When conservative treatments fail, many have been forced to choose between hysterectomy or putting up with debilitating symptoms.

How was adenomyosis diagnosed in the past, and why was it neglected?

In the past, when there was no means of accurate imaging to diagnose adenomyosis, it was only made after hysterectomy, when the uterus was examined by a pathologist. Up to 70% of hysterectomy specimens showed evidence of adenomyosis. However, with it being a benign, non-cancerous condition without effective specific treatments, there was no pressing necessity to make a correct preoperative diagnosis, since hysterectomy was the only solution to treat it until recently.

Without a correct diagnosis, some futile, unnecessary, and ineffective procedures might have been performed for women who were reluctant to have hysterectomy.

Over the years, we've come to realise that early diagnosis is prudent in the management of adenomyosis for women seeking symptom relief, and also for those seeking pregnancy. Effective treatments are now available. By raising awareness of this disease, and applying the correct investigation pathway, early diagnosis and effective treatment can be achieved. Hysterectomy should no longer be the only way to diagnose and treat adenomyosis in the 21st century.

Why, with modern ultrasound, are we still missing adenomyosis?

When a transvaginal ultrasound is done, much attention is paid to exclude nasty cancerous conditions in the ovaries or the cavity of the uterus. Any abnormalities of the ovaries, like ovarian cysts, are carefully documented. If there's thickening of the lining of the uterus, polyp, or

growth within the uterine cavity, it's carefully sought out. Any fibroids (benign tumours of the uterine wall) are measured and documented.

Nasty tumours of the uterine wall, called sarcomas, are extremely rare. They're usually large and might just look like any other fibroids that are commonly seen. Ultrasound is not able to tell if they're sarcomas or not. There's the tendency to think all uterine muscle wall lesions are benign and non-cancerous, and therefore there's no pressing necessity to be absolutely correct in distinguishing fibroids from focal adenomyosis, or in picking up diffuse adenomyosis in an almost normal-looking, albeit somewhat bulky, uterus.

Adenomyosis has a wide range of manifestations. It might be superficial, and therefore the signs on ultrasound can be subtle. When adenomyosis is diffuse, no "focal" abnormality is detectable. Only subtle changes in the texture and thickness of the uterine muscle wall can be seen. When the adenomyosis is focal, it's often mistaken for fibroids; and when fibroids are present, adenomyosis can be concealed.

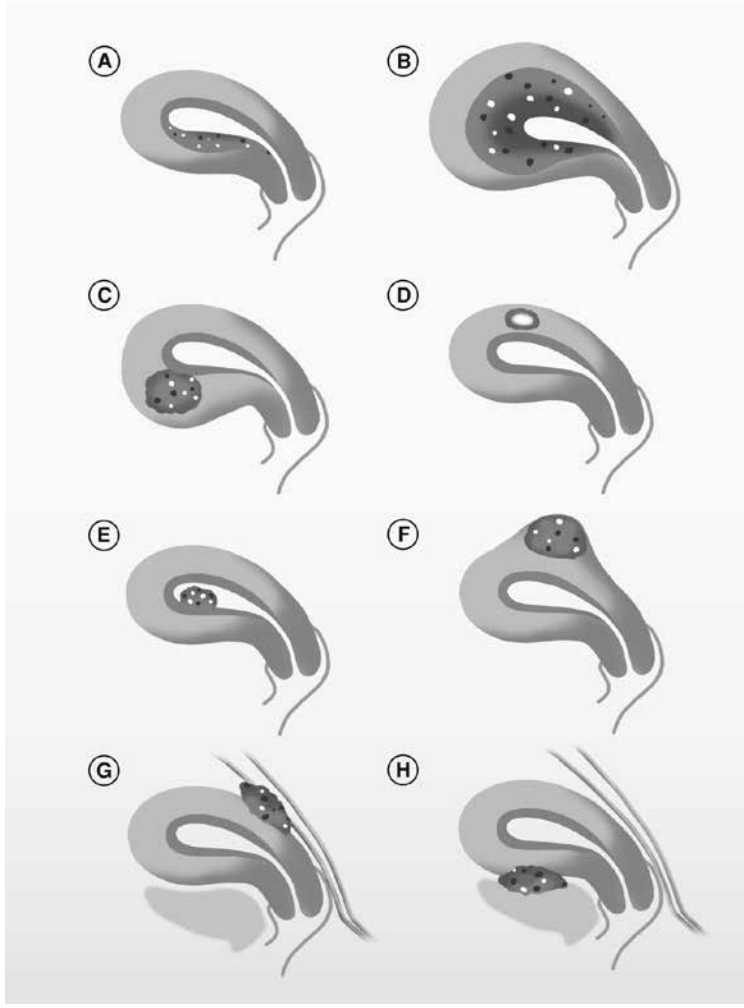

Figure 2.1: Different types of adenomyosis. A: Superficial; B: Diffuse; C: Focal Adenomyoma; D: Cystic adenomyoma; E: Focal submucosal adenomyosis; F: Focal subserosal adenomyosis; G&H: focal adenomyosis of outer myometrium merging with deep-infiltrating endometriosis

Ultrasound can be limited in its ability to correctly diagnose adenomyosis. Missing the diagnosis isn't thought to be as bad, or as significant, as missing uterine or ovarian cancer. Some might be rather apathetic, thinking that because adenomyosis isn't lethal, why make a fuss about it? However, as stated in Chapter 1, if women aren't informed of the diagnosis, they might be put through futile procedures and treatments, such as unnecessary laparoscopies, ineffective curette procedures, inappropriate endometrial ablations, or difficult/impossible surgical attempts to remove adenomyosis.

Of course, if we choose to stay with an antiquated approach, then a correct diagnosis would not be so imperative, as a hysterectomy will stop the bleeding, never mind if the woman wants it or not. Modern women deserve a nuanced approach to their menstrual issues. Making the correct diagnosis of adenomyosis allows them to choose from a range of treatment options.

In our clinical practice, we know that MRI is far more accurate in the diagnosis of adenomyosis than ultrasound. This is especially true for the superficial and diffuse type of adenomyosis, which may have subtle signs on ultrasound. We also know that MRI can easily distinguish fibroids from adenomyosis. However, MRI is more expensive and does not attract a rebate from Medicare in Australia for evaluation of non-cancerous uterine disease.

More about diagnosing adenomyosis.

To make an early diagnosis of adenomyosis, an awareness of the disease and a high degree of clinical suspicion is crucial. Although heavy

menstrual bleeding and period pain are rather common symptoms, the combination of these together should raise clinical suspicion of this underlying condition.

To make a correct imaging diagnosis, we need to know what we're looking for. (Refer to Figure 1.1 in Chapter 1). Remember that adenomyosis is due to the presence of endometrial tissue in the muscle layer of the uterus. Therefore, we look for evidence of pockets of endometrium in the lining of the uterine cavity, in the muscle layer, which is the active layer that changes throughout the menstrual cycle. The endometrial tissue is rich in cells, fluid, and protein. When this tissue is entrapped within the uterine muscle wall, it changes throughout the cycle, thickening up towards the second half of the cycle, and causes premenstrual bloating. Upon period time, haemorrhage can occur within these entrapped endometrium foci, forming small areas of micro-haemorrhages that can look like small cysts. When these cysts are microscopic, the wall simply looks "heterogeneous" on ultrasound. In other words, just not quite normal. The uterine muscle cells react to this invasion of the endometrial tissue by enlarging and thickening. As a result, the uterus can look globular and plump. The back wall can be affected more than the front wall, or vice versa. Therefore, the uterine wall enlargement may be asymmetrical, with one wall thicker than the other.

Ultrasound is best performed using a high-definition transvaginal probe to see the details of the wall of the uterus. The short wavelength, high-frequency ultrasound waves that these probes emit, returns a crisp, sharp image that an external ultrasound cannot provide. Normally, the uterus is around 60mL in volume and looks like a slender pear. With adenomyosis, the uterus is often enlarged. The wall thickening can be

asymmetrical, and the wall is often referred to as "heterogeneous", which is shorthand for, "It just doesn't look normal". There could also be so called "Venetian blind artefacts", where the microcysts interrupt transmission of the ultrasound waves and lead to characteristic radiating stripes away from the ultrasound probe, like a shadows casts when a torch is shone through a Venetian blind. Visualisation of cysts in the uterine muscle wall is highly indicative of adenomyosis but this is not a common feature.

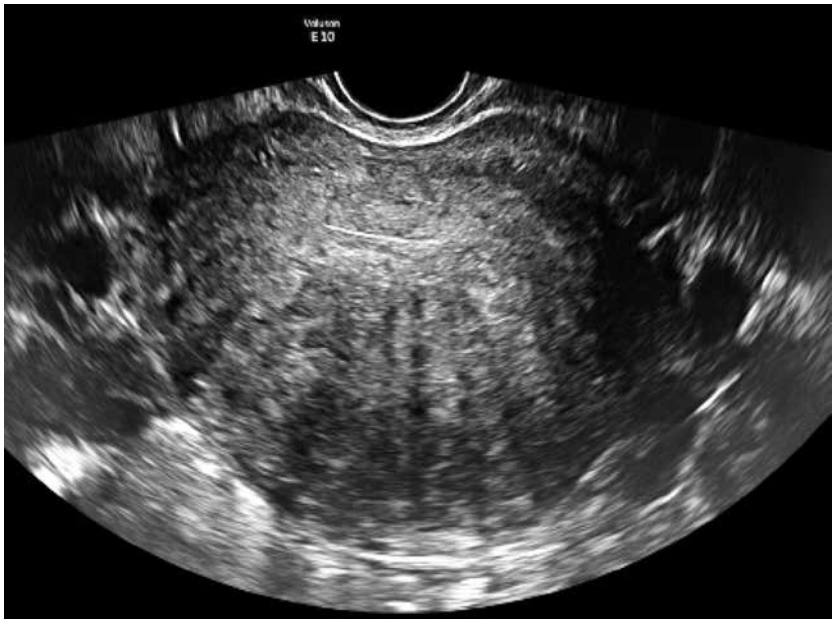

Figure 2.2: Adenomyosis is seen as asymmetrical wall thickening, Venetian blind artefacts, and subtle small myometrial cysts. (Image courtesy of Dr Linda Atkins, Ultrasound Care, Sydney Australia)

Figure 2.3: Adenomyosis is viewed as a globular-shaped uterus with a myometrial cyst (arrow).

MRI can visualise exquisite details of the uterine wall with intricate clarity and exhibits an excellent contrast between different tissue types. On MRI, endometrial tissue is bright and is normally seen lining the cavity of the uterus. Invasion of this endometrial tissue into the muscle wall can be easily spotted as "bright foci". Sometimes evidence of bleeding into these areas of entrapped endometrium within the wall of the uterus is observed.

Typically, there's also thickening of the "junctional zone", an inner layer of tightly packed uterine muscle cells. This layer is normally

dark and no more than 8 mm in thickness. When there's an invasion of endometrium into this layer, together with reactive uterine muscle cell enlargement, the junctional zone (JZ) is thickened. A JZ of 12 mm is said to be definitive for the diagnosis of adenomyosis on MRI, and many adenomyosis researchers use this criterion. For a small uterus, the absolute thickness is not meaningful, and therefore the other accepted criteria, either a JZ of more than 40% of total uterine wall thickness or a difference in thickness between the front and back wall of the uterus of more than 5mm, are used.

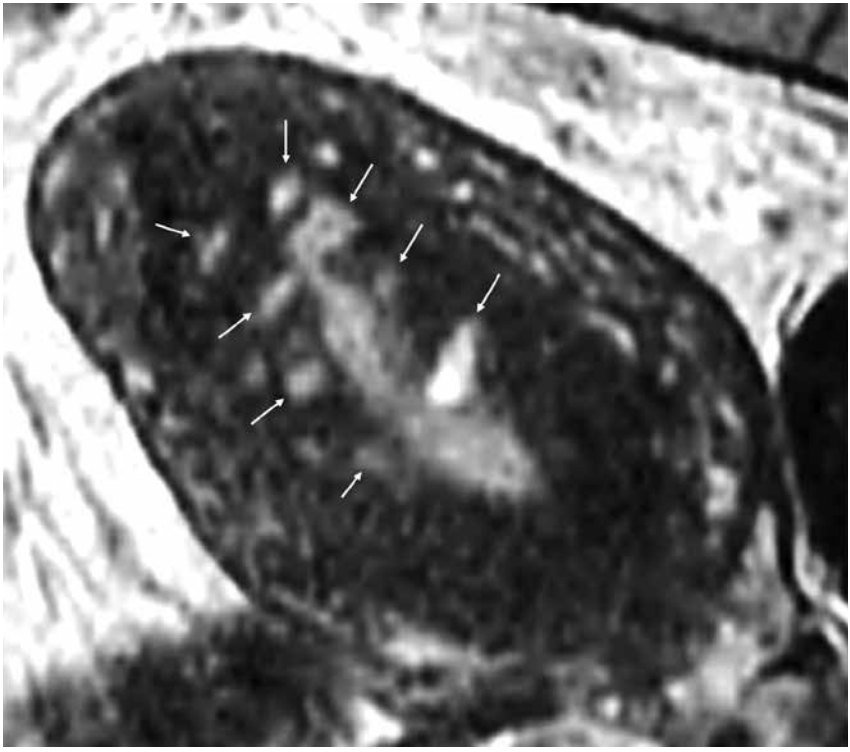

Figure 2.4 Adenomyosis with multiple bright signal foci (ectopic endometrial tissue) within the thickened junctional zone (reactive myometrial hyperplasia).

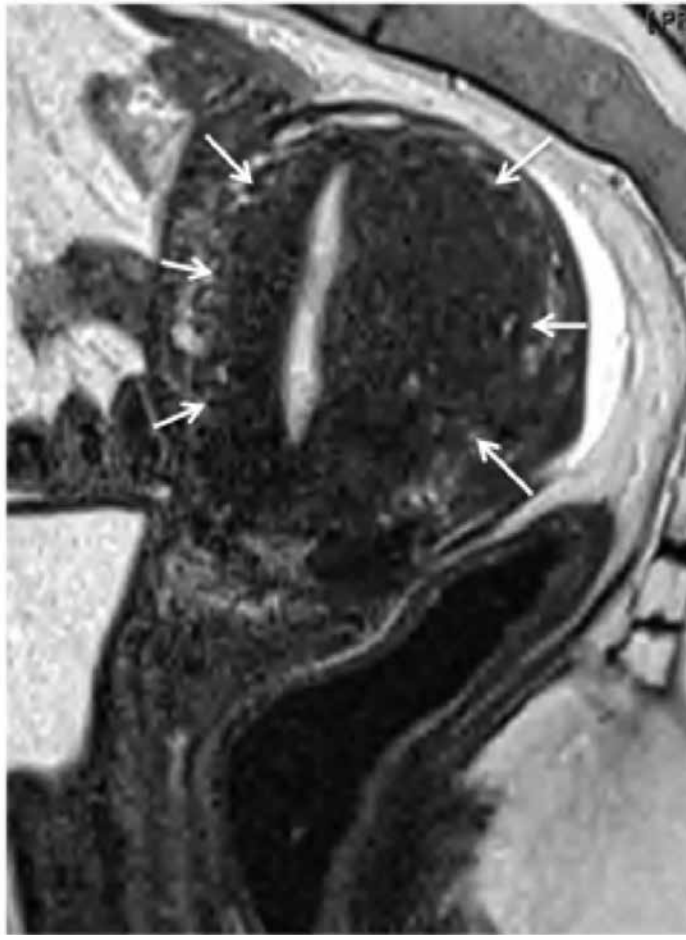

Figure 2.5 Adenomyosis with junctional zone thickening of the back wall of the uterus.

Figure 2.6 Adenomyosis is seen as irregular junctional zone thickening (short arrows) with a haemorrhagic cyst showing fluid-fluid level (long arrow). Coexisting fibroids are marked with an "F". Note that fibroids are easily distinguished from adenomyosis on MRI.

Both ultrasound and MRI have proven to be highly accurate in making the diagnosis of adenomyosis. Analysis of research studies has shown a slightly higher pick-up rate by MRI than ultrasound, and MRI is more often correct.

Ultrasound is more widely available and less expensive than MRI. However, an ultrasound image is obtained with a handheld probe and is highly dependent on the skill and experience of the sonographer taking the pictures. Studies showing a high pick-up rate and accuracy are often

from academic centres with a special interest in adenomyosis, as well as imaging centres that specialize in women's health. In real-world practice, we've seen many cases missed by ultrasound.

In our clinic, we see fibroids and adenomyosis co-exist in about 50% of cases. Uterine fibroids quite often obscure ultrasound visualisation of adenomyosis. Focal adenomyosis can often be mistaken for fibroids. Some women with severe symptoms might have adenomyosis in a small or normal-sized uterus, where ultrasound signs are subtle or absent, and therefore easily missed.

When adenomyosis is suspected in women with heavy and painful periods, this should be clearly indicated on the imaging request to alert the sonographers to look for these subtle signs.

CT scan is not useful for the diagnosis of adenomyosis. It's usually performed to look for other causes of unexplained abdominal pain.

Laparoscopy is the best diagnostic test for endometriosis, which is endometrial tissue outside of the uterus. It's an invasive surgical investigation that requires making small keyholes in the abdomen and a general anaesthesia. If adenomyosis is suspected due to heavy menstrual periods in addition to period pain, then non-invasive imaging, like ultrasound or MRI to look into the cross-section of the uterine muscle wall, is more appropriate. Laparoscopy can only visualise the surface of the uterus, but not inside the wall of the uterus where adenomyosis occurs. Endometriosis and adenomyosis often co-exist. Women with adenomyosis are likely to continue having pain following the surgical excision of endometriosis.

Hysteroscopy looks inside the cavity of the uterus by inserting a small camera through the cervix. This is required for the investigation of abnormal uterine bleeding. It's particularly important as a way to exclude

endometrial cancer as the cause of bleeding. Abnormal bleeding means bleeding when it's not expected, such as when not having a period, in-between periods, after sex, after menopause or in women at a high risk of developing endometrial cancer (cancer of the inner lining of the uterus).

Ultrasound might have shown thickening of the endometrium (the inner lining of the uterus), presence of polyps, or small fibroids in the cavity of the uterus. Biopsy of the lining and removal of polyps and fibroids can be done with the aid of this camera, which along with other instruments, are inserted through the vagina and then the cervix. The cervix needs to be dilated to allow passage of the instrument. Fluid needs to be pumped in to open up the cavity of the uterus and allow the camera to see. This procedure needs to be done under a light general anaesthetic.

However, hysteroscopy is not the right test for adenomyosis. As we've seen, many types of adenomyosis occur well within the wall of the uterus. The presence and extent of adenomyosis involvement cannot be appreciated by hysteroscopy, which only looks inside the cavity but not through the wall.

In a Nutshell

- ♥ Heavy and painful periods should raise the suspicion of adenomyosis.
- ♥ Ultrasound might miss adenomyosis, especially when fibroids are also present.
- ♥ MRI is more accurate than ultrasound in diagnosing adenomyosis but is more expensive and not covered by Medicare in Australia.
- ♥ CT scan, laparoscopy and hysteroscopy are not the right tests for adenomyosis.

A Conversation with Dr Bevan Brown

What are the possible causes of heavy menstrual bleeding?

As doctors, we use mnemonics to remember complicated lists of things. This means we make words out of the first (or other) letters of the words we want to remember. The mnemonic for heavy menstrual bleeding is PALM, COIEN. (Okay, sometimes the words are a bit forced). PALM refers to the structural causes of bleeding, and COIEN refers to the non-structural causes. The letters stand for:

P - Polyps

A – Adenomyosis

L – Leiomyoma (Fibroids)

M – Malignancy and Hyperplasia (Cancers, benign and precancerous, thickening of the uterine lining)

C – Coagulopathy (Clotting problems)

O – Ovulatory dysfunction (Hormonal)

I – Iatrogenic (An illness caused by treatment, with drugs or procedures.)

E – Endometrial (Something wrong with the lining of the uterus.)

N – Not Yet Classified (Just in case we forgot something.)

What are the bleeding patterns that might suggest a more sinister condition than just heavy periods?

There's really no way to distinguish whether the bleeding is due to cancers or from heavy periods in any woman who has not passed through menopause. After menopause, any bleeding is suspicious (although it's often not due to cancer, which needs to be excluded). What this means is that every woman who presents to her doctor with heavy menstrual bleeding will need to understand the possibility that her bleeding is due to a sinister cause that needs to be investigated to rule out as much as is possible.

How do you investigate heavy menstrual bleeding?

Any woman who presents to her doctor with heavy menstrual bleeding should expect to spend a fair bit of time talking (with her doctor listening)! We call this "history taking", and it's the most powerful tool doctors have available to investigate any problem.

The history will include questions about whether her cycle is regular, the length of time from the beginning of one period to the next, how many days she bleeds for, what her heavy days are, and how heavy her bleeding is. Any pain she's experiencing is significant in terms of its timing in her cycle, its severity, location in her body, and what makes it better or worse.

It's important to know whether she's low on iron, if she's taking extra, if she's had children and if she has plans in that area. The doctor will also want to know about a woman's general health, any medical or surgical problems, and anything that might run in her family.

Once we have a grasp of the nature of her problem, doctors will have a small range of possible diagnoses. Here's the point where the PALM, COIEN comes in.

A physical examination is conducted, which might be as simple as gently feeling a woman's abdomen, but should always include a Pap smear if one has not been taken recently, assuming that her bleeding isn't heavy on the day she's seen.

Blood tests are important, both to look for a cause, and to assess the extent of a woman's heavy bleeding.

Imaging is extremely important. As we've seen, ultrasound performed at generalist units isn't of uniform quality. Where possible, a gynaecologist should have an idea of the best ultrasound service in their local area. If you're referred to a unit by your gynaecologist, then it's a particularly good idea to go to the place they recommend.

In ultrasound, it's very much true that you get what you pay for in most cases. In my practice, I find that even expert ultrasound services can sometimes not provide enough information for the best management of a patient's problem. In this circumstance, an MRI referral is an essential part of working out what's going on.

What are the possible causes of period pain?

The causes of period pain are legion, but the most common one in a woman of reproductive age, is endometriosis. Nonetheless, any disease state or pathology that affects the abdomen can manifest as period pain.

What combination of symptoms would be suggestive of adenomyosis?

Adenomyosis can be thought of as the cousin of endometriosis, which is characterized by pain and difficulty conceiving. Endometriosis does not, however, cause heavy menstrual bleeding. Pelvic pain and heavy menstrual bleeding are more likely due to adenomyosis than anything else.

How do you confirm the diagnosis of adenomyosis?

Adenomyosis is relatively difficult to confirm in its milder forms. That's not to say the symptoms it produces are necessarily mild, but rather that the degree of pathology seen on imaging, or on a woman's uterus after hysterectomy, may not correlate well with how much pain or heavy bleeding it produces.

In general, a diagnosis can be reached through a combination of a good history and strong clues from imaging. Sometimes, empirical evidence of a good response to treatments that are relatively specific to a condition can (weakly) support a diagnosis. This can happen with adenomyosis, where a good response to a progesterone releasing IUD might support a diagnosis.

Do you think there's a lack of awareness and a delay in diagnosis of adenomyosis, and if so, how can this be changed?

I believe there is a genuine lack of awareness of adenomyosis. This is stunning for a condition found in the uteri of up to 70% of women who undergo hysterectomies. Many women presenting to my clinic in an affluent, well-educated part of Sydney, have never heard of the condition, and even if they have heard of it, they're often convinced that

the only solution for them is hysterectomy. The same is sadly often true of their doctors. This leads to delays as they put up with progressively worsening symptoms, until their periods become so unmanageable, that they're finally left with no alternative but to seek treatment.

Matters are not helped by a medical system that deals better with some problems than others. Chronic conditions, and especially women's health issues, are often overlooked or minimized. Endometriosis has only recently achieved a degree of prominence in the public eye, by dint of a coordinated and big-budget program spearheaded by charismatic doctors and public figures. Adenomyosis is, by comparison, very much the poor cousin.

Changing this situation lies firstly in education, both of the lay public, and of the primary health doctors who are the interface between them and specialists. To this end, I present you with this book!

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CHAPTER 3

Adenomyosis and Endometriosis: Are They Related?

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Adenomyosis and Endometriosis: Are They Related?

Women's Stories

Monica's Story:

Living with Endometriosis and Adenomyosis

When I was young, I experienced very bad periods and would often be in severe pain and discomfort. I dealt with this for several years before deciding to take the pill to regulate my period, but I found that it didn't agree with me. I often felt sick every two weeks, so I decided to go off it due to the side effects.

When I reached the age of 24, I had to take time off work to cope with the pain and discomfort. A specialist suggested I undertake a laparoscopy to investigate if I had endometriosis. Indeed, I had stage 2 endometriosis, and he removed all of the lesions that had been found.

At the age of 30, I started getting very heavy periods, while at the same time also trying to have children. After several failed attempts to conceive for four years, the gynaecologist said that the symptoms I had sounded like a recurrence of endometriosis and suggested another laparoscopy.

I had stage IV endometriosis. My left ovary was stuck to other organs, and I was told to take hormone tablets to regulate my period. They made me feel depressed.

At the post-op appointment, the doctor explained that I had a large fibroid the size of a golf ball situated in my uterus that had to be removed before trying to conceive. I had surgery to remove the fibroid one month later, after only just recovering from the first procedure. Then my doctor suggested I attempt having children with the natural approach for six months. When that didn't work, he recommended I try IVF. Unfortunately, after having three cycles, all of them failed. I started to experience severe period pain again, so I had my 4th surgery to remove more endometriosis.

Then I had another two cycles of IVF but still no pregnancy. After a fifth surgery to remove a cyst on my right ovary, I made the crucial decision to give up trying with IVF due to the mental angst and cost associated with the treatment.

As I approached my mid-40s, I noticed my periods become more frequent with in-between bleeding. My gynaecologist suggested a hysterectomy. I didn't want to go down this path, so I decided to live with having heavy periods and endured my pain with strong medication.

I started having accidents at work, as the bleeding was severe with large clots. My new gynaecologist sent me to have an ultrasound scan to check my uterus, and upon investigation, it was noted I had a large uterus with multiple fibroids. She said I needed to have a Mirena inserted. That's when I realised I couldn't put up with this any longer and decided to take her suggestion.

The first few days I was okay. Then I started feeling ill and ended up being up all night in excruciating pain. I was bleeding so heavily I changed my protection every ten minutes and used a whole packet of pads within one hour. I ended up at emergency at 3:30am in severe pain. Doctors checked to see if the Mirena was in place and suggested I keep it in for at least 3 months. However, I started to experience pain every day in my legs and felt bloated, so I had it removed.

I bled for several weeks, and it ended up being so heavy, I couldn't put up with the discomfort and hassle of wearing black clothes just in case I had an accident at work. I tried tablets to ease the bleeding, and they didn't work. My doctor prescribed a hormonal treatment, but I started feeling unwell and experienced a migraine.

I researched alternative treatments, and I found one called uterine artery embolization, that had been successful in treating the symptoms of fibroids. I was seriously getting desperate and didn't want a full hysterectomy. I found an interventional radiologist, and he told me to have an MRI scan, which showed I had extensive adenomyosis. He explained to me that it was the adenomyosis, not the fibroids, that were causing my issues. He suggested I have a UAE, which had a 90% success rate in treating adenomyosis.

The procedure was not uncomfortable, and it didn't take long. I stayed overnight in the hospital to recover and felt well enough to go home the following day.

Since the procedure, I no longer have any pain or heavy bleeding. I couldn't thank them enough for giving me my life back. I felt so much better within myself that I didn't have to worry when I had my period.

In total, I had more than 7 procedures to remove endometriosis, cysts, and a fibroid. Women need to be aware that there are alternative treatments, and they require guidance and awareness from the gynaecologists and GPs. UAE needs to be recognised within Australia, as it has improved my life for the better.

Lessons Learned

- ♥ Endometriosis and adenomyosis often coexist.
- ♥ Both can cause infertility: endometriosis causes tube blockages; adenomyosis causes implantation failure and miscarriage.
- ♥ When periods are not only painful but also heavy, adenomyosis should be suspected, investigated, and treated.
- ♥ Progestogen, orally or via Mirena IUD, can suppress endometriosis and adenomyosis, but unfortunately can cause side effects in some women, such as bloating and migraine.

- ♥ Both diseases are oestrogen-dependent and will progress with age until menopause. Early diagnosis and advice to consider pregnancy at a younger age is prudent.
- ♥ Fibroids are a common condition. Depending on their size and location, they may not be the actual cause of symptoms and infertility. Removing one fibroid does not stop other fibroids from growing.
- ♥ Adenomyosis is often misdiagnosed as fibroids, especially when there are other fibroids around and if adenomyosis is focal. MRI can easily distinguish fibroids from adenomyosis.
- ♥ Early diagnosis of adenomyosis as a uterine factor for infertility is prudent. Repeated futile IVF cycles could have been prevented, and the outcome would have been improved with GnRHa treatment to "recondition" the uterus.

Adenomyosis and endometriosis

Endometriosis is a disease marked by the presence of endometrial tissue (the lining of the uterine cavity consisting of glands and connective tissue) outside of the uterus. It's been found in the pelvis, around the ovaries and fallopian tubes, between the uterus and bladder, between the uterus and bowel, and frankly, anywhere else within the abdomen and pelvis.

In contrast, adenomyosis refers to a disease within the uterine muscle wall, due to the presence of similar tissue found in endometriosis. Some researchers consider these similar diseases, with adenomyosis affecting

only the uterus, and endometriosis affecting anything else outside the uterus.

Researchers from Frankfurt University in Germany investigated the relationship between endometriosis and adenomyosis. Their diagnosis was based on a laparoscopy for endometriosis (a procedure that requires general anaesthesia and several keyhole incisions in the tummy), and an MRI for adenomyosis. A strong association between the two conditions was confirmed. Adenomyosis was found in 51 out of 56 (91%) of women who had endometriosis. The reverse was also true. Endometriosis was found in 54 out of 67 (81%) of women who had adenomyosis. In other words, these two conditions very often co-exist. If you have endometriosis, there's a high chance you also have adenomyosis, and vice versa. Based on the level of awareness of adenomyosis, this information hasn't permeated the general public and medical community. Everyone seems to know what endometriosis is, but hardly anyone has heard of adenomyosis. Yet this study shows they can coexist in 80%-90% of cases.

Researchers from Aarhus University in Demark also studied the relationship between endometriosis and adenomyosis, and they found that women with stage IV endometriosis are more likely to have adenomyosis, and the adenomyosis tends to have deeper wall invasion. In other words, women with severe endometriosis are not only more likely to have adenomyosis, but probably also have a more severe type of adenomyosis.

This coexistence has important implications as to how we should manage women's heavy painful periods and infertility.

Since endometriosis is a disease outside the uterus, if a woman's predominant symptom is pain without heavy period bleeding, then perhaps this is the dominant ailment, and therefore laparoscopy, which looks at the outside of the uterus, would be appropriate for diagnosis and treatment. If the laparoscopy is negative, a repeat ultrasound looking for clues of adenomyosis, or perhaps the much more accurate MRI, should be performed.

On the other hand, adenomyosis is a disease affecting the uterus itself. If a woman is suffering from heavy bleeding in addition to pain, then it must be a uterine ailment. Instead of laparoscopy, women should be sent for non-invasive, cross-sectional imaging, such as a high-quality ultrasound or MRI, to look for adenomyosis.

Male factors aside, the main issues in female infertility are ovarian, tubal, and uterine factors. Ovarian conditions are usually age dependent. The quality of the egg that's determinant of a successful pregnancy starts to decline quickly between the ages of 35 and 40. Tubal factors are a common problem for many women. This is where IVF comes in, to bypass the blocked tube. Adenomyosis, which affects the uterus, is often neglected and ignored. (Further discussion on adenomyosis and fertility can be found in Chapter 9, regarding how adenomyosis can impact negatively on fertility and how this can be improved.)

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A Conversation with Dr Bevan Brown

How do you manage period pain in young girls, and what tests will you do?

Period pain is common in young girls. Heavy and irregular bleeding can also be a frequent issue, as the first few cycles that a young woman has are more likely to be anovulatory (not involve releasing an egg, with the hormonal changes that entails). This can go on for a few years, and then resolve.

The best response in this case would be to try some simple pain relievers. Anti-inflammatories are a good choice. Local heat (hot packs) and paracetamol can be helpful as well. If this doesn't work, or it's not subsiding, then a second look at the situation is strongly recommended. It will mean a trip to your doctor, starting with your GP. Many GPs are good at managing period pain and starting off the necessary investigations if things aren't straightforward. It may mean a trip to see a specialist doctor, such as a gynaecologist.

There are a few things you should do before seeing your doctor.

First, make a diary of when your periods are coming, how heavy your flow is, and any other symptoms, such as pain or nausea. If you're tech savvy, there are several good apps for your mobile phone that can help with this.

Next, have a look at different things that might help reduce your pain or make it worse. If you find that lots of milk or ice cream, for instance, makes your pain worse, the problem might be as simple as lactose intolerance. If you find that your pain is helped by a hot pack across your tummy or lower back, then that's also useful information. Note it down when your pain comes on and where in your body you feel it. Where does it start? Does it go anywhere? Is it there all the time? Does it come and go?

Do you have pain on opening your bowels or with a full bladder?

If you're sexually active, then do you get pain with sex? Where in your body do you feel it?

Your doctor won't mind if you have your period when you come to see them. Sometimes it helps to work out what's going on.

Most of what will happen at a doctor visit is talking questions and answers. You might be more comfortable if your mum is there, or you may prefer to have some time on your own with the doctor. It's your choice.

If you're uncomfortable with the idea, or you're not yet sexually active, you don't need to have a vaginal (pelvic) examination. It does help to work out what's happening, but the most important thing is that you feel safe and listened to.

Your doctor will probably refer you for an ultrasound, but not all ultrasounds are the same. It's better to get one done at a specialist

Women's Ultrasound unit. They're usually more experienced and gentler, and their machines are set up to scan women's pelvises. The doctors are usually gynaecologists, so they know what they're looking for better than a generalist. You will be asked if you're okay with having an internal ultrasound (vaginal probe). This really makes the scan a lot more useful, but if you're uncomfortable with the idea, then we must make do with what is acceptable for you.

Blood tests can be helpful to look at your hormone levels, to see if you're ovulating, especially if your cycle isn't regular. Checking if you have enough iron stores is also important, especially if you have heavy bleeding.

Once all of the tests come through, your doctor will want to see you again. Sometimes further tests (such as a laparoscopy) are needed. You might also decide together that you don't need one, and you can move on to treatment. The best one will always depend on what your diagnosis is.

Can you diagnose endometriosis without a laparoscopy?

There's no doubt that the gold standard for the diagnosis of endometriosis is laparoscopy, removal of endometriotic tissue, and confirmation by the lab that you have endometriosis. You can't make a definite diagnosis without one.

However, sometimes it might not be convenient to have a laparoscopy (final year examinations coming up?). It may be too expensive to come into hospital, or the waiting list might be very long. In that case, some doctors might wisely decide to try and treat your period pain as if it

were endometriosis, without a definite diagnosis. In any case, it should be made clear to you, the patient, that without a laparoscopy, you won't have a definite diagnosis of endometriosis.

If your symptoms are strongly suggestive, then a laparoscopy is advisable, because endometriosis is a progressive illness that should benefit from early recognition and treatment.

Do you recommend laparoscopy for young girls?

Laparoscopy is a surgical procedure. It involves a general anaesthetic, incisions in a woman's body, and the passage of instruments into their abdomen. Even though the incisions may be small, and the hospital stay may be short, it's a significant surgical procedure that carries risks and discomforts, so it should not be embarked upon lightly. For this reason, especially in young women, a laparoscopy is not going to be a first choice in management, unless the clinical situation leaves no other choice. In such a situation, there is no age limit.

Consider the situation of appendicitis. A surgeon would have no hesitation in performing a laparoscopic appendicectomy (removal of the appendix) if the appearance was strongly suggestive of appendicitis, regardless of the patient's age.

Because endometriosis shares symptoms with a variety of other conditions, it's reasonable to be as certain as possible that it's necessary before embarking on surgery. Some symptoms will resolve with the passage of time, so it may be worthwhile waiting for simple measures to be effective.

In the real world, delay in presentation to a doctor may take several years, so it's uncommon in my practice for a young woman to present much before the age of 16. Given that this is the age of consent for surgery in my state (NSW), it's a reasonable time to consider laparoscopy, unless symptoms are strongly suggestive and disabling.

How safe is laparoscopy? What is the recovery like afterward?

Laparoscopy is a safe surgical procedure and is one of the best-researched ways of doing surgery. Compared with operations that have been around for hundreds of years, such as removing kidney stones, it's relatively recently developed.

The risk of complications has been quoted as about 1% by RANZCOG, the accrediting body for specialist gynaecologists in Australia. About half of these are considered minor. The more serious the complication, the rarer it is. This includes things like bleeding and blood clots, infections, and damage to organs and structures near the part of the patient being operated on, such as the bladder, tube, bowel, or ovary.

Recovery after laparoscopy is considerably easier than after conventional "open" surgery. Pain in the port sites in the patient's abdomen is relatively minor, because the incisions are small, and local anaesthetic is placed before the port incision is made. The most common problem is gas pain. This feels like a stitch under the diaphragm or in the shoulder, and usually settles within 1-2 days.

Feeling weak and unwell after surgery is common, partly due to anaesthetic drugs, and partly related to the nature of the procedure the

patient might have had. Again, this usually passes quickly, within a couple of days.

If you get a fever, if bleeding seems to be getting worse, if you feel unwell, and especially if you have any bowel pain, or your gas pain is getting worse, it's a really good idea to contact your surgeon.

If endometriosis is found, how do you suppress the disease?

The gold standard for treatment of endometriosis is to excise it. It is possible to ablate (burn out) endometriotic deposits, but such an approach has a higher recurrence rate and can cause damage to the tissue the endometriosis is found in. If it's on your ovary, for example, ablation can destroy healthy eggs waiting to be ovulated, which reduces ovarian reserve. Endometriosis does come back, even after what seems to be a complete excision. At 5 years, post-operatively, the recurrence rate is around 10%, although rates as high as 67% have been recorded. To reduce this rate, several suppression strategies have been proposed.

The oral contraceptive pill, and recent variations on it that are specifically designed to prevent menstruation and inhibit the growth of endometrial cells, are commonly recommended.

A Mirena device can be helpful and cost effective.

In the short-term, drugs such as GnRHa may be used if the plan is to go on to a pregnancy (especially an IVF pregnancy) in the short term, or if disease needs to be suppressed before a major surgical procedure, to reduce the risk of complications. These drugs are not suitable for

long-term use, because of the side-effect profile and the problem of osteoporosis arising when your ovaries stop cycling.

How does endometriosis affect fertility and pregnancy?

Endometriosis has two hallmarks: pain and infertility. In general, the more severe your endometriosis, the lower your chance of successfully conceiving. Severity is measured by Stage. The most widely used staging system was developed by the American Fertility Society, to reflect how hard it might be to conceive (AFS-R). Formerly, it was thought that infertility was caused by distortion of tubes and pelvic anatomy. Now it's clear that other factors are also involved. This includes abnormal hormonal and immune factors in the abdomen and fallopian tubes, and changes in the endometrium.

Once you're pregnant, the pregnancy itself can be complicated. Scarring from endometriosis can be pulled and stretched, causing pain or bowel symptoms. Presumably because of scarring of the fallopian tubes, the risk of a pregnancy in the tube, known as an ectopic pregnancy, goes up, and the pregnancy itself can be difficult. Some studies report an increase in the incidence of abnormal bleeding, placenta praevia, and preterm birth.

Overall, though, the most likely outcome is that the pregnancy will be entirely normal. In such a situation, specialist care will produce the lowest risk of an adverse outcome.

Does endometriosis get better with age? Does pregnancy cure endometriosis?

Endometriosis is a progressive disease, albeit with exacerbations and remissions in some women. It's not seen before the onset of puberty, and it's supposed to resolve with menopause, unless a woman is taking Hormone Replacement Therapy. In practice, it may persist in terms of symptoms for some years after the cessation of menstruation.

Pregnancy was initially thought to always produce a resolution of symptoms; however, a few women experience an exacerbation of their endometriotic symptoms in pregnancy. Specifically, any scarring will come under tension and may cause pain.

How would you advise young women with endometriosis and adenomyosis regarding family planning*?*

Endometriosis and adenomyosis *both* cause problems with having a family. In general, getting pregnant and having an uneventful pregnancy with a healthy baby is *never* a guaranteed outcome, even in an otherwise healthy woman. All we can do is look to reduce the risk.

Both endometriosis and adenomyosis are progressive diseases, with adverse impacts on conception and pregnancy. As a rule, the longer you wait to conceive, the worse the disease will be, and the more difficult it will be to conceive and carry a pregnancy. Accordingly, any treatment that's considered, should be directed toward maximizing your chances. With endometriosis, excision is advised, and if pregnancy is not part of the immediate agenda, suppression of endometriosis until the time comes may be the best option.

Adenomyosis does not offer the opportunity for excision. In this situation, treatment should be aimed at rapid suppression of the disease. GnRHa are a good option here, and then getting on with having a family. However, all of the options that lead to disease suppression are contraceptive.

If their age is increasing, some women might want to contemplate IVF with embryo or egg freezing as a fertility-preserving option.

Would hysterectomy cure endometriosis?

It seems logical that if endometriosis results from backflow of menstrual blood, and implantation of endometrial cells (Sampson's Theory), then hysterectomy should prevent endometriosis from returning. Unfortunately, this is not the case. A 1995 study put the risk of recurrence of endometriosis symptoms at 10% after having hysterectomy.

The risk diminishes with removal of ovaries, suggesting that there may have been some residual disease left behind that was continuing to get hormonal support from the ovaries, but despite that, it never went away. This result has been replicated in other studies. Hysterectomy is probably best used as a last resort, and even then, may best be followed by the use of a suppressive agent.

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CHAPTER 4

How to Treat Adenomyosis with Medications?

Chapter 4

How to Treat Adenomyosis with Medications?

As discussed in Chapter 1, adenomyosis is a benign (non-cancerous) condition of the uterus, so the treatment, therefore, should be aimed at relieving symptoms. There's one view that the only cure for adenomyosis is hysterectomy, but today there are effective treatment options that will keep adenomyosis symptoms under control using simple and less invasive means.

When we talk about treatment options, we usually list them from least invasive and risky, to most effective and perhaps also most risky.

Since adenomyosis is not a cancerous condition, perhaps doing nothing is an option, but is it a good one? Probably not, especially if a woman is suffering from heavy menstrual bleeding that's preventing her from living a normal life during her period, if she's developed an iron deficiency and anaemia, and/or has acute pain that would affect her quality of life. If the anaemia is severe, the heart can be overloaded, causing rapid and irregular heartbeat, and even heart failure. Dizziness and fainting with severe anaemia can lead to accidental injuries.

Medical therapy for adenomyosis refers to medications or pills aimed at easing symptoms. These treatments, however, are not addressing the

underlying disease itself. They consist of treatments for period pain and heavy bleeding. Like all medications, there are potential short- and long-term side effects. When symptoms are severe, these medical therapies are usually used as a short-term fix while a long-term solution is being organised.

Pain-relieving medications

Non-steroidal anti-inflammatory drugs (NSAIDs) have been shown to be effective in reducing period pain. Examples include ibuprofen (Nurofen), mefenamic acid (Ponstan), naproxen (Naprogesic), and diclofenac (Voltaren). These drugs work by blocking prostaglandin production and can reduce uterine cramps. They also have a mild effect on reducing the heaviness of menstrual bleeding. However, none of these drugs have been tested specifically for effectiveness in the setting of adenomyosis.

NSAIDs are over-the-counter medications, and they're generally safe. Common side effects are stomach upset with pain, nausea, and heartburn. Some people can develop bleeding ulcers in the stomach and duodenum (the first part of the small bowel). Also, blood pressure might be raised, and asthma triggered. Serious rare side effects have been reported, including kidney failure, and even heart attacks and stroke. There's no evidence to determine which one is more effective or safer.

Menstrual-flow-reducing medication

Tranexamic acid (Cyklokapron) has been shown to be effective in reducing heavy menstrual bleeding. It works by slowing down the breakdown of clots that are formed by the body to stop bleeding. Clot

formation and breakdown is a dynamic process. Tranexamic acid shifts the balance towards thrombosis by slowing the breakdown of clots, so they last longer. It's also used in trauma, post-partum haemorrhage, and during surgery.

Side effects from this medication are rare but include nausea, diarrhoea, and visual disturbance. The major concern of tranexamic acid is the potential for deep venous thrombosis. In a case-control study using data from the British General Practice Research Database, women taking tranexamic acid had a 3-fold higher risk of developing deep vein thrombosis (DVT). Tranexamic acid should not be taken together with combined oral contraceptive pills, which by themselves increase the risk of DVT. Tranexamic acid should be avoided in women with known pre-existing conditions that make them prone to developing a thrombosis.

Menstrual cycle suppression

When external sex hormones are administered, the production of ovarian-stimulating hormones, FSH and LH from the pituitary gland at the base of the brain, is suppressed. Therefore, cyclic changes in the ovaries are also suppressed, and there are no mid-cycle oestrogen surges.

Sex hormone pills in the form of combined oestrogen and progestogen pills (so-called combined oral contraceptives pills or COCPs), or progestogen-only pills (Minipills), can be used for this purpose. Many COCPs contain a mixture of active pills with drugs in them, and a number of sugar pills that have no active drugs in them, to mark the days when a woman is expected to have a period. The active pills can be used continuously for several months. By skipping periods, a woman can avoid period-related issues. However, the withdrawal bleed could be heavy and difficult to manage. There are currently no well-conducted

trials to support this strategy for adenomyosis, and therefore it should probably not be considered as a long-term solution. As there are more than thirty COCP brands available in Australia, choosing the right one might not be an easy task, and it's best to discuss this with your GP.

Medically induced temporary menopause

We know that adenomyosis is an oestrogen-dependent condition. Hormonal manipulation to turn off oestrogen production might cause regression of adenomyosis. This can be achieved by using Gonadotropin-Releasing Hormone Agonists (GnRHa) acting act at the pituitary level. They turn off the stimulating hormone directed towards the ovary, which will then stop making sex hormones and prevent a woman from having a period. It's like a medically induced temporary menopause. These drugs can therefore shrink the adenomyotic tissue and the overall size of the uterus. GnRHa can be administered as a twice daily nasal spray or monthly depot injection.

Woman might have side effects like those experienced when going through menopause: hot flushes, mood changes, and reduced bone density. These side effects limit the duration of treatment to 3-6 months.

Once the treatment is stopped, a woman's adenomyosis might bounce back. Symptoms can recur, and the uterus may increase to pre-treatment size.

Pregnancy is possible soon after cessation of the treatment. Therefore, GnRHa can be used as a temporary solution for women who are severely symptomatic but want to conceive. GnRHa can also be used as pre-treatment with the hope to increase the success of IVF.

Should you wait for menopause?

Is telling women to wait for menopause good advice? Probably not.

Since adenomyosis is an oestrogen-dependent condition, symptoms should subside after menopause. On average, an Australian woman would expect to enter menopause at around the age of 52, so depending on how far she is from menopause, and for all the years leading up to it, adenomyosis is not going to get better by itself. In fact, symptoms can get worse the nearer she gets to menopause, as adenomyosis becomes more extensive after each month's cyclical oestrogen stimulation. Furthermore, the closer she is to menopause, a woman's cycle can become irregular and unpredictable. This can be difficult to manage for those suffering from heavy menstrual bleeding. Accidental leak-through and embarrassment are real concerns. Not knowing when her heavy flooding period is going to come is particularly stressful. At this stage, medical therapies might no longer be effective.

In the past, hysterectomy was the only solution. Nowadays, we have progesterone-releasing IUDs (Mirena and Kyleena), and UAE, which can be used alone or in conjunction with each other, especially when medical therapies are not effective or are undesirable.

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A Conversation with Dr Bevan Brown

How do you advise women regarding management of their period pain?

The first step in managing period pain is to accept that pain isn't normal. A minor degree of discomfort is common, but when it gets to the point that a woman is unable to enjoy normal activities or needs to look to pain-relieving strategies, it's a sign that something isn't right.

In that case, the second step is to determine what's causing it. Period pain can come from the uterus, the tissues around the uterus, the bowel, the bladder, and even the musculoskeletal system. Treatment isn't as simple as taking a particular pill or having a certain procedure.

Simple approaches, such as hot packs or TENS machines, will have some effect, regardless of the cause of pain in many cases. They are not panaceas. Furthermore, if the cause is progressive, for instance with endometriosis, then simply using a pain reliever is allowing a progressive condition to go unchecked, with potentially more problems in the long term.

Medications certainly have their place, but they usually work better when they're targeted to the site of the problem. For example, opioid medications slow bowel function, and so their use in bowel-related period pain is potentially unhelpful, as they may worsen bloating and gut discomfort. Furthermore, opioids are also highly addictive.

Any pain-relieving strategy will carry with it both the effects we desire, and the effects we don't (side effects). When choosing one, it's important to minimize side effects and maximize efficacy. For example,

using NSAIDs for an extended period can cause stomach ulcers, kidney problems, and easy bruising. Whatever the approach, it's a compromise deal, meaning a less-effective pain reliever will produce fewer side effects.

It's not always a bad thing to combine different ways of treating pain into a coordinated approach. For instance, take some NSAIDs and use a hot pack for the first couple of days of a painful period.

Taking strong pain relievers without a clear diagnosis is a bad idea. First, this approach will mask potentially serious problems. Second, many of the stronger ones are addictive. Third, this approach may appear cost effective at first, but over time, the expenditures mount up. It can be a case of "penny wise, pound foolish".

Accordingly, my recommendation is to use pain relievers in two ways: as a temporary measure while a diagnosis is being sorted out, and where the solution is unsatisfactory in respect to a woman's plans and ambitions. For example, a hysterectomy is unsuitable for someone who plans to have children.

What causes bloating, and what can be done about it?

Bloating around period time is a common symptom. It can be actual bloating or just the feeling of being bloated. It's quite easy to distinguish these. If your clothing is feeling tighter, then you're getting bloated. If you stay the same size, then something else is going on.

Despite how it may feel, the only abdominal organ that changes size enough to make clothing tighter in a short period of time, is the bowel.

If we exclude rare and serious cases of bowel problems, such as an obstruction, the major cause of bloating from the bowel, is slower activity, which is commonly hormonal.

Progesterone hormone levels peak in the two weeks (and particularly the last week) before a period. One of the things progesterone does is reduce uterine activity. It has the same effect on the bowel. A slower bowel leads to a back-up of bowel material. Not only does this cause bloating, but gut bacteria have more time to act on the backed-up material. They ferment complex sugars and starches into carbon dioxide, acid, and complex (and unpleasant-smelling) gases.

Sometimes judicious use of dietary fibre supplements at this time of the month can be a valuable aid in treating bloating. On occasion, the only viable solution is to use a contraceptive pill to suppress ovarian function. This will prevent a surge of progesterone pre-menstrually and can be quite helpful for bloating.

The other cause of feeling bloated is related to the sensation of bloating. This is usually related to increased blood flow or muscle activity. Adenomyosis and fibroids can both cause increased blood flow through the pelvis, and hence a sensation of bloating. An overactive bladder can make a woman feel as if she constantly has a full bladder. In both cases, the best solution lies with establishing the actual cause of the problem.

What is your view on using tranexamic acid? Is it safe?

Tranexamic acid is an amazing drug. By increasing the rate at which bleeding vessels are sealed off by a blood clot, it reduces blood loss.

It is not, however, without its problems. Any drug that increases the ability of blood to clot in the places you want it to, can also cause clotting in places you don't. The risk is difficult to measure, but a conservative estimate of a tripling of the risk of DVT in women on tranexamic acid, is reasonable.

There are a variety of other side effects that are more common, such as nausea, diarrhoea, bloating, chills, fever, headaches, alteration of colour vision, and back pain.

Overall, the drug is generally well tolerated and safe, but is not a sensible long-term strategy.

Would you use hormone pills to treat heavy menstrual bleeding? What are your preferences?

Hormone pills used in women's health boil down to two main groups: the combined oral contraceptive pills (COCPs) and the progestogen-only pills. Both can be effective in controlling heavy menstrual bleeding.

The COCP combines oestrogen and progestogen. Oestrogen causes growth of the endometrium lining the uterus. For this reason, it's paired with a progestogen, whose role is to inhibit growth of the endometrium. This works so well, that just about every COCP reduces menstrual flow. Some are so effective at thinning the lining of the uterus, that they entirely denude it. This means that the vessels that normally feed the lining, and are protected by it, are now on the surface. They bleed with the least amount of trauma, causing unpredictable bleeding. The trick is to find the right balance of effect and side effect.

On the downside, the COCP can increase the risk of deep venous thrombosis (DVT), cause problems with migraines, acne, and weight gain, and is, of course, a contraceptive. The suppression of ovarian function can go on well after a woman has stopped taking her COCP, which isn't ideal if a couple is planning to conceive.

Progestogen drugs, such as Norethisterone (Primolut-N) and Medroxyprogesterone (Provera), are commonly used to treat an acute episode of heavy menstrual bleeding. They may work quite well initially, but inevitably they will need to be stopped at some point. This results in a fall in progestogen activity in a woman's blood stream, which is the same signal her body uses to initiate a period. I often see women who've been started on these medications and either forget to take a pill or complete a course, only to find that their menstrual bleeding has come back very heavy again.

I prefer to avoid using these pills for a couple of reasons. First, where there's a choice, it makes little sense to me to treat a woman's entire body with a drug that produces a side effect, when the desired actual site is just the uterus. Second, at some point, the woman is going to have to stop the medication, which inevitably leads to a bleeding episode.

How about injectable progestogen depots, like Depo Provera or Implonon?

Progesterone depot injections are popular in New Zealand, as well as prisons and mental hospitals. The advantage is that once given, they're going to keep working until they run out, so there's no forgetting a day's medication. The disadvantage is that they cause problems with

ongoing unpredictable bleeding during the initial "bedding-in" period, which can last months and take time to wear off. Finally, they're often discontinued, because they can cause weight gain, mood change, acne, and hair growth. Also, having an injection every month isn't much fun.

Implantable progestogen rods suffer from the same weaknesses.

What advice would you give to a woman who still wants to get pregnant but is currently troubled with heavy and painful periods due to adenomyosis?

Adenomyosis and pregnancy plans are uneasy bedfellows. Adenomyosis itself works to impair fertility. This means that the problem of heavy menstrual bleeding may be one of the least difficult for a woman who wants to conceive. Taking tranexamic acid during menstruation isn't likely to get in the way of conception, as it's taken well before an egg is released. After conception, menses are stopped for the duration of a woman's pregnancy, so tranexamic acid will not be needed.

To deal with the actual adenomyotic deposits is more difficult, since all treatments are contraceptive. The trick is to use them for the shortest time necessary to suppress any disease, and then aim to conceive as quickly as possible after stopping the medication. This could mean using GnRHa for a short period of time, less than 6 months, and then trying to conceive straight away, or using a progestogen-releasing device for a short period of time until a woman wishes to conceive, and then removing it. These devices aren't designed to suppress ovarian function, so conception should follow easily after removal.

UAE is not generally recommended for women with adenomyosis who are planning to conceive.

When should a woman start to consider procedural treatments like Mirena or UAE?

Progestogen-releasing intrauterine devices such as Mirena or Kyleena (Australian Trade names) are a good compromise for the treatment of adenomyosis. They're minimally invasive but weakened by the fact that they have a lower efficacy than other more effective methods. They're generally well tolerated. Once "bedded in", the advantage they have is that they're putting progestogen exactly where it's needed with minimal spill-over into a woman's body. I feel they represent an excellent first-line treatment for women with adenomyosis. They're cheap and reversible, but the only reasons for avoiding their use would be previous problems with a similar device, significant uterine abnormality, or patient preference to avoid a foreign body in their uterus.

If a woman has completed her plans for childbearing, then UAE is an option. It may be considered where no other options have proven effective or acceptable. However, UAE for adenomyosis is not recommended for women who still desire pregnancy.

For women who want to conceive, we have data to support the use of UAE for fibroids. However, data is currently lacking to support the use of UAE for adenomyosis.

If a woman has coexistent fibroids and adenomyosis, and has no desire for childbearing, then UAE is, in my view, the best first choice available.

CHAPTER 5

How Good is Mirena for Adenomyosis?

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How Good is Mirena for Adenomyosis?

Women's Stories

KW's Story

I had Mirena inserted, thus avoiding surgery, in the hope that my period and the pain would just go away. However, the Mirena did not work for me. I bled every two weeks, and I was moody and irritable. After three months, I begged the gynaecologist to remove it, but he wouldn't. He said I needed to give it at least six months, but nothing changed in that time. I had it removed, but again my periods became heavy. I was at a work conference, and despite wearing a large overnight pad, I had a massive bleed that stained the chair I was sitting on.

NC's Story

After suffering with a disturbingly heavy, painful, and highly irregular cycle for a few years, I had the Mirena put in. That largely solved the problem for about a year and a half, before the problems returned. Following an MRI, it was discovered that I had rather severe adenomyosis of the entire uterus.

Mirena, a hormone-releasing IUD, is commonly used for heavy menstrual bleeding and period pain. A significant majority of women have a positive experience with it in terms of its effectiveness and lack of side effects. As with all medical therapies, Mirena isn't effective for everyone, and some women do develop significant side effects. In our specialist tertiary referral clinic, we tend to see women who've found that Mirena didn't help them or were trying to avoid having it.

Its failure could be simply ineffectiveness. For these women, their menstrual bleeding was still heavy and/or painful. In some, their bleeding had been so heavy, that the Mirena was expelled. For others, it might have worked for some time, but as the disease progressed, it stopped working.

One of the common issues with Mirena is that it might take 3 to 6 months to "settle in" and become effective. During that time, there could be irregular bleeding, continuous light bleeding, or spotting. Women are often encouraged to persevere for that length of time, with the expectation that it might eventually work. Many women follow this advice but then become rather fed up with having to wear a pad every day for so many months. They get frustrated and just want it out. What follows is that, unless there are other backup therapies in place, they might suffer from a severe withdrawal bleed with flooding and clotting, once their Mirena is removed.

Some women are unlikely to have a good response with Mirena. Sadly, we didn't know about this until recently. A 2016 study from Korea has shown Mirena is less effective in women with more extensive adenomyosis. They found that if a woman's uterus was larger than 150ml, Mirena was

more likely to be discontinued. And in women whose uterus was larger than 314ml in volume, the rate of discontiuation was 70%.

When the uterine cavity is distorted due to fibroids or focal adenomyosis, Mirena might not sit well, be difficult and risky to insert, and is more likely to be expelled.

Some women come to see us looking for alternatives. Others have experienced side effects like weight gain, mood swings, bloating, and abdominal pain. Many are concerned about having it inserted after reading about these side effects online or hearing about them from their friends.

Mirena insertion can be uncomfortable for women who haven't had a vaginal birth, because the cervical canal can be rather tight, so it might have to be done under sedation with local anaesthetic gel.

Mirena is also an effective contraceptive device that might be appropriate for some women, as once removed, they can try to get pregnant straight away. It's also useful in treating period pain associated with endometriosis, which often coexists with adenomyosis.

Many women might stop having a period altogether. This happens in up to 8% of women at 6 months, and 16.8% at 12 months. This is desirable for some women but might not be for others.

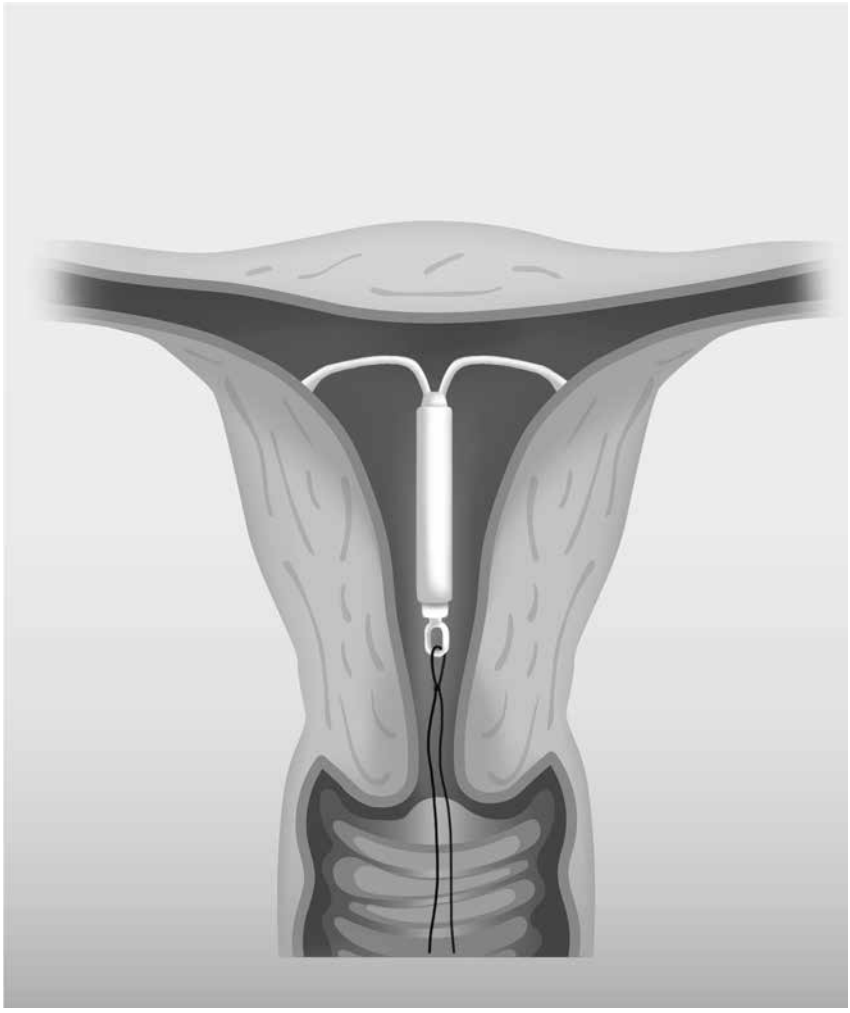

Figure 5.1: Mirena IUD

More about Mirena and adenomyosis

Mirena is an intrauterine device that slowly releases a tiny dose of progestogen over 5 years. It was initially designed as a contraceptive device, but it has been commonly used for control of heavy menstrual bleeding.

It's T-shaped, with two soft plastic flexible arms measuring 3.2 cm total width across. The tubular body, 3.2 cm in height, houses the progestogen reservoir. The device can be inserted in a doctor's office, or if insertion difficulty is expected, it can be done under ultrasound guidance with sedation.

Apart from UAE, Mirena is currently the best-evaluated and the most efficacious non-surgical treatment for adenomyosis-related heavy bleeding and period pain.

We don't completely understand how it reduces heavy menstrual bleeding, but it has been hypothesised to work in two ways. First, the slowly released progestogen causes thinning of the endometrial lining and therefore decreases the amount of menstrual flow. Second, the high local concentration of progestogen turns down the responsiveness of oestrogen receptors in the adenomyotic tissues and prevents oestrogen stimulation of the adenomyotic foci, causing them to shrink. This allows better uterine muscle contraction to help reduce menstrual blood loss.

A study from the Women's Health Teaching and Research Hospital in Turkey confirmed the effectiveness of Mirena in reducing menstrual blood flow. The study compared Mirena with abdominal hysterectomy.

It was published in 2011 in the journal *Fertility and Sterility* and showed a similar outcome in controlling heavy menstrual bleeding. This was a randomised control study, with 43 women assigned to Mirena and 43 assigned to hysterectomy. The haemoglobin level of the women in the study was measured at 6 and 12 months. Both groups showed comparable increase in haemoglobin by 20 grams/L. At 6 months, with 23.8% of women reporting having no period bleeding, while at 12 months, 51.4% reported no more period bleeding.

The side effects reported were headache (11.9%), breast tenderness (7.1%), acne (4.8%), and transient depression (2.4%). Health-related quality of life was measured and showed improvement in both groups. Mirena was superior to hysterectomy on improvement in psychological and social life. The study concluded that Mirena may be a promising alternative to hysterectomy.

A 3-year follow-up study from Beijing O&G Hospital in China, showed Mirena was also effective in reducing period pain. The study followed 94 women with adenomyosis treated with Mirena. A significant drop in menstrual pain score was noted, from 77.9 at baseline, to 16 at 12 months and 11.8 at 36 months. However, the patient satisfaction rate was only 56.3% at 12 months. The common side effects reported were prolonged light bleeding (25%) or irregular bleeding (14%). Other less-common side effects were weight gain (28.7%), ovarian cyst formation (22.3%), lower abdominal pain (12.8%), acne (6.4%), and transient depression (1.1%). These side effects might have contributed to the less-than-ideal satisfaction rate. At one year, 12% of Mirena had been expelled, and10.6% were removed due to side effects, resulting in a 22.6% discontinuation rate.

Possible Mirena Side Effects

(List from Bayer Consumer Medicine Information)

- ♥ Nervousness, depressed mood, mood swings
- ♥ Lower abdominal/pelvic pain or back pain, period pain
- ♥ Bleeding changes, including:
  - increased or decreased menstrual bleeding,
  - spotting, infrequent or light periods,
  - absence of bleeding
- ♥ Headache, migraine, nausea
- ♥ Acne, excessive hairiness
- ♥ Tender or painful breasts
- ♥ Itching, redness, and/or swelling of the vagina, vaginal discharge
- ♥ Weight gain
- ♥ Decreased libido
- ♥ Expulsion of Mirena

In a Nutshell

- ♥ Mirena is a progestogen-releasing contraceptive IUD.
- ♥ Mirena alleviates adenomyosis-related HMB and pain in a majority of women.
- ♥ Common side effects are irregular bleeding and spotting.
- ♥ Mirena might not work well for a uterus larger than 150ml.

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A Conversation with Dr Bevan Brown

Is Mirena commonly used in your clinical practice?

I LOVE Mirena. Most of my patients love it, too. In my practice, I find it effective and well-tolerated for contraception, family spacing, control of heavy bleeding, period pain, and as an important part of the options available for women needing hormone replacement therapy.

Fortunately, I'm also not blind to its weaknesses. Any health professional inserting a Mirena should be well aware of the risks associated with insertion and also the ways to manage unwanted symptoms.

For some women, Mirena is never going to be a good fit for their needs. These women need to be listened to and a better option explored. For the vast majority, though, it fits their needs well, with no issues.

Is Mirena painful to insert? How do you minimise discomfort?

Almost every woman I've spoken with has confided in me that they find any procedure involving their cervix uncomfortable to a varying degree, and Mirena is no exception.

Dealing with potential insertion discomfort begins at the initial consultation. For some women, the idea of a foreign body inside them is a deal-breaker, and they will never be comfortable with a Mirena. For the remainder, a full and reassuring explanation of the procedure can help allay concern.

At the time of insertion, a Mirena is going to be at room temperature (say 22 degrees Celsius), and the patient's body will be around 37.5 degrees Celsius. In addition, the manipulation of a woman's cervix and uterus can be a significant cause of cramping. Often, simple measures such as an anti-inflammatory tablet taken at least an hour prior to insertion can be a great help.

Coming in with a full bladder lines a woman's uterus up with her vagina and makes the insertion easier. Easy is always safer and less uncomfortable.

Sometimes simple additional measures can be a great help. Having a supportive companion or a nurse chaperone to reassure a woman, can be useful.

Local anaesthesia, in the form of an injected anaesthetic or a topical gel, is something I would always use in an office insertion.

Ultrasound-guided insertion is highly effective, well-tolerated, and safe. In this technique, local anaesthetic gel and a full bladder, combined with a skilled operator and supportive chaperone, leads to a quick and minimally uncomfortable insertion.

Inhaled anaesthetics, like "The Green Whistle", are often helpful, although I personally feel that a high degree of discomfort or anxiety is a warning sign that a woman may not be a great candidate for an office insertion, or that something isn't going right.

For a few women, general anaesthesia is the only acceptable option. This is absolutely fine, and their choice is respected.

Who is not suitable for insertion in your office?

I'm especially cautious with insertion of Mirena in my office. If a woman hasn't had a vaginal birth, I won't do it. If she has a scarred uterus from previous surgery, such as a caesarean section birth, then an office insertion carries the risk of the device passing through the scar, and I personally wouldn't do the procedure in my office for such a patient.

Other obvious considerations, such as a uterine abnormality, or the presence of a benign or malignant tumour within the uterus, would be either relative or absolute reasons not to insert in office.

What are the situations you would consider Mirena unsuitable for a woman?

First, and most importantly, if a woman doesn't want a Mirena, or is uncomfortable with either the idea of the device or the potential side effects and risks, I believe she should be heard. It will never be for her.

If there's any suggestion of a uterine cancer, no Mirena should be inserted until reasonable measures have been undertaken to exclude this risk.

Also, Mirena should never be inserted into someone who is already pregnant.

What is you experience using Mirena to treat adenomyosis?

Mirena can be effective for the treatment of adenomyosis. It's especially helpful for women who are contemplating suppression of their disease, with the aim of a future pregnancy. For younger women who often have

a smaller amount of disease tissue, a simple procedure, such as Mirena, might answer their contraceptive needs, as well as addressing their heavy and painful periods.

How would you manage women who are not satisfied with Mirena and want it removed?

If a woman wants her Mirena out, I start from the standpoint that this is a totally reasonable request, and I plan to remove it immediately. I will always ask why, and if the reason is something I can help with, such as prolonged spot bleeding, I will offer a solution for this as an alternative to removal. Mirena is not for everyone. It doesn't always work well for every patient or for every patient's disease. Acknowledging that means removal of a woman's Mirena is not a disaster. Rather, it spurs us to embark on another solution that would better meet her needs.

What is Kyleena, and who is suitable for it? What is your experience with Kyleena so far?

Kyleena is a relatively new progesterone-releasing system made available in Australia, in 2020. It releases less hormone than Mirena and has a smaller frame size. Because of this, its inserter is also a fraction thinner. Additionally, it has a slightly higher rate of irregular bleeding than Mirena. In my practice, Kyleena finds its place in younger women with smaller uteri or in women who have had discomfort from the larger-framed Mirena. It may also be useful in women who've had side effects from the higher dose of hormone in Mirena.

CHAPTER 6

Should Ablation Be Done for Adenomyosis? Can Adenomyosis Be Removed Surgically?

Chapter 6

Should Ablation Be Done for Adenomyosis? Can Adenomyosis Be Removed Surgically?

Women's Stories

Vicki's Story

For the first six months after ablation, I didn't have any bleeding. Then I started getting pain in my pelvis again around that time of the month and eventually started getting spotting and short periods again. The pain and bloating became worse, and my pelvis was tender most of the time. I had an ultrasound eighteen months after my ablation and was told that I had adenomyosis.

Kaycee's Story

After my ablation, the monthly pain became increasingly unbearable, and I sometimes felt like I wouldn't be able to move or function properly due to the pain. When I went back to see my gynaecologist, she was surprised when I said that the ablation didn't work. She suggested that I might have a thing called adenomyosis.

Joan's Story

When I was 34 years old, my periods started getting heavier, and the period pain increased. By the time I was 40, my period was becoming a real problem for me, as my bleeding was heavy every month.

My GP suggested I have an ablation and referred me to my local public hospital gynae clinic. The registrar looked over my notes and the ultrasound report, and then introduced me to the doctor who would be performing the ablation. He had a quick chat with me, and I was booked in for the procedure.

My first period after having the ablation, I did bleed less, but I still had pain for a few months. Ten months on, the pain was unbearable and lasted at least seven to ten days each month. I couldn't go to work some days.

I saw another GP in the same practice who noted one of my previous ultrasound reports had shown that 'the adenomyosis may have been the cause of the menorrhagia and dysmenorrhea'. However, on the pre-ablation ultrasound, the report read, 'no current features to suggest adenomyosis'. Same imaging centre, different diagnosis! It was the first time I'd ever heard of adenomyosis.

I was referred to the joint fibroid clinic, run by a gynaecologist and an interventional radiologist. They sent me for an MRI, which confirmed that I had adenomyosis. I was keen to avoid a hysterectomy, and they offered me uterine artery embolisation (UAE). Immediately after I had it done, my pain eased. It's now just over a year since having it, and I'm feeling well. I don't have pain when I have my period.

Lessons Learned

- ♥ When period pain is present in a woman with HMB, adenomyosis needs to be suspected.
- ♥ Missing adenomyosis can lead to inappropriately choosing endometrial ablation as treatment for HMB.
- ♥ Period pain can be worse after endometrial ablation for adenomyosis.
- ♥ Endometrial ablation should be avoided if adenomyosis is present.
- ♥ Post-ablation pain from adenomyosis can be treated with UAE.

Adenomyosis and Ablation Failure

Endometrial ablation is a procedure that uses an energy source to destroy the inner lining of the uterus, so there will no longer be menstrual bleeding. The energy might be heat (hot water, hot wires), laser, radiofrequency waves, or microwaves. Ablation can be an effective treatment in 90% of women with heavy menstrual bleeding. However, studies have shown the presence of adenomyosis predicts a poor outcome and usually results in persistent or worsening period pain.

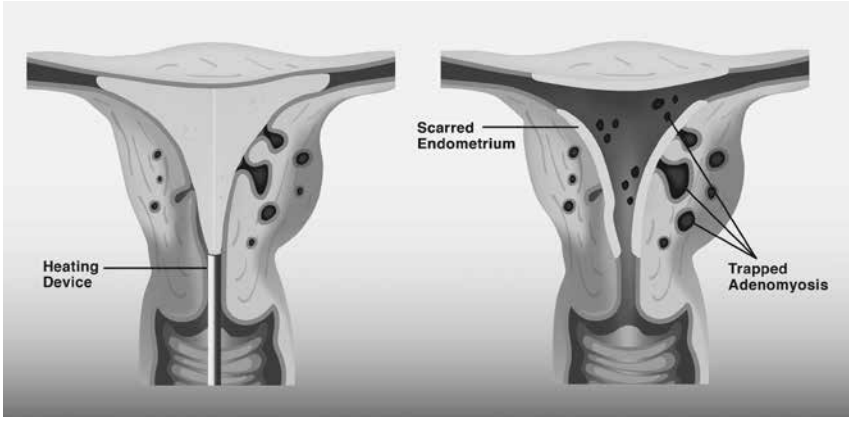

Figure 6 The effect of endometrial ablation using heat energy to destroy the inner lining of the uterus. It seals the surface layer of the cavity that becomes permanently scarred, trapping more glands inside the muscle layer. Therefore, ablation can worsen period pain and premenstrual bloating. Ablation only treats up to a 4 to 9mm thickness of the uterus, which means the deeper adenomyosis remains untreated and still viable.

This is not difficult to understand. Remember, as we discussed in Chapter 1, adenomyosis is a disease caused by migration of the endometrial gland (adeno) into the muscle layer (myosis). When energy is used to destroy the lining of the uterus, more adenomyotic tissue is trapped within the muscle layer, so therefore, worsening pain is not surprising. Premenstrual bloating, a common symptom of adenomyosis, is also likely to be worse, as more glands are now trapped.

Modern ablation uses radiofrequency energy to generate local heat to destroy the lining of the uterine cavity. The device is inserted and then expanded to be in contact with the endometrial lining. However, only up

to 4-9mm of tissue is heated and destroyed. As discussed in chapter 2, we often use a junctional zone thickness of 12mm as an MRI diagnostic criterion for adenomyosis. Therefore, all of the adenomyosis that we can confidently diagnose on MRI, would have adenomyosis involvement deeper than an ablation device can treat. In other words, if the diagnosis of adenomyosis is made on MRI criteria, ablation is likely to fail.

In a 2013 study on women who failed endometrial ablation and had subsequent hysterectomy, adenomyosis was found in 43% of cases.

In 2019, a review study published in "Obstetrics & Gynecology", a prestigious journal, has identified "period pain" as the strongest predictor of ablation failure. Period pain, in the presence of heavy menstrual bleeding, suggests underlying adenomyosis or the coexistence of endometriosis. The review stated that both conditions are difficult to recognize on an ultrasound and therefore can be easily missed. The pain associated with both of these conditions should not be treated by ablation. The presence of period pain alone is a significant factor in predicting poor patient outcome from ablation.

Can adenomyosis be removed surgically?

Generally speaking, adenomyosis is not suitable for surgical removal. As we discussed in chapter 1, it's often a diffuse, infiltrative process. Unlike fibroids, which can be easily separated from the normal uterine wall, adenomyotic tissue does not have a clear boundary with the normal myometrium (the muscle layer of the uterus).

Surgeons often find it difficult to determine where adenomyosis stops and normal myometrium starts. The removal is either incomplete, leaving behind adenomyotic tissue that can continue to grow and cause

problems, or some larger than necessary amount of normal myometrium around the adenomyosis that might have to be removed.

Surgeons might have been misled by an incorrect ultrasound diagnosis and inadvertently proceeded to surgery with the intention of removing a "fibroid". Then halfway through, they realise the "fibroid" can't be separated out from the uterus, and in fact, it's adenomyosis that they are actually dealing with, so the surgery might need to be abandoned.

Adenomyosis can be the "mistaken identity" for a difficult "fibroid" removal surgery. The distinction between focal adenomyosis (so-called adenomyoma) and fibroids can be difficult to discern on an ultrasound. Adding to the complexity is the reality that fibroids often coexist with adenomyosis, making an ultrasound distinction even more difficult (see Figures 2.5 and 2.6 in Chapter 2).

On MRI, fibroids and adenomyosis can be easily distinguished from each other. MRI is particularly useful in planning for uterine-preserving surgery to remove fibroids. It's more expensive than an ultrasound, but it can potentially prevent a surgeon from performing inappropriate surgery.

More about surgery for adenomyosis

Surgery for adenomyosis is technically challenging, and there are no standardised techniques. Several non-standard methods have been described, but none can guarantee complete removal of adenomyosis. As we stated in Chapter 1, adenomyosis is often a diffuse, infiltrative process, and therefore can't be shelled out. One method is to use heat energy to destroy the adenomyosis tissue during surgery, and the other method is to "cut it out".

Heat energy can be applied via a laparoscopic (keyhole) approach. In one study using electrocoagulation, 10 patients were treated. Seven reported symptom improvement at 12 months, and 3 required further surgery. In another study using radiofrequency energy, 15 patients with focal adenomyosis were treated and showed reduction of the pain score, but the follow up was only up to 12 months.

A few operative techniques to cut out adenomyosis have been described, but the numbers in each study group were very small, and these surgical techniques could only be described as experimental at best.

The long-term outcome of surgical excision of adenomyosis remains unknown. The literature tends to be more focused on the surgical technique, and some reported only a 3-month follow-up.

Reports regarding pregnancy following a surgical resection is scant, and case numbers are small. This perhaps reflects the reality that surgery for adenomyosis is technically quite challenging, and a good result for pregnancy is generally not expected.

A Japanese study followed 23 pregnancy outcomes in women who had surgery for adenomyosis. The number of women who'd had the surgery with the goal to conceive were not reported, and therefore we don't know how many who wanted to get pregnant were actually successful.

Nevertheless, we can look at the result of these pregnancies. Only 6 were spontaneous. Sixteen were through IVF, and one was via artificial insemination. Of these 23 pregnancies, 43% resulted in an early miscarriage, and 57% carried through to delivery. Of the miscarriage

cases, two had a uterine rupture, probably caused by the wide excision of the uterine wall. Uterine rupture is a dangerous situation that results in foetal death, and also potential maternal death. They concluded that the optimum wall thickness should be from 9 to 15mm to allow conception and prevent uterine rupture during pregnancy.

In a Nutshell

- ♥ Adenomyosis affects the wall of the uterus.
- ♥ Endometrial ablation destroys the inner lining of the uterus, sealing off glands in the muscle, potentially causing more pain.
- ♥ Adenomyosis is a diffuse, infiltrative process, and therefore not suitable for surgical removal.

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A Conversation with Dr Bevan Brown

Which patients are suitable for endometrial ablation?

Endometrial ablation can be a fantastic treatment for heavy menstrual bleeding. It's best for women without a major anatomical distortion of the uterus. In general, good candidates for an ablation have a uterus smaller than a 10-week pregnancy size.

They should not have cavity distortion, such as might be caused by large fibroids.

Adenomyosis should have been excluded as a cause for their symptoms. Cancer should have been excluded as a cause of bleeding, both from the cervix (through a cervical screening test) and the lining of the uterus (by endometrial biopsy).

The patient should have completed her plans for childbearing and have a reliable form of contraception in place prior to consideration of an ablation. It's not contraceptive, however the consequences of a pregnancy for someone who has had ablation can be dire both for the

foetus and the mother. Any active genital tract infection must be treated prior to considering a patient for the procedure.

In short, they should have a small uterus and no obvious cause for their heavy menstrual bleeding.

What tests help you to select a good candidate for endometrial ablation?

In general, the workup for a patient thinking about an ablation is much the same as for anyone with heavy menstrual bleeding. A recent pap smear is essential, and a current high-quality pelvic imaging is advisable. Anything less than an ultrasound performed at a subspecialist women's ultrasound unit is likely to be inadequate to exclude intrauterine pathology, including fibroids, adenomyosis, and endometrial polyps. Where there's doubt, sometimes an MRI is the only way to be sure of the absence of adenomyosis and other pathology.

As stated previously, a woman should have completed her childbearing plans, and a pregnancy test on the day of surgery is a mandatory requirement in most hospitals. An active pelvic infection should be excluded by physical examination, swabs, and blood tests.

Finally, the patient needs to be aware that ablation doesn't guarantee they won't have any more periods. The rate of amenorrhoea is about 50%, with about a 90% patient satisfaction rate.

How is an endometrial ablation done?

Endometrial ablation is done using a variety of methods. The most common one is using heat to coagulate the tissue lining a woman's uterus and to coagulate the blood in the vessels feeding the lining. Because the process is hot, it's almost always done under general anaesthetic, in the operating theatre of a hospital.

Most women can go home on the same day as the procedure, but a few need to stay overnight for pain relief. After the procedure, a woman will have a grey/yellow discharge for between 2 and 4 weeks, as the lining of her uterus heals over. She will have a fairly good idea of what to expect following the operation by the second or third period after the procedure.

What is your explanation for ablation failure in women with adenomyosis?

Adenomyosis is a disease that affects the wall of a woman's uterus to a minimal depth of around 12mm. Ablation doesn't reach this deep, which means that there will be untreated adenomyosis after almost every ablation. Just as a barbecued steak is seared to keep the juices from leaking out, so does ablation sear the uterus and seal off the pockets of endometrial tissue. This means that menstrual bleeding has nowhere to go but into a woman's uterine wall, and the whole area turns into a big bruise.

Furthermore, endometrial tissue can grow back into the uterine cavity from the corners of the uterus (the tubal openings). This means that given time, most women who've had ablations will get some bleeding

back. The big problem here is that during the healing process, the front and back wall of a woman's uterus often get stuck together. This means that a doctor can't rule out a cancer by putting a telescope into a woman's uterus and taking a sample (a curettage). The only option for these women is a hysterectomy, which is often going to show that there was nothing sinister going on to justify the hysterectomy.

What else can a woman do after a failed endometrial ablation?

An ablation can fail in one of two ways. It can be unsuccessful in achieving control of the bleeding or make symptoms, usually pain, much worse. An ablation can't be performed twice, as the cavity is healed over, and the ablation device is unable to be inserted for a second time. There's no space for a progesterone-releasing IUD. In the past, the only option left was a hysterectomy, which was precisely what the woman was trying to avoid by having the ablation in the first place. We have had some success in treating adenomyosis using UAE in women who failed ablation.

Do you believe adenomyosis can be surgically removed?

For any tissue to be surgically removed from within a patient's body, it must either have a sharply evident edge (a margin), or the surgeon must be satisfied that it's possible to remove all of the abnormal tissue without sacrificing too much normal tissue. This is a real problem when removing some brain tumours, for example.

Adenomyosis does not have a defined margin, because it infiltrates diffusely between the muscle fibres of a woman's uterus.

Worse than that, there's no way for a surgeon to establish during the procedure that they got all of the adenomyosis tissue out of a woman's uterus. This means that a wide margin would need to be taken. Given that adenomyosis is usually diffuse, meaning widely spread through most of a woman's uterus, complete excision can't be possible. If the adenomyosis is localized (sometimes called adenomyoma), it might be possible to cut it out, but there's often major bleeding and no guarantee of getting all the abnormal tissue out.

In short, successful, complete surgical removal of adenomyosis is limited to a hysterectomy, and any other approach usually ends up the same way.

CHAPTER 7

How Good is UAE as an Alternative to Hysterectomy?

Chapter 7

How Good is UAE as an Alternative to Hysterectomy?

Women's Stories

NK's Story

It's a simple procedure. From the first period after the UAE, they were regular and much shorter, two-three days, with very light flow and next to no pain at all during any stage of my cycle. I soon had the confidence that I would no longer make a mess, get caught out, or suffer with the excruciating pain of the past.

MA's Story (Registered Nurse)

Since the UAE procedure, my blood loss has reduced by 75%, which has had a huge positive effect on my life. I no longer use super tampons and maternity pads or pass large blood clots.

It was quite a painless procedure.

VB's Story (Mine Manager)

I was awake the whole time, and the doctor talked me through what he was doing. I had a small amount of pain afterward, which was managed by a PCA. Then I flew home to regional Queensland two days after the procedure. I feel amazing and have had no pain, no bloating, and no more heavy bleeding since the UAE 18 months ago! How fabulous is that? I feel really well and am so grateful to this innovative, non-invasive procedure.

DW's Story

My friend was also diagnosed with adenomyosis and had a hysterectomy. She suffered an infection from the surgery, was on bed rest for two weeks, and she couldn't drive for 6 weeks after the surgery. She still isn't feeling herself months later. Within 6 days of my UAE procedure, I was off on holiday to Singapore and never looked back.

KC's Story

I had local anaesthetic and was conscious while the doctor did his magic. I didn't feel a thing. I stayed overnight in hospital and was home by lunchtime the following day.

When I got my next period, I wondered how much pain there would be.....but there was none! For the first time in over thirty years, I was pain-free and didn't need medication.

The heaviness and number of days I was bleeding have also reduced. I was a bit sceptical initially. Oh, how wrong I was. It's been eighteen months since the UAE procedure, and it's been a miracle! Not one bit of pain. No tablets, no heat packs, no days off work, and no leaking through my clothes. And I have energy! My iron levels are at a healthy rate for the first time in years.

HS's Story

The quality of my life was pretty substandard due to the pain I was suffering during the past six years. It not only permeated my work and social life, but my overall outlook.

Thank you for giving me my life back. Diagnosing me with adenomyosis and offering me UAE as an alternative was a godsend.

My recovery took a week, and I was back at work without any complications.

I'm happy to say I'm fully functional, and I no longer have to stay home in bed for a full week taking drugs.

My overall experience and the end results have been amazing, to say the least. My quality of life has improved in terms of work productivity, health, and exercise choices. I've joined the gym, I'm hiking again, and I'm a "yes" girl on social outings. I feel great.

The debilitating pain has reduced to a faint next-to-nothing experience.

Lessons Learned

- ♥ UAE is a simple local anaesthetic procedure.
- ♥ UAE recovery is quicker than hysterectomy.
- ♥ The results of UAE can be seen soon after the procedure.
- ♥ UAE is potentially life-changing for many women.

UAE stands for Uterine Artery Embolisation and is an interventional radiology procedure. Emoblisation means blocking an artery and shutting down blood flow from inside the artery itself. It's non-surgical and non-hormonal. It's essentially the same procedure that has been used to treat uterine fibroids and post-partum haemorrhages.

UAE as a treatment for adenomyosis is highly effective and durable, but far less invasive than a hysterectomy.

Sadly, like adenomyosis itself, there is a pathetic lack of awareness of this treatment option for adenomyosis in the medical community.

Many women were told hysterectomy was the only solution to treat their adenomyosis. Some didn't want to have one and started to do their own research to find out about UAE themselves.

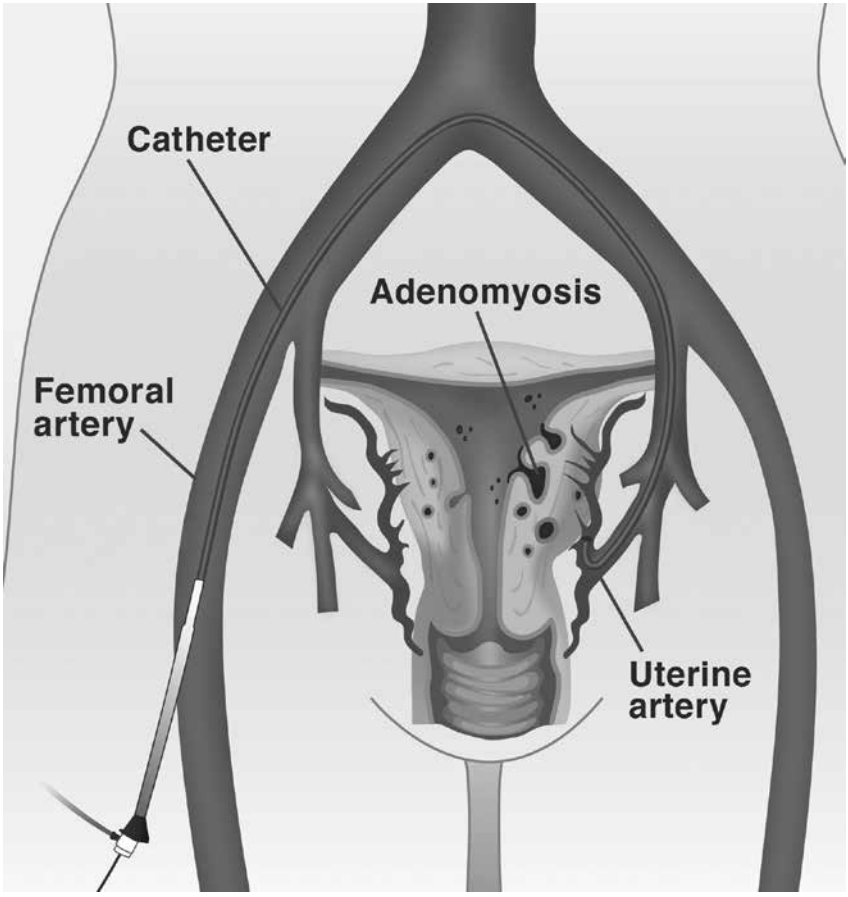


Figure 7.1: Uterine Artery Embolisation (UAE)

How does UAE work?

Body tissue can't survive without blood flow, which supplies oxygen and nutrients for metabolism. Shutting down the blood supply will cause tissue death and scarring. One example is the heart muscle. During a heart attack, blockage of a coronary artery causes tissue injury and death of muscle cells, which is followed by scarring as a healing process of the dying heart muscle cells. The affected part of the heart will then have a thinner wall due to scarring. When adenomyotic tissue is cut off from its blood supply, that tissue will die and form scar tissue, and since that tissue is no longer active, it's no longer capable of producing adenomyosis-related symptoms.

During UAE, particles are injected non-discriminably into the left and right uterine arteries. Affected areas can't be, and do not need to be, targeted for treatment. All types of adenomyosis, whether focal or diffuse, in all locations and with any extensiveness, are treated by the same technique of injecting particles into the left and right uterine arteries. The affected area will die, and the normal parts of the uterus will survive.

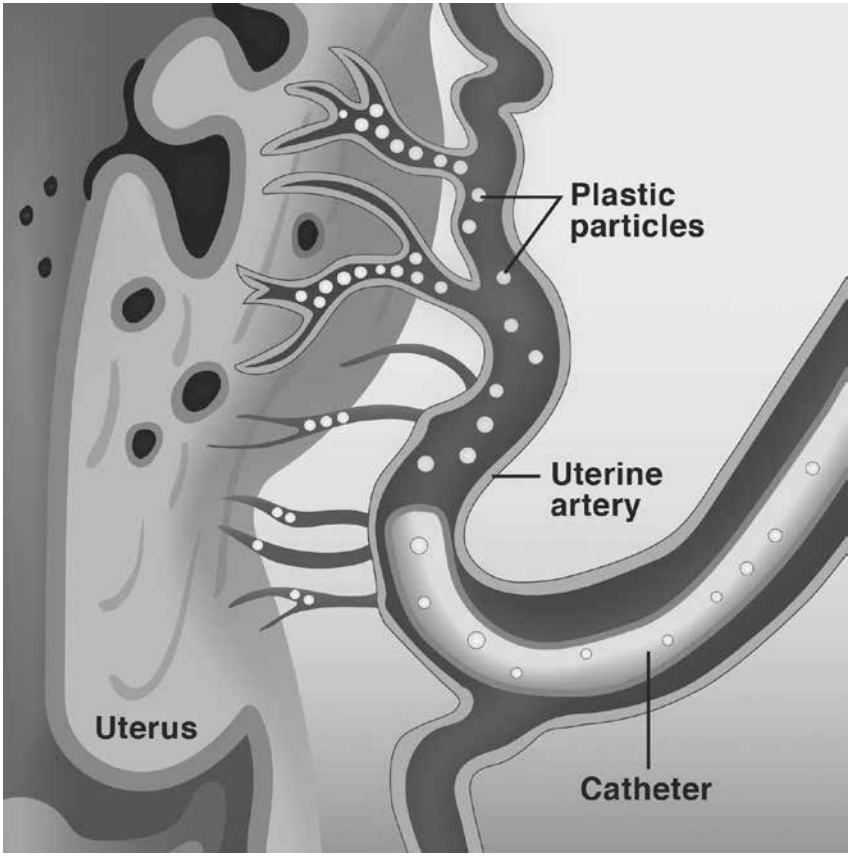


Figure 7.2: Particles injected into uterine artery.

Why is the normal uterine tissue not harmed?

Unlike tissues in other organs, within the normal uterine muscle wall, there are vast networks of dormant collateral blood vessels that can be called upon when there's an increased demand, such as during pregnancy.

Put simply, when the uterus senses the lack of oxygen, dormant vessels will open up to keep it alive.

Adenomyotic tissue, however, does not have this ability to open up new vessels and will shrink and die when there's no oxygen and nutrients. Likewise, fibroids face the same fate when embolised, but the normal parts of the uterus live on. The difference is clearly seen on an MRI with contrast injection to show blood flow. Normal tissue continues to have a healthy blood supply, yet the adenomyosis tissue or fibroids are no longer showing blood supply or viability (see Case Study 4 below).

How can we explain this observation? Well, the uterus is rather a unique organ in the human body. It's only 60 to 80mL when a woman isn't pregnant, but it can enlarge enormously during pregnancy and increase its blood flow up to 40-fold. An artery in the uterus may need to increase in length by more than ten times to reach the top of the uterus that has expanded from deep within a woman's pelvis to almost the level of her chest. Not only must arteries increase in length and girth, but new networks and branches of arteries need to form to meet the demand of the growing foetus and the enlarging uterus. Once the baby is born, the uterus contracts and shrinks back down to its normal size. Inside the uterine muscle wall, the blood vessels will also contract and shrink. Some might even become dormant with minimal flow.

These dormant vessels are so small, that the particles used for UAE will bypass them and not be able to enter. During UAE, particles are injected and lodged in all the vessels feeding adenomyotic tissue, and in some of the uterine vessels that are open in the normal parts of the uterine wall. The particles shut down the flow in these vessels. Soon afterwards, the

dormant vessels within the normal parts of the uterus are then stimulated by the lack of oxygen and start to open up. In other words, normal parts of the uterine muscle wall have spare vessels to call upon when there's demand, that are able to protect themselves from being harmed.

The transient pain after a UAE is partly due to lack of oxygen in the normal tissue of the uterus, which is then stimulated to open up its collateral vessels in the hours following the procedure.

How is UAE done?

UAE is an angiographic procedure performed under light sedation by an interventional radiologist in an angiographic suite, which is a medical procedure room fitted with a modern high-tech X-ray machine that's designed to see and track blood vessels.

A guidewire is inserted into the artery through a skinny needle in the groin, followed by a catheter (a small tube). The guidewire and the catheter are then navigated under X-ray to find the uterine arteries, one on the left and one on the right. Upon reaching the uterine artery, the radiologist rechecks the tip position of the catheter to make sure it has reached the target position. The particles are suspended in X-ray dye and slowly injected into the uterine artery. The injection is monitored under X-ray and will stop when the flow is diminished. At the end of the procedure, the catheter is removed, and a special closure device is used to seal the small puncture in the femoral artery at the groin. The patient then needs to lie in bed for a couple of hours to avoid bruising in the groin, but other than that, the procedure is complete!

For eBook readers, follow this link to watch the short video showing how UAE is done:
https://www.sydneyfibroidclinic.com.au/adenomyosis/adenomyosis-faqs/

Book readers can visit: www.sydneyfibroidclinic.com.au, click Adenomyosis, and choose UAE FAQ to watch the video.

How effective is UAE for adenomyosis?

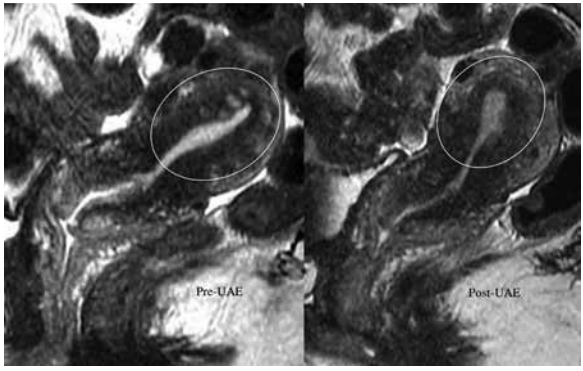
About 90% of women will have a successful outcome after UAE. We've followed 117 women with adenomyosis treated by UAE. At an average 22-month follow-up, 90% of women were successfully treated with UAE, meaning they were happy, or very happy, with the outcome. To be counted as a successful case, the woman's period needed to be back to normal or lighter than normal, and her period pain needed to be significantly improved as well. The average pain score in this group dropped from 7.5 to 1.3.

In this group, all women had severe symptoms that would have been treated with a hysterectomy in the past. Following UAE, only 5% of women ended up needing a hysterectomy. In other words, we were able to save 95 out of 100 women who otherwise would have gone through hysterectomies. UAE enables most women suffering from adenomyosis to avoid a hysterectomy that they didn't want (or need!). The results of UAE for adenomyosis have been so impressive, that researchers in the Netherlands have started a randomised control trial comparing UAE with hysterectomy. The result of this comparative trial is yet to be published but is expected in 1-2 years.

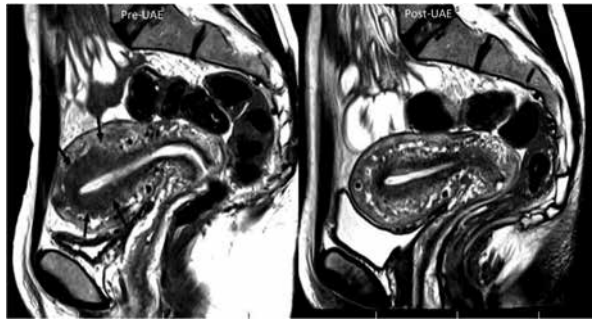
For eBook readers, follow this link to see the abstract of our paper and watch the video summary at the end:
https://obgyn.onlinelibrary.wiley.com/doi/abs/10.1111/ajo.12767

For book readers, you can visit: www.sydneyfibroidclinic.com.au and click Doctor's Resources. You'll find the link to the abstract and video, under UAE for Adenomyosis ANZJOG 2018

UAE for Adenomyosis Case Studies:

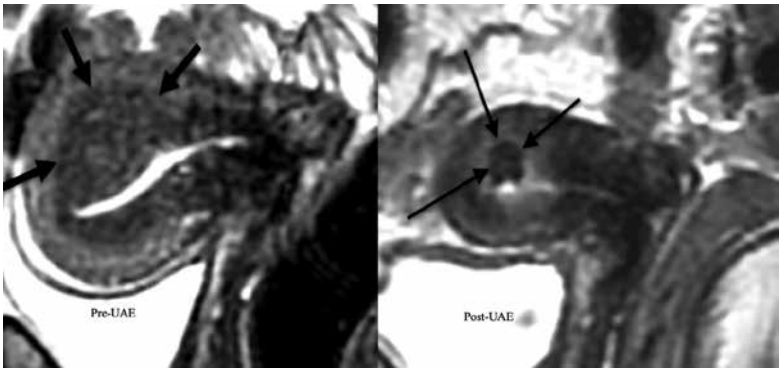


Case Study 1: A 45-year-old optometrist suffered from heavy menstrual bleeding and period pain. Her pre-UAE MRI confirmed adenomyosis, showing multiple bright foci in the wall of the uterus, signifying migration of endometrial tissue from the lining of the cavity. Her post-UAE MRI showed the disappearance of the bright foci. Her periods are now much lighter, and her pain has markedly reduced.



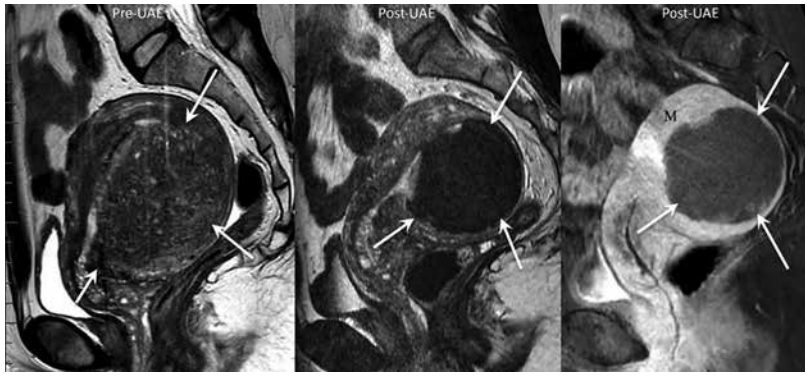
Case Study 2. A 28-year-old mother of three young children suffered severe menstrual bleeding, tiredness, exhaustion, and incapacitating pain for a few days each month. She had tried NSAIDs, but they didn't work, and she was changing super-absorbent pads every two hours while on tranexamic acid. A Mirena IUD was not tolerated, due to acne and continuous spotting. Throughout this ordeal, her uterus was reported as normal on an ultrasound.

Because of her severe symptoms, an MRI was eventually performed. It showed thickening of the junctional zone, confirming adenomyosis, and she was treated with UAE. An MRI six months post-UAE showed normalisation of the junctional zone. She now has very light, regular periods, and her pain is almost completely gone. She is energetic and able to bike ride with her children. She's pleased with the significant improvement of her quality of life.



Case Study 3. A 52-year-old horse breeder with three adult children suffered heavy menstrual bleeding, requiring tampon and pad changes every 30 to 60 minutes. Bleeding occurred for as long as three weeks each month. Her cramping period pain left her house-bound and unable to work. Her ultrasound reported "a small fibroid" in her uterine wall, though it was not enough to explain the severe symptoms.

An MRI discovered an area of adenomyosis as the real culprit, and she underwent UAE. Her post-embolisation MRI at six months showed a dark area of scar tissue. All of her menstrual symptoms resolved. As an active woman, she did not want to have a hysterectomy, and she was glad to have chosen UAE as the less-invasive option.



Case Study 4. A 45-year-old insurance broker suffered from severe heavy menstrual bleeding and period pain for many years. Tranexamic acid and progestogen were no longer ineffective for her symptoms. She expelled two Mirena IUDs and failed endometrial ablation. Her MRI showed a large area of adenomyosis in the back wall of her uterus, and she decided to undergo UAE.

Six months post-UAE, her MRI showed scarring of focal adenomyosis and shrinkage from 272ml to 115ml. The normal part of the uterine wall remains normal and viable. Her periods are light and no longer painful.

What are the plastic particles used for UAE?

It's a concern many people have. Plastics have got a bad name due to the additives put in by the manufacturers. To solidify plastic products, they add reinforcing agents, such as bisphenol A (BPA), and plasticizers, such as phthalates, to make them soft and flexible. During the production of furniture and electronics, fire retardants are added to make them less flammable. Altogether there are many plastic additives that consumers come into contact with on a daily basis, some of which are harmful to your health and have been found in human urine and blood. For example, BPA is suspected of causing hormone disruption and is associated with metabolic and reproductive diseases, as well as cancers.

However, the PVA (Polyvinyl Alcohol) particles used for UAE are made from pure plastic, with no additives. Pure plastic is inert, meaning it doesn't interact, chemically or biochemically, with our body.

There are many commercially available blocking (embolic) agents that can be used for UAE. We have chosen PVA and have been using it to treat fibroid and adenomyosis for nearly 15 years. PVA has been used as an embolic agent since the 1970s. There have been no safety issues raised or reported regarding the use of PVA particles, and they're not biodegradable. PVA particles are lodged and trapped in the small blood vessels that they block and become part of the scar tissues that are formed following the death of adenomyotic tissue, so they will not end up elsewhere in the body.

Is UAE Painful?

The UAE procedure itself is essentially painless. There's some minor stinging in the groin area when local anaesthetic is injected, but otherwise, it's easy to tolerate. Since the injection is done under sedation, the pain is much less than what you'd expect from something like a visit to the dentist. You might feel some warmth when X-ray dye is injected. Most women don't feel the catheter being navigated within their arteries.

Since UAE will shut down the blood supply to the whole uterus until collateral networks and dormant vessels open, ischaemic pain, or pain due to lack of oxygen, is felt in the pelvis. It's often described as bad period pain or cramps. Most women have moderate discomfort, others have minimal, and for some it could be severe. It's not possible to predict, so therefore a robust pain management protocol is put in place for all patients. Background paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs, like ibuprofen) are given. Patient-controlled analgesia (PCA) is also set up and ready to go, with the patient in control of the button to administer a dose whenever she needs it, without having to find a call buzzer and wait a for a nurse to respond.

Women typically stay overnight on bedrest and for pain relief. Intravenous fluid is dripped in for hydration. A PCA drug is administered through the same IV line, which can be ceased when the pain level is less than 6/10. If a woman can eat and drink, she can then be discharged home on oral medications.

What is the recovery like?

Most women only spend one night in hospital. In the following 3 to 4 days, some might still have residual pain and nausea, while others might develop a low-grade fever and lethargy. These are the transient side effects of cutting off the blood supply to the adenomyosis tissue. Minor vaginal discharge and light bleeding might also occur due to shedding of the lining of the uterus, prior to regeneration of a new layer. By day 4 or 5, they should be well enough to drive to the local shops and to do minor housework. By the end of the week, most women can resume normal activities, including going back to work.

What are the complications and side effects of UAE?

Like any medical procedure, there are potential risks. The chance of vessel injuries and putting the particles in the wrong place are very rare, both less than 1%. If performed properly by an experienced interventional radiologist, the risks are even lower.

There are other possible complications that aren't directly related to the technique. For example, there's a 3% chance of a bladder infection from the bladder catheterisation. There's also a very small risk of drug allergies to the X-ray dye, antibiotics, and analgesic drugs that are used during the procedure and its recovery.

No major complications have been reported from UAE for adenomyosis. Some women with large areas of focal adenomyosis may shed tissue debris that comes out as brownish vaginal discharge, but as long as there's no bad odour from it to suggest infection, antibiotics are not needed.

How soon will I see the results of UAE?

Some women will notice their periods becoming lighter their first period after the UAE. By the second and third, improvement is more noticeable, and 90% reported their periods being back to normal, lighter than normal or even the lightest ever.

Similarly, period pain will lessen in the first three months. Some women noticed improvement at the time of their first period, while others noticed it more gradually over time.

What if UAE didn't work for me?

For 90% of women who had UAE for adenomyosis, they were happy, or very happy, with the outcome, and nothing else was needed for their symptoms. But for about 10%, the improvement was not sufficient.

Previously, medical therapies and Mirena might not have been effective, but following UAE, these add-on medical therapies could now be effective enough to control the residual symptoms.

If these add-on conservative measures failed, further management options might be a repeat UAE or a hysterectomy.

What should I do if UAE has worked for heavy bleeding, but there's still period pain?

If the bleeding has eased, then UAE must have worked for the underlying adenomyosis. Remember, adenomyosis and endometriosis are related. They overlap in up to 80% of patients suffering from either, so it's

possible one might also have endometriosis as the other cause of period pain.

Endometriosis lies outside of the uterus and therefore would not have been treated by UAE. Management could be a suppression strategy, such as a Mirena or continuous OCP. In some women, a laparoscopy might be needed to remove the endometriosis.

What if I also have fibroids?

Fibroids are common and can be found in over 70% of women. In fact, about 50% of our patients who had UAE also had fibroids in their uterus. Studies have shown that UAE for adenomyosis coexisting with fibroids has a higher success rate than UAE for pure adenomyosis alone.

UAE has been used to treat fibroids since 1995 and is often referred to as Uterine Fibroid Embolisation (UFE).

UAE and UFE are essentially the same procedure.

Would UAE work if I had a previous ablation?

We've seen a quite a few cases of endometrial ablation failure that were successfully treated with UAE. Most ablation failure is characterised by worsening period pain, while other women have a recurrence of heavy menstrual bleeding. Please see chapter 6 regarding why ablation should be avoided for women with adenomyosis.

Will UAE help with my premenstrual bloating?

Premenstrual bloating is a common symptom amongst women with adenomyosis. When the trapped endometrial glands start to thicken up during the second half of a woman's menstrual cycle, it gives them the sensation of premenstrual bloating and pain. Many women report easing, or complete resolution, of their premenstrual symptoms following UAE.

Should I take out my Mirena before UAE?

We suggest you keep your Mirena before a UAE. If you have it removed prior to the procedure, you might have heavy withdrawal bleeding. Mirena doesn't interfere with the UAE procedure or recovery, and it doesn't seem to cause infections. After UAE, you might want to keep your Mirena as a contraceptive device or for additional suppression of your adenomyosis.

If you didn't want to have the Mirena in the first place, due to its side effects, the best time to have it removed is 2-3 months after the procedure, when you know the UAE has worked for you. If you have continuous bleeding and spotting following UAE, then removing the Mirena might resolve the issue.

If you do develop a uterine infection (pain, smelly discharge, and fever), then the Mirena needs to be removed promptly, since it hides bacteria and makes it difficult for the antibiotic to clear the infection.

Why do I need to have an MRI before UAE?

UAE is a uterine-sparing procedure. Since we're not removing the uterus, we must have some way of checking the changes afterward. Therefore, we need a reliable baseline scan to compare with the 6-month one. The signs of adenomyosis on ultrasound are often subtle. Besides, ultrasound is an operator-dependent handheld device, and the imaging planes and settings might not be the same each time the scan is done. Therefore, ultrasound is not the best imaging for a side-by-side, before-and-after kind of comparison.

An MRI is more capable of distinguishing focal adenomyosis from fibroids and mapping out the extent of adenomyosis involvement. Imaging planes and settings are standardised between scans, and therefore MRI is the best imaging for comparison purposes.

Do I need other tests before UAE?

Your Pap smear (Cervical Screening Test) needs to be up to date and normal, and your endometrial lining must be within normal limits on an ultrasound or MRI. If bleeding has occurred in between your periods, you might need to have an endometrial biopsy taken by a gynaecologist.

What is the follow-up schedule after UAE?

After three months, there's a clinical follow-up to see what the first three periods are like after the UAE. Then there's another six-month follow-up, along with a progress MRI.

Is UAE a durable treatment for adenomyosis?

Yes. According to our long-term, 52-month audit data, about 90% of women who had a successful initial outcome remain well, without symptom recurrence, until menopause. Recurrence of symptoms was reported by 10% of women, some of whom required additional treatments. Only one additional hysterectomy was required in our cohort of 117 women. This durability paper will be published in 2021 ANZJOG.

Why is UAE not mentioned by my GPs and gynaecologists?

Like many other areas of science, medicine is advancing at such a fast pace, in so many frontiers, that it's impossible for doctors to keep abreast of all the new treatments. This is especially taxing for GPs, who need to deal with problems from head to toe, and from infant girls to the elderly. Failing conservative treatments, GPs tend to refer women with menstrual issues to a local gynaecologist who they know well. Gynaecologists will offer procedures they're familiar with and trained to do, like hysterectomies. Many gynaecologists might not be unfamiliar with UAE, and are therefore unwilling to refer on to interventional radiologists.

UAE for fibroids (also known as UFE) has been around since 1995. Although there have been many studies showing its effectiveness, UFE remains underutilised today, 25 years on. In Australia, around 30,000 hysterectomies are done each year, and the ratio of hysterectomy to UFE is still 100 to 1. Australia has one of the highest hysterectomy rates amongst OECD countries. We still do 250 hysterectomies per 100,000 women every year in Australia, compared to 20 in Demark.

UAE for adenomyosis is relatively new and less well researched compared with UAE for fibroids. Nevertheless, as far back as 2013, the National Institutes of Clinical Excellence (NICE) in the UK, studied available evidence and recommended UAE as an alternative option for patients who don't wish to have a hysterectomy and/or want to preserve their fertility.

To date, most of the GPs and gynaecologists are still unaware of UAE as a treatment option for adenomyosis. Many gynaecologists continue to be sceptical about UAE, citing lack of convincing evidence. It's not hard to see why they're unwilling to refer on to another specialist for a little-known procedure, when they themselves are so well-versed in hysterectomies. More work needs to be done to raise awareness of UAE for adenomyosis as an alternative treatment option for women facing hysterectomy.

Can I still get pregnant after UAE for adenomyosis?

A woman is highly likely to keep her uterus after UAE, and therefore pregnancy is possible. However, no one can guarantee pregnancy. It's a complex issue, and research data is currently insufficient to recommend UAE for women with a strong desire for pregnancy. It's known that pregnancy with adenomyosis may be difficult, because women who have this condition experience a higher rate of miscarriage and pre-term delivery, and a lower success rate with IVF. A uterus with adenomyosis isn't normal to start with, so it's hard to be sure if the problem with fertility and pregnancy is related to the pre-existing adenomyosis or the UAE treatment.

UAE can be used as a uterine-preserving procedure to treat symptoms of adenomyosis, but it's yet to be proven as a fertility-enhancing procedure. In other words, it's highly likely that the uterus can be conserved after UAE, but we don't know how well the uterus will carry a pregnancy. A uterus with treated adenomyosis isn't the same as one that never had it. Women who choose to have UAE to treat their adenomyosis will also have to accept the 1-3% risk of early menopause. For women who are unwilling to accept this risk, egg harvesting and embryo freezing are options that can be considered. For further discussion regarding adenomyosis issues related to fertility, pregnancy, and UAE, please refer to chapter 9.

UAE in a Nutshell

- ♥ UAE is a non-surgical procedure performed by an interventional radiologist under local anaesthesia.
- ♥ UAE works by shutting down the blood supply to the uterus and starving the adenomyosis, which will shrink and die.
- ♥ UAE is 90% successful, requiring a 1-night stay in hospital and 1 week of recovery.
- ♥ UAE is the most effective uterine-sparing alternative to hysterectomy.

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A Conversation with Dr Bevan Brown

How did you discover UAE for adenomyosis?

I'm a fortunate person. I work in the private sector, in the largest private hospital in my state. It's a non-profit institution that works to provides cost-effective care across a broad range of medical disciplines, and is keen to treat fibroids with embolisation. During my collaboration with Dr Eisen Liang in treating fibroids with UAE, we noticed that many of our patients had coexistent adenomyosis, which might have been the real cause of their symptoms and also that UAE was just as effective in treating adenomyosis as fibroid. We turned to the international literature and found this was no surprise to like-minded investigators and doctors overseas. From that point, it was inevitable that we would turn to treating adenomyosis in the absence of fibroids, as was already standard practice in overseas units.

What is your experience with UAE for your adenomyosis patients? Adenomyosis is a brute to treat. It's a debilitating condition, both from a pain and a bleeding perspective, so it's not hard to understand how a (particularly male) gynaecologist might look at a hysterectomy as a godsend for affected women. I certainly did!

Unfortunately, I found that many of my patients did not share my enthusiasm. I turned to progesterone-releasing devices like Mirena, and found that they were of some limited assistance. However, the results weren't great. Even though it had a low rate of side effects, it was still unacceptable for many of the women I was working with.

Dr Liang and I had already developed a relationship from our collaborative work on fibroids, in which we'd collected data on fibroids and adenomyosis. Progressively, it mounted up for the treatment of women with adenomyosis, which mirrored the overseas experience.

Currently, we can help 95% of women with adenomyosis without the need to go on to hysterectomy.

At present, we have a multidisciplinary approach that offers access to all proven methods of treatment for adenomyosis. As new treatments become available, we scan the literature, attend conferences, and discuss with colleagues and our patients how to best include them in our range of treatment options.

For the small percentage of women who had a suboptimal result from UAE, what would you do next?

The truth is that no treatment in medicine is 100% effective. Likewise, UAE is not 100% effective. Adding a Mirena device to UAE might raise a woman's chance of an effective treatment from 90 to 95%. Unfortunately, for 5% of women, hysterectomy might be the remaining option.

What role does UAE play if a woman still desires a future pregnancy?

For women wishing to conserve their chances of conceiving, short-term treatment with GnRHa and Mirena devices offer a way to do this without hysterectomy. However, these treatments are contraceptive and need to be stopped before a pregnancy is embarked upon. When these treatments are stopped, adenomyosis is no longer suppressed and can rebound.

The evidence doesn't yet provide a clear, encouraging recommendation for UAE in women seeking pregnancy. However, it's impossible to conceive and carry in your own body if you don't have a uterus. On that basis, and notwithstanding the risk of early menopause, sometimes UAE is the best and only option available for women desiring a future pregnancy who haven't had a good response to other treatments.

How would you help women choose between UAE and hysterectomy?

The biggest driver in my conversations with any woman about how she wishes to manage her heavy menstrual bleeding, is what she wants to do.

In every case, there's a trade-off between efficacy and the degree of invasiveness and side effects. Making the choice as to how to proceed involves a full disclosure of the nature of each option and a discussion of all relevant side-effects, risks, and costs. We consider carefully both a "Plan A" and a "Plan B" in most situations.

If I'm unable to offer an option that a patient wants, I'm more than happy to refer them on to a practitioner who can offer other alternatives. It's also my responsibility to discuss unproven and ineffective treatments and to caution my patients against adopting them.

In general, the decision as to going with UAE or a hysterectomy, if we get to that point in a management plan, is usually straightforward.

CHAPTER 8

Hysterectomy and Its Controversies

Chapter 8

Hysterectomy and Its Controversies

In this chapter, we will explore the following issues:

- Who needs a hysterectomy?
- How is a hysterectomy done?
- What are the benefits of hysterectomy over other treatment options?
- What are the perceived benefits of keeping your uterus?
- Should hysterectomy be done to prevent cancers?
- What are the risks of hysterectomy?
- What are the long-term side effects of hysterectomy?
- Is hysterectomy still the only solution for adenomyosis?

What is a Hysterectomy?

A hysterectomy is a surgical procedure to remove the uterus from a woman. It requires a general anaesthetic, 2-6 days of hospital stay, and 4-6 weeks of recovery.

It's regarded as a major surgery and therefore carries the risks of a major surgery, such as those associated with general anaesthetics, blood

transfusion, wound infection and haematoma, as well as injuries to the bowel, bladder, and ureter (the tube that connects the kidney to the bladder).

What conditions would require a hysterectomy?

If you had cancer of the uterus, you may not have any choice but to have the uterus removed. However, an overwhelming majority of hysterectomies in the developed countries, such as the USA and Australia, are performed for benign conditions such as uterine fibroids and adenomyosis. Since there are now many effective non-surgical means to treat fibroid and adenomyosis, hysterectomy for these benign conditions should be considered as a last resort, when all other less-invasive methods in treating the symptoms have failed.

What are the perceived benefits of a hysterectomy?

Hysterectomy has been regarded as the ultimate cure for adenomyosis. The uterus, that is the source of heavy menstrual bleeding, is removed, and thereby the symptom of heavy bleeding is eliminated. If the pain is from adenomyosis alone, it will be eliminated as well. Bladder and pressure symptoms will also be relieved instantly. If the cervix is removed, there will be no more Pap smears, and obviously, no further need for contraception. The risk of developing uterine cancer is also eliminated.

What are the different types of hysterectomies?

There are several types of hysterectomy, depending on the indication for having one.

- **Partial (subtotal) hysterectomy**: only the body of the uterus is removed, leaving behind the cervix. Ovaries and tubes might also be removed.
- **Total hysterectomy without oophorectomy**: the entire uterus and cervix are removed, but the ovaries are left behind, Fallopian tubes are usually removed.
- **Total hysterectomy and bilateral salpingo-oophorectomy**: the entire uterus, including the cervix and fallopian tubes, as well as both ovaries, are removed.

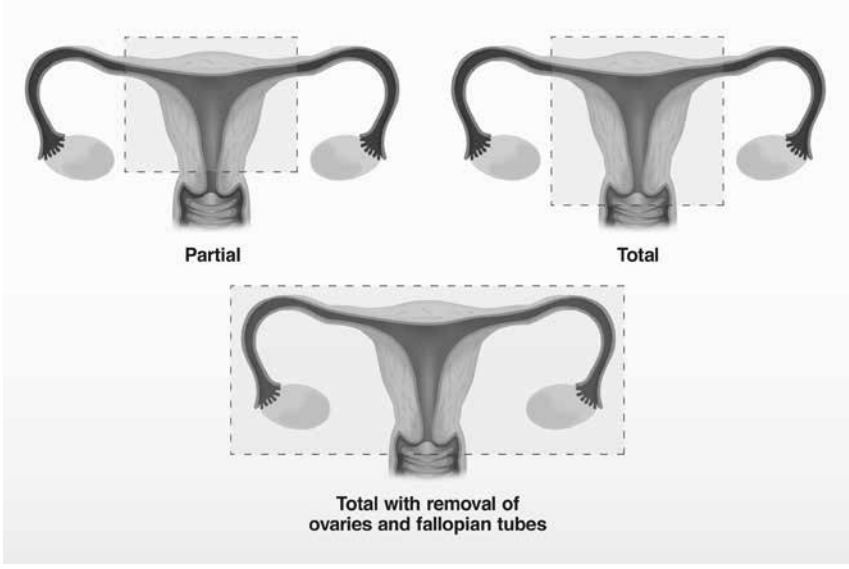

Figure 8.1 Different types of hysterectomies.

What are the different ways of removing the uterus?

There are many ways of removing the uterus, which depend on the woman's needs, the surgeon's skill, experience, and preference, and of course, the reason for the hysterectomy.

- ♥ **Abdominal hysterectomy**: performed through a 15cm incision in the lower abdomen. Also called an open hysterectomy.
- ♥ **Vaginal hysterectomy**: performed through a speculum in the vagina (the cervix will have to be removed).
- ♥ **Laparoscopic hysterectomy**: this is the so-called keyhole surgery. Through three or four small cuts in the abdomen, the surgeon inserts a camera and other surgical instruments.
- ♥ **Laparoscopically assisted vaginal hysterectomy**: combines laparoscopic technique with vaginal hysterectomy.
- ♥ **Laparoscopic or robotic single site hysterectomy:** a modified laparoscopic or robotic technique in which the surgeon performs hysterectomy through a single incision.

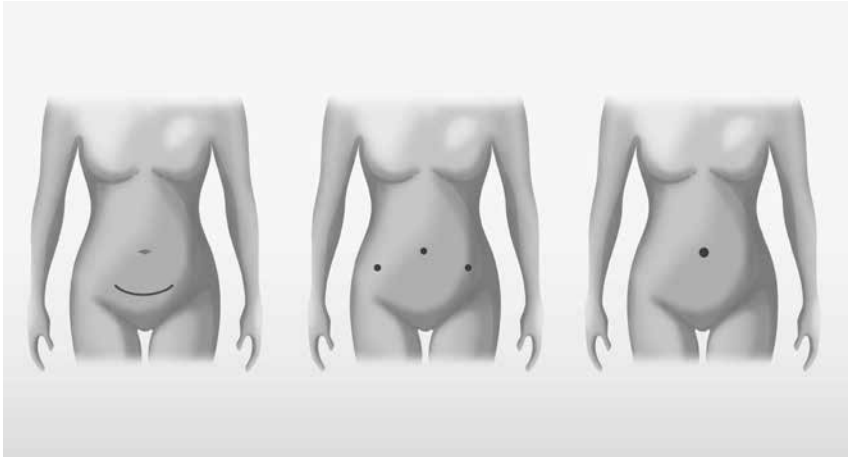

Figure 8.2: Different ways to remove the uterus: 0pen abdominal hysterectomy; laparoscopic (keyhole) hysterectomy; robotic single port hysterectomy.

Pros and cons of laparoscopic vs open hysterectomy

Laparoscopic surgery involves 3-4 very small incisions in the lower abdomen. Therefore, the recovery is quicker. However, the surgical risks are not necessarily lower. The cost is often higher, especially if robotic techniques are used. Laparoscopic surgery is technically more demanding, and there's a steeper learning curve for surgeons.

Due to limited access and visualization, it can be riskier in terms of injuries to blood vessels, bowel, bladder, and ureter. Whether laparoscopic surgery is the right choice for you depends on the reason for your hysterectomy, any other associated problems (like previous surgeries, endometriosis), your desire for a quick recovery, as well as the skill and experience of the surgeon.

Cochrane reviews on hysterectomies (As of October 2020)**:**

These are the main points regarding the review of available evidence by Cochrane:

- Vaginal hysterectomy has a quicker recovery than abdominal hysterectomy.
- Laparoscopic hysterectomy has a quicker recovery than abdominal hysterectomy, but has a greater risk damaging the bladder and ureter and also has a longer operating time.
- There is lack of evidence to suggest robotic hysterectomy is better than laparoscopic hysterectomy.
- Subtotal hysterectomy does not offer improved outcomes for sexual, urinary, or bowel function when compared with total abdominal hysterectomy.

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Should ovaries or tubes be removed at the time of hysterectomy for benign diseases?

Some would argue that removing the ovaries at the time of a hysterectomy could potentially reduce the risk of ovarian cancer and the need for future gynaecological procedures. However, premenopausal women who've had their ovaries removed also reported an increased risk of cardiovascular disease and other complications due to early menopause.

The evidence provided by observational studies does not support high numbers of prophylactic oophorectomy being done on premenopausal women without BRCA mutations. The lifetime risk of developing ovarian cancer is 1/80, while the lifetime risk of breast cancer is 1/8. If we argue that ovaries should be removed to prevent cancer, then perhaps all women should have their breasts removed to prevent breast cancers. Clearly this is not an acceptable argument for most women and their doctors.

In more recent years, it's been understood that most ovarian cancers develop due to factors involving the fallopian tubes. Therefore, the current practice is to remove only the tubes at the time of hysterectomy to prevent ovarian cancer. However, although this makes sense, there are no studies that prove this practice is an effective means of preventing ovarian cancer. Critics of this approach caution against possible injury to the blood supply of the ovaries, which shares their blood supply with the fallopian tubes. This can potentially result in early menopause, even if only the tubes are removed.

Current evidence suggests that routine removal of ovaries during hysterectomy is not generally recommended, while routine removal of the fallopian tubes should be an option that's discussed with women planning one.

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Should hysterectomy be performed to prevent uterine cancer?

The lifetime chance of developing a uterine cancer is 1/33. Over 90% of all uterine cancer is endometrial cancer (cancer of the lining of the uterus), which can be detected early. Ultrasound can demonstrate thickening of the lining and the diagnosis is made by endometrial biopsy. The symptoms are bleeding in between periods or after menopause. Risk factors are obesity, type 2 diabetes, and an increased (either longer duration or higher levels of) exposure to oestrogen.

Adenomyosis itself is a benign disease, due to the presence of endometrial tissue in the uterine muscle wall. Questions have been raised regarding whether endometrial cancer can develop within adenomyotic tissue. Studies have shown that this occurs very rarely. Only 3% of endometrial cancers develop from adenomyotic tissue, so therefore the lifetime chance of endometrial cancer developing from adenomyosis is less than 1/1,000. This means it's a very rare occurrence, and it tends to appear in postmenopausal women with a mean age of 65. On this basis, it doesn't make sense to perform hysterectomy for adenomyosis to prevent endometrial cancer.

The more problematic uterine cancers to diagnose are those arising from the uterine muscle wall, known as sarcomas, which account for less than 10% of all uterine cancers. Sarcomas are exceedingly difficult to distinguish from fibroids, which are common benign tumours of the uterine muscle wall. The lifetime risk of sarcoma is less than 1/330, and the lifetime risk of a fibroid is more than 1/2 (fibroids can be present in up to 70% of women). Sarcoma is present in only 2/1,000 hysterectomies performed for fibroids.

In other words, sarcomas are rare. Rapid growth and the large size of a uterine tumour does not predict the presence of a sarcoma, and ultrasound can't reliably diagnose a sarcoma. Advanced MRI (diffusion-weighted imaging DWI) and blood tests (LDH isoenzymes) might raise suspicion. Continued growth after menopause, and failure to shrink following embolisation, are other warning signs.

Fortunately, over 97 % of sarcomas are slow growing. If a particular uterine fibroid remains viable after embolisation, a hysterectomy may

be needed to rule out a sarcoma. It's important to attend MRI follow-ups after having UAE, to ensure a sarcoma has not been missed. Fear of sarcoma shouldn't normally be construed as a reason for hysterectomy. The American College of Obstetricians and Gynaecologists does not recommend a hysterectomy solely to rule out sarcoma.

Let's put things into perspective. The lifetime chance of a women developing breast cancer is 1/8, lung cancer 1/17, colon cancer 1/25, and ovarian cancer 1/80. The lifetime chance of developing a sarcoma of the uterus is less than 1/330, while an endometrial cancer from adenomyosis is less than 1/1,000. If we're *not* promoting the notion of removing breasts to prevent breast cancer, it makes no logical sense to remove a woman's uterus to prevent these rare uterine cancers.

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Why should women try to avoid hysterectomies?

Hysterectomy is a major surgical operation that requires general anaesthetic, a few days in hospital, and 4-6 weeks of downtime to recover. Hysterectomy is associated with surgical complications and long-term side effects. If you have benign diseases like fibroids and adenomyosis,

there are now effective alternative treatments, and therefore hysterectomy should be regarded as a last resort, when less invasive treatments have failed.

What are the hysterectomy risks?

Risks include anaesthetic complications, blood transfusion, DVT, and injuries to other organs.

Since hysterectomy is a major surgery, it's associated with the risks of any major operation, including those associated with general anaesthetic, blood transfusion, infection, wound healing, and deep venous thrombosis. Rare but severe hysterectomy complications are injuries to the bladder, ureter (the tube connecting the kidney and bladder), bowel, and blood vessels, that might mean a second trip to the theatre with another specialist to repair the damage.

To date, the risk of severe complications from hysterectomy remains at 3.5 to 11.0 %[1].

Studies from Melbourne reported a hysterectomy mortality rate of 1.5 /1,000 in Australia[2].

Hysterectomy long-term side-effects

- Early menopause
- Prolapse
- Incontinence

- Sexual dysfunction
- Constipation
- Coronary heart disease.

Women who've had hysterectomies may enter menopause almost 4 years earlier. The blood supply to the ovaries may be compromised during surgery by ligation, spasm, or thrombosis. Early menopause is known to be associated with increased cardiovascular risk such as heart attacks and strokes, as well as osteoporosis. Premature menopause can also increase the risk of dementia.

A woman's ovaries continue to produce small, measurable amounts of oestrogen for at least ten years after the start of menopause and to produce androgens until at least age 80. The androgens are converted to oestrogens by fatty tissue and muscle. Oestrogen produced by the ovaries reduce the risk of osteoporosis and heart disease, and it may also help to maintain cognitive and sexual function.

Androgen affects bone and muscle mass, drives libido, affects lipid metabolism, and gives women a sense of well-being, energy, and appetite.

Preservation of the ovarian production of oestrogen and androgen, albeit reduced compared to the reproductive years, may contribute significantly to a woman's health. This is another rationale for preserving one's genital organs.

It is well known that hysterectomy may cause prolapse and incontinence many years later. Urologists are familiar with women who complain

bitterly of urinary symptoms related to a previous hysterectomy. They'll say, "Everything was all right, until I had my hysterectomy".

Hysterectomy weakens the supports for the upper and mid-vagina, and can cause stress urinary incontinence. Removal or cutting of the ligaments supporting the cervix and vagina may predispose women to the development of vaginal vault prolapse. Furthermore, the effectiveness of prolapse repair can be compromised by the removal of the cervix and ligaments, which are used to anchor an effective repair.

Studies regarding the effect of hysterectomy on a woman's sex life can be confusing. Essentially, it depends on whether her symptoms that led her to consider hysterectomy were affecting her sex life in the first place. Women whose sex life was ruined by menstrual symptoms might find hysterectomy "liberating", improving the sex life that they didn't previously have.

On the other hand, women whose sex life was not affected by their menstrual symptoms need to be aware that studies have demonstrated decreased libido and altered orgasm sensation, especially after total hysterectomy. Nerve damage during surgery may be a cause.

For some women, uterine contraction is essential for orgasm. This could be lost after hysterectomy, leading to failure to orgasm or changes in the nature of them.

Surgery may also change the anatomy of the top of the vagina, resulting in an altered sensation for women and their partners.

Constipation following hysterectomy has been reported, and this may be a result of nerve injury.

Woman who've had a hysterectomy take longer to recover than those who've undergone other major surgeries. Symptoms include urinary problems, tiredness, and depression, and the underlying cause is uncertain. This condition has been labelled Post Hysterectomy Syndrome and is thought to be due to hormone imbalance after hysterectomy.

Registry studies have shown that removing ovaries during a hysterectomy can cause long-term health risks like cardiovascular disease and affect general well-being.

A recent Mayo Clinic study has shown that hysterectomy, even without removal of the ovaries, is associated with a 33% increased risk of coronary heart disease. The risk is increased by 250% if the hysterectomy is performed on women younger than 35 years of age.

Finally, the uterus has a great psychological and cultural significance for some women, and their feelings should be respected. For some, removal of their uterus means they might lose their womanhood or sense of being a woman. For those who've never been pregnant, keeping their uterus gives them a sense of hope, despite their age and other adverse factors that might affect their chances.

Some women are strongly opposed, in principle, to the removal of any organ, genital or otherwise, unless absolutely necessary. Practitioners should always respect a woman's view regarding their bodily integrity.

Is hysterectomy still the only solution in the 21st Century?

It's obvious that in the event of a woman developing a cancer of the uterus, a hysterectomy is a logical and absolute necessity. However, in a developed country like Australia, the majority of hysterectomies are performed for benign conditions like fibroids or adenomyosis.

Is hysterectomy still the only solution in the 21st Century?

Women have the right to question the necessity of a hysterectomy for their health-related issues. It should be the obligation of the treating doctor to present them with all treatment options available, giving them the pros and cons of each one. They should do so honestly, even if they're not the providers of some of the options discussed. If the woman elects not to have a hysterectomy, the doctor is obligated to support her in her decision, even when it means a referral to another specialist.

Are we doing too many hysterectomies in Australia?

Australia's national hysterectomy rate is one of the highest amongst OECD countries. We perform 250 per 100,000 women per year, while Demark performs just 20 per 100, 000. Yet there are no major differences between the two countries in terms of longevity, mortality, and quality of life. Similar countries like the UK, Ireland and New Zealand all have about half the hysterectomy rate of Australia. We do about 30,000 hysterectomies each year, and more than 90% are for a benign indication. The question to ask is, "Are they really necessary?".

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A Conversation with Dr Bevan Brown

How do you make sure a woman doesn't have uterine cancers if she decides to keep her uterus?

It's nearly impossible to prove a negative. This means there's no possible way to be sure a woman won't develop uterine cancer without removing her uterus. Obviously, this is not desirable or practical for many women and carries significant consequences that are not mitigated by the reduced risk of cancer.

With this in mind, we're reduced to screening methods that are, by their nature, "chances are" methods, rather than "yes/no" methods. In other words, they're not designed to completely rule out cancers. They will always miss a diagnosis on occasion.

Cervical screening tests are helpful to reduce the risk of developing a cancer of the cervix or "neck" of the uterus. A series of normal CSTs is even more reassuring.

To exclude a cancer of the lining of the uterus, a careful chat with the patient is a good idea. They need to be asked about bleeding after menopause, between periods, or after intercourse, which are warning signs that might prompt me to sample the lining of a woman's uterus by hysteroscopy and curettage.

An investigation with ultrasound imaging might reveal a thickened uterine lining or a polyp, which would also prompt a sampling to exclude a cancer or precancerous change.

MRI using DWI and LDH isoenzyme blood testing can be helpful to provide reassurance that a sarcoma isn't present, but they're not diagnostic and can't completely rule out a cancer.

The most crucial element is to follow up. If a woman has a procedure to conserve her uterus, and the response to the treatment is not as expected, it prompts me to reassess what's going on in order to rule out a cancer, if possible.

When would you recommend a hysterectomy?

In many cases, it's not my choice. If a woman enters my office and wants a hysterectomy, I would be hard-pressed to deny her.

In general, however, the choice to proceed to hysterectomy is one of last resort, when nothing else is suitable or effective.

Active considerations regarding what her plans are for childbearing, which a hysterectomy would prevent, and what alternatives she may have considered or would find acceptable, strongly influence my advice.

How do you choose the type and mode of hysterectomy?

In general, vaginal, or laparoscopically assisted vaginal hysterectomy, are my preferred approaches. Recovery is quicker, as the woman doesn't have an abdominal wound to recover from, in addition to her other surgical wounds. If she's previously undergone Caesarean section, has large fibroids, or another pelvic disease, an abdominal approach may be safer or preferable.

How do you reduce the risks of hysterectomy?

The short-term risks of any operation comprise bleeding, infection, and damage to surrounding structures.

Bleeding is always a risk when dealing with a vascular organ. Women with heavy menstrual bleeding provide ample proof of the blood supply the surgeon must face. The risk can be mitigated by careful surgical technique, and there's a great advantage in having a skilled surgical assistant and anaesthetist as part of my surgical team.

Infection can occur in the surgical wound, either abdominally or vaginally. The risk is greater if bleeding is poorly controlled, and sometimes a surgical drain can be inserted to remove any potential accumulation of blood. A bladder infection from a urinary catheter, which is inserted at the start of the surgery, is also a potential risk. In all cases, prompt recognition, and the use of either prophylactic (preventative) antibiotics or therapeutic (treatment) antibiotics, leads to a reduction of the potential for long-term problems.

The presence of other significant medical illnesses, such as diabetes, can increase the risk of complications like infection, so it's always valuable to have my patients in the best possible health before embarking on surgery.

The organs closest to the uterus, and at greatest risk of injury at the time of the surgery, are the bladder, which sits immediately in front of the uterus and could have accidentally been stitched into it at caesarean section, and the ureters, which pass about 1cm on either side of a woman's cervix. A bladder catheter keeps the bladder empty, thus reducing the risk of damage. If a small puncture is made, it can often be simply repaired at the time of surgery. The ureters are best avoided by careful surgical technique, but if a woman's pelvis is distorted by endometriosis or large fibroids, for example, then a surgeon may choose to have stents (firm catheters) placed in a woman's ureters at the beginning of an operation to make them easier to see and avoid.

Post operatively, there's a risk of blood clots and chest problems. To reduce this risk, I use a blood-thinning injection that's administered to my patients until they're up and around, which reduces the chance of clots in the legs (DVT).

Chest infections and pneumonias are a problem in any surgical unit, and the risk is higher if a woman smokes. Early mobilisation, physiotherapy, and strong advice, such as telling her, "Whatever you do, don't smoke!", are helpful.

Do you recommend ovaries or tubes be removed at the time of hysterectomy?

I do recommend the removal of the fallopian tubes at the time of surgery. It's slightly more difficult for the surgeon, but of minimal, if any, adverse consequence to the patient. Ovarian cancer has no screening program. It's commonly picked up in advanced stages, so anything I can do that reduces the risk of cancer without increasing the risk of problems for my patients, is something I consider worthwhile.

If a woman is post-menopause, I do routinely advise removal of their ovaries. This is based on the same rationale as removal of the fallopian tubes. I acknowledge that there may be some loss of androgen production, however the reduced risk of ovarian cancer mitigates this. If a woman is symptomatic of low oestrogen post-menopause, she's likely to be taking an oestrogen supplement. Adding a testosterone supplement, if she feels the need, is relatively simple.

Pelvic prolapse and urinary incontinence are potential long-term side effect of hysterectomy. How do you manage them?

The uterus is connected to the remainder of a woman's pelvis by means of ligaments. The uterosacral ligaments are the strongest of these. Surgical techniques where they're isolated, conserved, and firmly sutured into the top of the vagina are preferable. There are surgical techniques to shorten these ligaments or to draw the tissues around them together to reduce the risk of prolapse. The use of these is determined by the individual circumstances of a woman's anatomy.

As the pelvic floor is remote from where the uterus is attached, pelvic floor exercises are unhelpful in managing prolapse of the uterus, and hysterectomy is not going to weaken the pelvic floor.

Where surgical technique, healing, hormones, hard work, or the natural collagen properties of an individual woman conspire together, prolapse is likely.

Why are we performing more hysterectomies in Australia than many other countries?

"If the only tool you have is a hammer, then every problem is a nail". Most gynaecologists have learned early in our careers how to safely perform a hysterectomy. It's a known quantity, with a 100% chance of preventing heavy menstrual bleeding.

Furthermore, many older women, for instance, the mothers of our patients, have grown up in a climate where hysterectomy was considered acceptable, or even expected, as a means of treating heavy menstrual bleeding.

Finally, one might speculate that the remote nature of Australian rural practice tends to lead to a bias toward single stop, drastic approaches, because it might be some time before a woman is able to get to her gynaecologist again.

For these reasons, we perform many more hysterectomies than comparable countries.

CHAPTER 9

Adenomyosis and Fertility

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A Woman's Story

Audrey's story

Audrey is a civil engineer who'd been suffering from heavy menstrual bleeding and period pain since she was very young. She was always low in iron and required NSAIDs.

She got married three years ago to her engineer husband at the age of 36, and the couple were keen to start a family. Having tried and failed for two years to get pregnant, the couple embarked on IVF treatments. They tried two cycles without success, due to implantation failure. Six months later, she got pregnant naturally but sadly miscarried at the 5-week gestation. Her heavy menstrual bleeding became progressively worse, to the point that she required using maternity pads. Her period pain had become excruciating.

Her fertility doctor didn't seem bothered about her adenomyosis, which was reported on her ultrasound, and she was sent for a laparoscopy, for reasons she didn't seem to understand. She was told her tubes looked fine, and there was no endometriosis.

Her MRI showed an 8x7x6cm large focal adenomyosis at the back wall of the uterus, as well as three small coexisting fibroids. With her extensive adenomyosis, it would have been almost impossible for her to carry a pregnancy.

She is now 39 and just wants her life back. She's no longer interested in getting pregnant and is seeking UAE as an alternative to having a hysterectomy.

Lessons Learned

- ♥ For a woman with heavy menstrual bleeding and period pain, the suspicion of adenomyosis should have been raised.
- ♥ Early diagnosis at a younger age, when adenomyosis is still relatively mild and treatable with GnRHa, might have increased her chance of getting pregnant.
- ♥ Women with extensive adenomyosis should be forewarned about the reduced success rate of IVF. Pre-treatment with GnRHa might increase the chance of successful pregnancy.
- ♥ An MRI is crucial in differentiating fibroids from adenomyosis, and also to visualise the extent of adenomyosis.

Adenomyosis and Fertility

Nowadays, women are entering relationships later and want to delay their pregnancy. Adenomyosis also tends to develop later in life and becomes more advanced with age.

There's now increasing medical evidence to show that adenomyosis has a negative impact on fertility and pregnancy. Women with adenomyosis are more likely to have premature births.

Adenomyosis can also have a detrimental effect on IVF outcomes. It reduces pregnancy and live birth rates, and increases miscarriage rates.

An IVF study published in 1999 found that spontaneous abortions were higher in women with a diffusely enlarged uterus without distinct uterine masses on an ultrasound, which would be suggestive of adenomyosis, compared to those with a normal-looking uterus.

Women who have an MRI that indicates a junctional thickness of more than 7mm, which is a feature of adenomyosis, are more likely to have implantation failure from their IVF treatments.

The exact mechanism as to how adenomyosis causes fertility and pregnancy issues is not fully understood. Several theories have been proposed. The uterine cavity might be distorted, since the uterine wall is infiltrated by adenomyotic tissue, which disturbs the periodic movement of the uterus in moving the sperm upstream. There could be increased local production of oestrogen in the adenomyotic tissue. Local inflammation and oxidative stress might also play a role.

For women who are suffering from adenomyosis-related symptoms, but are keen and ready for pregnancy, the commonly used continuous suppression strategy with OCP or progestogen, or Mirena IUD, are obviously not suitable.

Although Gonadotrophin-releasing hormone agonist (GnRHa) can't be used as a long-term solution to treat adenomyosis, a course of treatment lasting 3 to 6 months prior to trying natural pregnancy or IVF cycles, might cause regression of adenomyosis and recondition of the uterus, and therefore may optimise the chance of carrying the pregnancy. Studies have shown that GnRHa before IVF improved pregnancy rates and could be an option for women seeking symptom control and immediate fertility.

GnRHa is produced in the hypothalamus of the brain, an organ that sits immediately above the pituitary gland. It signals the pituitary to release stimulating hormones, which in turn stimulate the ovaries to produce sex hormones. GnRHa, in the first two weeks, acts as a stimulus to the pituitary, but after that, it will desensitize it, which in turn stops stimulating the ovaries. Without stimulation, the ovaries will cease to produce sex hormones. The effect is like a medically induced temporary menopause. Without sex hormone stimulation, the adenomyotic tissue will regress, and the disease becomes quiescent.

GnRHa has been used to treat endometriosis for over 30 years. It can be administered as a nasal spray twice daily or given as a depot injection either once a month or every three months. The treatment is usually limited to 3 to 6 months, as longer usage might cause osteoporosis. Other side effects of GnRHa treatment are like menopausal-type symptoms due to a low level of oestrogen. These include hot flushes, night sweats, insomnia, mood swings, decreased libido, and vaginal dryness.

Performing surgery to remove adenomyosis is technically challenging and should not be undertaken lightly. Unlike fibroids, which can be easily "shelled out", adenomyosis, even focal, is an infiltrative disease that can't be separated from the normal uterine wall. Surgeons are unable to find a natural boundary between adenomyotic tissue and the normal part of the uterus. In other words, there's no way to tell where it starts and where it finishes, and therefore the surgeon either errs by not cutting out enough or cutting more than is needed. Incomplete removal inevitably results in residual and recurrent disease. In order to achieve a complete removal of adenomyosis tissue, a wider area has to be cut out, which potentially causes defects and scarring that might lead to pregnancy complications, such as a miscarriage or uterine rupture. A uterine rupture during pregnancy is rare, but is the most feared catastrophic event. It can cause the death of the mother and the foetus.

In a Nutshell

- ♥ Adenomyosis increases the risk of premature delivery/ rupture of the membrane.
- ♥ Adenomyosis may cause foetal growth restriction and poor neonatal outcome.
- ♥ Adenomyosis reduces IVF pregnancy and birth rates.
- ♥ Adenomyosis can increase IVF miscarriage rates.
- ♥ There's the risk of uterine rupture following a surgical treatment for adenomyosis.

Fertility and Pregnancy after UAE

There are many reported case series documenting possible successful pregnancies following UAE for the treatment of fibroids. However, for adenomyotic women, there's currently insufficient data regarding its impact on fertility and pregnancy. Following UAE for adenomyosis, there's a more than 90% chance that the uterus can be retained. It remains unclear if UAE will positively or negatively affect uterine function in relation to fertility and pregnancy outcomes.

More about UAE for adenomyosis and pregnancy

Getting pregnant is a complex business. When it doesn't happen easily, it can be due to problems with the male partner (male factors) or problems with the female partner (female factors). Often, there are contributions from both.

"Female anatomical factors" fall into three main groups, namely the ovaries, the tubes, and the uterus.

Ovarian function and the quality of a woman's eggs declines steeply from the age of 35. Beyond 40, egg quality becomes a major factor determining a woman's chance to conceive. There's a small (1-3%) chance that UAE might cause ovarian injury and early menopause in women younger than 40. For women older than 40, if they develop early menopause after UAE, it's more likely to be her own natural menopause than to have been caused by the UAE procedure.

Women who choose to have UAE to treat their adenomyosis will have to accept the 1-3% risk of early menopause. If this risk is not acceptable

to a woman, then egg or embryo freezing prior to the procedure should be considered.

As discussed in chapter 3, if a woman has adenomyosis, there's a high chance she might also have endometriosis, which can cause scarring and blockage of the fallopian tubes. Patency of the tubes can be checked with a special ultrasound test called hystero-contrast-sonography (HyCoSy). Fizzy saline is injected into the uterine cavity, which fills and flushes the tubes. The bubbles can then be visualised and tracked on an ultrasound.

As mentioned earlier in this chapter, adenomyosis itself has a negative impact on fertility and pregnancy. It can be associated with miscarriages and premature birth, and reduce IVF success rates. Although UAE improves adenomyosis symptoms in 90% of women, we don't really know if it enhances fertility and pregnancy. At the present moment, we can't recommend UAE as a standard treatment for those who are suffering from adenomyosis symptoms but still have a strong desire to get pregnant. However, options do exist. For women younger than 35, GnRHa can be used to "recondition" the uterus, followed by a trial of natural conception. For older women, we're rushing against time, and therefore IVF should be considered to maximise the possibility. To optimise their options, couples should consider egg retrieval and subsequent embryo freezing, followed by 3-6 months of treatment of GnRHa, to "recondition" the uterus, prior to implantation of the frozen embryo.

If GnRHa failed to achieve adenomyosis symptom control, and if a hysterectomy was the only other option, UAE becomes a valid uterine-sparing treatment option.

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A Conversation with Dr Cheryl Phua (fertility specialist)

How do you measure ovarian function for fertility?

There are two main tests to measure ovarian reserve. The first is a blood test, called an AMH or anti-Mullerian hormone. The second is called an Antral Follicle Count (AFC), which is a trans-vaginal (internal)

ultrasound test to count the number of antral follicles in the ovaries. It's important to note that markers of ovarian reserve don't necessarily reflect the chance of falling pregnant naturally, or egg quality. Unfortunately, there is no test for ovarian function per se.

At what age will a woman's egg quality start to decline?

Evidence suggests that the egg quality starts to decline from age 35. A woman's age is the most important factor in egg quality, as well as predicting the chance of natural conception and IVF success.

We're born with as many eggs as we have, and this number only reduces with age, even if a woman has been on the pill or using an intra-uterine contraceptive device, so that her ovulation might have been suppressed over the years. Egg numbers will continue to reduce as women get older.

What is the best predictor of a spontaneous pregnancy rate?

A woman's age is the most important factor. It's the best marker for the chance of falling pregnant spontaneously. At the age of 30, it's around 25% per month and declining to 5 – 8 % per month at age 40.

What is the overall IVF successful pregnancy rate at age 35, 40, and 45?

According to the most recent ANZARD data from 2018, the live birth rate was higher in women younger than 30 years old. The live birth rate per fresh embryo transfer in women aged 30 – 35 was 26%, aged 35 – 40 was 17.3%, and at 40-45 years old was 5.7% per initiated IVF cycle.

There is now a federal government-funded website available for you to determine your own IVF success based on this data. You can access this at www.yourivfsuccess.com.au.

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What does egg freezing involve?

Egg freezing involves stimulation of the ovaries with an injection of hormones to grow as many follicles as possible. Thereafter, eggs are collected, and the retrieval is performed trans-vaginally under ultrasound guidance. The final step is snap-freezing of the eggs in liquid nitrogen for storage.

How does adenomyosis affect fertility and pregnancy?

Evidence suggests that adenomyosis may reduce fertility, as well as IVF success rates.

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Epilogue

Adenomyosis is not uncommon and can cause debilitating heavy menstrual bleeding and severe period pain, which significantly affects a woman's quality of life. It has been an under-recognised condition that's often overlooked clinically and missed sonographically, potentially leading to inappropriate treatments. Cross-sectional imaging is the key to diagnosis. MRI is more accurate than ultrasound but is more expensive. Laparoscopy and hysteroscopy are not the primary tests to diagnose adenomyosis.

Most medical therapies are short-term symptomatic treatment solutions. Mirena IUDs work for a majority of women, but some do develop side effects, and it's less effective for a uterus with more extensive adenomyosis. Endometrial ablation can make period pain worse. Surgical resection for adenomyosis is inappropriate, since it's an infiltrative disease. UAE is an effective, minimally invasive alternative to hysterectomy. UAE treats all types and extent of adenomyosis.

Adenomyosis has a negative impact on fertility and pregnancy. Currently, there's a lack of data as to the best way to manage symptomatic adenomyosis in women who want to get pregnant. Pre-treatment with GnRHa prior to frozen embryo transfer seems to improve the IVF outcome. Currently there is no data regarding the effect of UAE on fertility and pregnancy.

Besides raising awareness of this dreadful disease, more research is needed to evaluate uterine sparing treatment options and their impact on fertility. The medical research community needs to realise that adenomyosis is not a single disease. It's a spectrum of involvement, from superficial to deep, from focal to diffuse, and can occur anywhere within the uterine wall. There is an urgent need for a classification system for the types of adenomyosis and a grading system for the severity of the disease. Without a refined classification and grading system, research on treatment efficacy, as well as fertility outcomes, won't generate meaningful results to guide individualised treatment selections. MRI with standardised imaging and reporting protocol might be essential in achieving such a classification and grading system.

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The book is based on our day-to-day clinical experience helping women with menstrual issues. I could not have run Sydney Fibroid Clinic without my PA, Anna Satherley. Thank you, Anna, for sharing my passion, for being empathetic, and for your professionalism in following up our patients. I also have to mention Samantha Sincich, our medical receptionist, for being compassionate, yet super-efficient.

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About The Authors

Dr Eisen Liang, Interventional Radiologist

Dr Eisen Liang is an interventional radiologist with a special interest in women's health intervention, including uterine artery embolisation (UAE) for fibroid and adenomyosis, and ovarian vein embolisation for pelvic congestion syndrome.

Dr Liang is passionate about using minimally invasive treatments to improve a woman's quality of life and has helped countless women suffering from heavy menstrual bleeding, period pain, and bladder and pressure symptoms, as well as pelvic pain.

After graduating with First Class Honours from UNSW in 1988, Dr Liang completed his internship and residency at Westmead Hospital. He then began his radiology training in Hong Kong in 1990 and was appointed Lecturer in Radiology at the Chinese University of Hong Kong in the Prince of Wales Hospital in 1994.

He was awarded the Fellowship of the Royal College of Radiologists (FRCR) in 1995 and the Fellowship of the Royal Australian New Zealand College of Radiologists (RANZCR) in 1997, and performed his first uterine fibroid embolisation (UFE) in 1998.

Dr Eisen Liang has been an interventional radiologist at Sydney Adventist Hospital since 2004 and began performing UAE in 2007, when the Medicare rebate became available in Australia.

Dr Liang and Dr Brown published the results of the first Australian series of uterine artery embolisation for fibroids and adenomyosis in the *Australian and New Zealand Journal of Obstetrics and Gynaecology* (ANZJOG) in 2012. Their ANZJOG paper on the effectiveness of UAE for treating adenomyosis was published in 2018. A subsequent paper on the long-term durability of UAE for adenomyosis was published in ANZJOG in 2021, and together they've co-authored how-to-treat articles in *Australian Doctor*, one on fibroids in 2015 and the other on Adenomyosis in 2019.

Dr Liang is also a senior clinical lecturer at The University of Sydney School of Medicine.

Dr Bevan Brown, Obstetrician Gynaecologist

Dr Bevan Brown is a well-known obstetrician and gynaecologist based in Sydney's Hills district. Upholding a caring and compassionate approach, he offers individualised and empathetic care to his patients.

After graduating from Sydney University, Dr Brown trained at the Royal Hospital for Women. He then became Staff Specialist at Liverpool Hospital and co-joint Clinical Lecturer in Obstetrics and Gynaecology at the University of New South Wales. He completed his training at Liverpool Hospital, where he gained experience in advanced laparoscopic surgery.

Dr Brown currently runs a busy private obstetrics and gynaecology practice, with a special interest in hysteroscopic and laparoscopic surgery, treating pelvic pain, endometriosis, prolapse, fibroids and adenomyosis. He has co-authored many articles with Dr Eisen Liang in specialist and GP journals regarding the treatment of fibroids and adenomyosis.

He maintains a keen interest in the medical and surgical management of fibroids and adenomyosis and continues his research into fibroid and adenomyosis treatment options while teaching students at the Sydney Adventist Hospital Medical School.

Sydney
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www.sydneyfibroidclinic.com.au

About Sydney Fibroid Clinic

The Sydney Fibroid Clinic is dedicated to improving the quality of life for women suffering from fibroids, adenomyosis, and pelvic congestion syndrome.

The clinic's philosophy is to practise evidence-based medicine, with an emphasises on collaboration between the doctors, in order to apply the least-invasive treatments possible and empower women who want to avoid unnecessary hysterectomies.

Interventional radiologist Dr Eisen Liang has worked closely with obstetrician gynaecologist Dr Bevan Brown for more than ten years. To meet the needs of women seeking alternatives to a hysterectomy, they co-founded Sydney Fibroid Clinic in 2013. Since then, they've accumulated extensive experience in applying uterine embolisation and minimally invasive surgical techniques to help women choose the right treatment option for themselves.

Throughout the years, they've successfully tackled many challenging cases where women were told elsewhere that hysterectomy was the only solution. Their cross-specialty collaboration has allowed them to the push the boundaries of what each individual specialist could do and to think outside of their own boxes. By offering high-end, cutting-edge approaches to the effective treatment of fibroids and adenomyosis, their collaborative approach allows the Sydney Fibroid Clinic to help women who wish to explore less invasive treatment options.

Their collaboration has also brought research opportunities. They've since published research papers on adenomyosis in ANZJOG in 2012, 2018 and 2021, and How-to-Treat articles in *Australian Doctor*, one on fibroids and another on adenomyosis.

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STOP PUTTING UP WITH PAINFUL HEAVY PERIODS

So many women are suffering alone and in silence from a dreadful, relatively unknown disease called adenomyosis, and they don't even know it.

Too often, women have been told it's simply a condition they need to live with. But every month, they have to build their lives around heavy, painful periods. They stay at home, wear black clothing, and have little or no energy to do the things they want in life.

Many women diagnosed with endometriosis, are not aware that they may also have adenomyosis, its evil cousin, which is far more debilitating and not as well known.

Could it be Adenomyosis? reveals what women need to know in order to get their life back and stop being controlled by this disease. It offers life-changing information to rescue their uterus and bring themselves back to a life of health and vitality.

Whether you've been given a diagnosis, have symptoms, want to heal or are looking for information to decide on treatment options, *Could it be Adenomyosis?* has the answers and is a must-read for both patients and medical practitioners alike.

Dr Eisen Liang is an interventional radiologist with a special interest in women's health. He's been performing UAE for fibroids and adenomyosis for almost 15 years, helping women with menstrual issues get their lives back without hysterectomies. He and Dr Bevan Brown have collaborated for more than 10 years in clinical practice and research on adenomyosis. Together, they've published their results in ANZJOG (2012, 2018, 2021), have presented their experience in GP seminars, and published articles in "Australian Doctor" and "Medical Republic".

Dr Bevan Brown is an obstetrician gynaecologist. Apart from his busy obstetric practice, he has special interests in the treatment of fibroids, adenomyosis, endometriosis, and prolapse. He upholds a compassionate and empathetic approach to women with menstrual health issues, respecting their wishes and helping them achieve the goal of uterine conservation by using the least-invasive approach possible.

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