Challenging Concepts in Obstetrics and Gynaecology

Cases with Expert Commentary

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OXFORD
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Great Clarendon Street, Oxford, OX2 6DP,
United Kingdom

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide. Oxford is a registered trade mark of
Oxford University Press in the UK and in certain other countries

Impression: 1

Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America

British Library Cataloguing in Publication Data
Data available

Library of Congress Control Number: 2014947259

ISBN 978–0–19–965499–4

Printed in Great Britain by
Ashford Colour Press Ltd, Gosport, Hampshire

CASE

1 A 'classic' case of heavy menstrual bleeding?

Shruti Mohan and Jasmine Tay

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Case history

A 41-year-old Para 3 woman was referred to the general gynaecology clinic by her general practitioner (GP). She presented with increasingly heavy periods over the past year. She continued to have a regular 28-day cycle, but was now bleeding for six days each month, four of which she felt were excessively heavy, such that her daily activities were interrupted. She was not experiencing any inter-menstrual or post-coital bleeding, but did describe a feeling of 'pressure' in the pelvis. She was otherwise fit and well. Her smear tests were up to date and had always been normal.

Having had three caesarean sections (CS) in the past, she expressed a desire to retain her fertility, although she had no immediate plans to conceive. For the previous four months the patient had been using tranexamic acid as prescribed by her GP, but had not noted any significant improvement in her symptoms.

A pelvic examination was performed. The patient was noted to have a slightly bulky uterus, of approximately 10/40 size. The cervix was normal and there were no adnexal masses. The patient was referred for a full blood count and pelvic ultrasound scan. A menstrual calendar was provided in order for the patient to record the duration and severity of her bleeding prior to her subsequent review. In the meantime she was advised to continue taking the tranexemic acid.

Learning point Assessment and quantification of menstrual blood loss

Menstrual blood loss can be assessed both subjectively (by the patient) and objectively. Based on population studies a monthly blood loss of over 80 ml has been taken as the objective definition of menorrhagia. Approximately 10% of women experience a loss of over this level and it carries an association with anaemia [1].

Numerous methods for the objective measurement of blood loss have been described, including recording numbers of sanitary products used, weighing of sanitary products, use of a menses cup to collect blood passed, and chemical analysis of blood content of used sanitary products. Assessment of the number of sanitary products used can serve as a guide to lifestyle impact, but has been shown to be as related to a patient's hygiene practices as it is to the volume of blood lost. Many of the other documented methods have significant practical limitations, and some have been used solely as research tools.

In practice, any blood loss which a woman finds to be significantly detrimental to her quality of life should prompt treatment, and use of such subjective definitions is now encouraged. However, pictorial blood loss charts [2] and menstrual calendars remain useful, both for a patient's understanding of her symptoms as well as to monitor response to treatment.

Clinical tip Examination of women with menorrhagia

Symptoms such as unscheduled (post-coital or inter-menstrual) bleeding, pelvic pain, or pressure symptoms raise the possibility of structural abnormalities and other pathology. In practice, all women presenting to secondary care with heavy menstrual bleeding should be examined in order to assess the size and mobility of the uterus and for the presence of any cervical polyp. Where indicated outpatient endometrial biopsy may be performed simultaneously.

Learning point Causes of menorrhagia

The causes of menorrhagia are varied **(Table 1.1)**. History, examination, and investigations should be directed towards the identification of the likely common causes, in order to plan appropriate management.

Table 1.1 Causes of menorrhagia

Pelvic	Uterine fibroids
	Adenomyosis
	Endometrial polyps
	Pelvic infection
	Endometrial hyperplasia
	Endometrial adenocarcinoma
	Presence of copper containing intra-uterine contraceptive device
	Uterine vascular malformations
	Myometrial hypertrophy
Systemic	Coagulation disorders, e.g. thrombocytopenia, Von Willebrand's disease
	Hypothyroidism
	Systemic lupus erythematosus
	Chronic liver failure
Functional	Dysfunctional uterine bleeding

Learning point Investigation of menorrhagia

Blood tests—Full blood count is indicated in all women presenting with menorrhagia. In certain cases (relevant personal/family history, presence since menarche), testing for coagulation disorder may be appropriate. Thyroid function tests are only indicated if other signs and symptoms of thyroid disease are present. Routine hormone profile testing is of no benefit if the menses are regular.

Ultrasound is the first-line imaging modality. Imaging is indicated in the vast majority of women presenting to secondary care with menorrhagia and certainly it should be undertaken where the uterus is palpable per abdomen, a pelvic mass is found on bi-manual examination or where previous pharmaceutical treatment has failed. Both trans-vaginal and trans-abdominal scanning have a role, depending on the size of the uterus and patient acceptability.

MRI has no advantage over ultrasound as an investigation tool in most cases. However, where ultrasound is inconclusive it may provide valuable additional information (Figure 1.1). An example is the differentiation of adenomyosis from the presence of multiple small fibroids. It is also used to map position and size of fibroids prior to uterine artery embolization, and other developing treatment modalities such as MRI-guided focused ultrasound.

Endometrial biopsy: Although post-menopausal bleeding is the hallmark symptom which necessitates exclusion of endometrial pathology, up to 25 % of women with endometrial cancer will present prior to the menopause [3]. In pre-menopausal women suspicious symptoms (eg inter-menstrual or continuous bleeding), suspicious scan findings or failure of pharmacological treatments, particularly in a patient over 45 years of age, should prompt endometrial biopsy. Blind, outpatient biopsy is convenient but is known to miss significant pathology in a proportion of cases.

Hysteroscopy (and directed biopsy) is indicated where there are inconclusive scan findings or a high index of suspicion regarding endometrial pathology. Occasionally it is performed because sampling is required but has not been possible in the outpatient setting. It is generally considered the gold-standard investigation due to high sensitivity and specificity for detecting atypical hyperplasia and endometrial cancer [4].

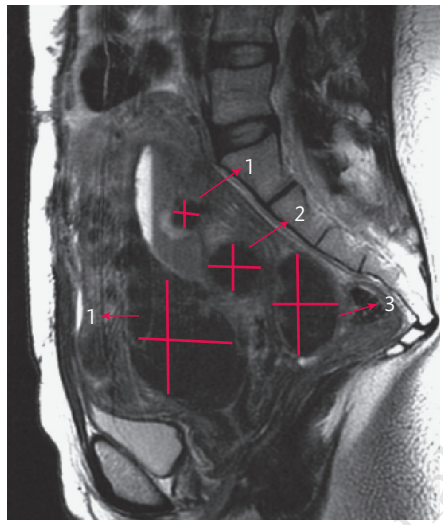

Figure 1.1 MRI picture demonstrating uterus enlarged with multiple fibroids. Note that the uterine cavity is obstructed by an additional large submucous fibroid (arrowed) to the left.

1. Submucous fibroid
2. Intramural fibroid
3. Subserous fibroid

Learning point Pharmacological treatments for heavy menstrual bleeding

Historically, pharmacological methods have been offered to women as the first line of treatment, and they continue to be the only treatments available in primary care **(Table 1.2)**. The following have all been shown to cause clinically significant reductions in blood loss in some women, and a variable amount of comparative data is available. However, the choice of treatment will depend upon the patient's preference in terms of hormonal or non-hormonal methods, contraception requirements and mode of administration.

The success of many of these treatments is often limited by their side-effect profiles and need for continued, regular usage. Patients will frequently seek more definitive solutions. The Levornogestrel IUS has, however, transformed the management of menorrhagia.

Table 1.2 Pharmacological treatments for HMB

Treatment	Administration	Hormonal	Contraceptive
Tranexamic acid	Oral tablets, to be taken whilst bleeding	No	No
NSAIDs	Oral tablets, to be taken whilst bleeding	No	No
Levornogestrel containing IUS	Intra-uterine device	Yes	Yes
Combined oral contraceptive pill	Oral tablet taken for 21-days of 28-day cycle	Yes	Yes
Oral progestagens	Oral tablets to be taken from day 5 to day 26 of each cycle	Yes	Yes
Injected/ Implanted progestagens	12 weekly intramuscular injection or 3-yearly subdermal implant	Yes	Yes
GNRH analogues	Monthly injection	Yes	No

She was reviewed in gynaecology clinic one month later. Her Hb was 10.2 g/dl (normal range 12.0-15.5 g/dl) and pelvic ultrasound demonstrated an enlarged fibroid uterus; one subserosal fibroid of 4 cm, one intramural of 3 cm, and one submucous fibroid of 3 cm diameter. No endometrial or adnexal abnormality was noted (Figure 1.2).

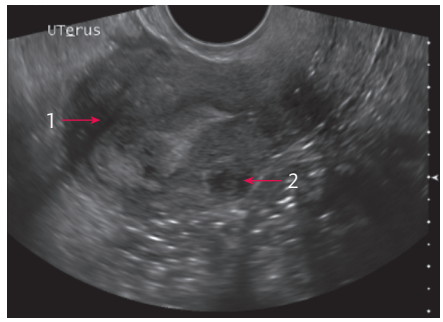

Figure 1.2 Transvaginal ultrasound picture demonstrating uterus in sagittal section:

1. Submucous fibroid indenting uterine cavity
2. Subserous fibroid

Evidence base Levonogestrel intrauterine system (LNG–IUS)

The LNG–IUS was first marketed in Scandinavia in the early 1990s as a contraceptive device. It quickly became apparent that it caused a reduction in menstrual blood flow, and, although not licensed for use in menorrhagia until 2001, it has dramatically altered the treatment of heavy menstrual bleeding in the past 15 years.

An early investigation of its potential in the setting of menorrhagia [7] found an 86% reduction in menstrual loss after three months and 97% reduction after 12 months of use. 37% of women were amenorhhoeic at one year. A Cochrane review [8] of RCTs compared the LNG–IUS with medical and surgical treatments. Compared with cyclical norethisterone the IUS was more effective and women were more likely to continue treatment. The IUS led to a smaller reduction in blood flow when compared to endometrial ablation; however, satisfaction scores were the same in both groups. When compared with hysterectomy, quality of life scores were not significantly different with the IUS, but the IUS was more cost effective. However, this was based on a single trial with follow-up of up to five years only.

By its continuous release of 20 mcg of levonorgestrel every 24 hours, the IUS prevents endometrial proliferation and goes on to cause endometrial suppression. The hormone is largely absorbed by the endometrium itself, with little reaching the systemic circulation. Therefore progestagenic side-effects, although experienced by some women, are relatively infrequent and generally minor. However, patients should be warned about the possibility of irregular bleeding which is common for 3–6 months post insertion.

The LNG–IUS holds a number of advantages over other treatments for menorrhagia including ease of insertion, no requirement for anaesthetic, excellent reversible contraception, and avoidance of risks of surgery. However, it is not suitable or effective for every woman, and there is evidence that a significant proportion of patients with an IUS will go on to request hysterectomy in the future.

The management options were presented as follows, with written information provided on each.

a. Hysteroscopy with trans-cervical resection of fibroid as appropriate, +/– insertion of Levornogestrel intra-uterine system (LNG–IUS)
b. Insertion of LNG–IUS without resection of fibroid
c. Uterine artery embolization

Expert comment

A fluid deficit equal to or greater than 1000 ml glycine should warn the surgeon to the possibility of hyponatraemia and hypo-osmolality. However, modern bipolar resectoscopes allow resection in saline and virtual elimination of the risks of fluid overload.

The patient opted for hysteroscopy and transcervical resection of fibroids (TCRF). In view of the anticipated resection, and patient preference, this was arranged under general anaesthetic, as a day case. A moderate sized Grade 1 submucous fibroid was noted and resected (Figure 1.4). Due to fluid overload and risk of hyponatraemia, the procedure was abandoned prior to complete resection.

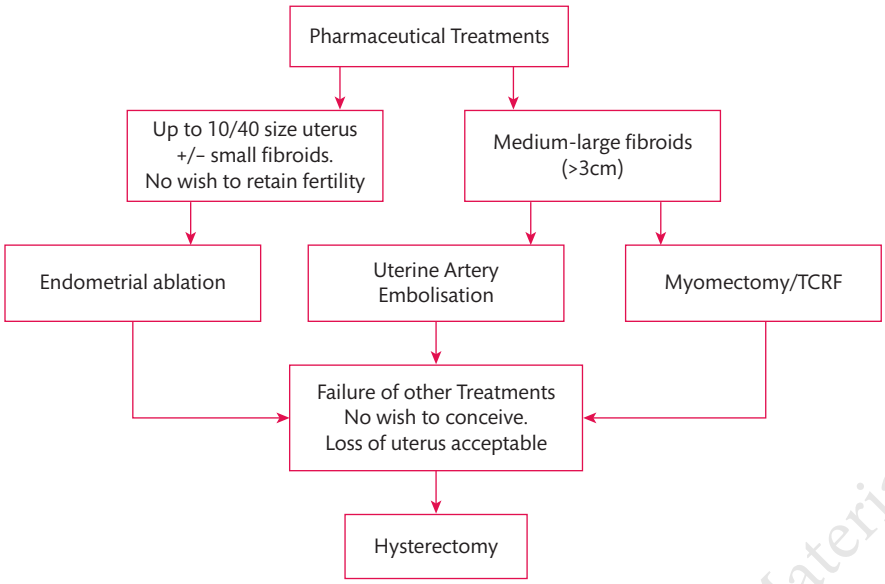

Figure 1.3 Treatment ladder in menorrhagia.

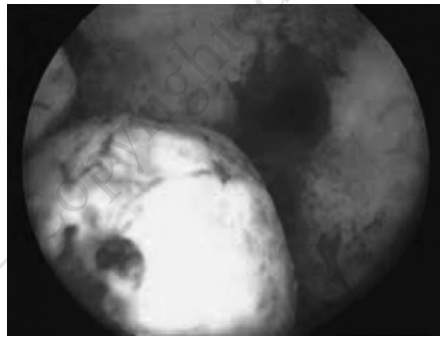

Figure 1.4 Hysteroscopic view of a sub-mucosal fibroid

Image courtesy of Ms Deborah Holloway.

An LNG–IUS was inserted although she was counselled on the possible need to remove the IUS and repeat the procedure if her symptoms were not adequately controlled. She was warned regarding the risk of irregular bleeding in the short term (up to six months) after IUS insertion. She was discharged on the same day with a normal blood sodium level.

Expert comment

First-line treatments for menorrhagia associated with fibroids may differ from those in a woman with a structurally normal uterus. Pharmaceutical treatments are likely to be less effective, including the Mirena IUS, which may also be more difficult to site in the presence of fibroids. However, alternative treatments are more limited in women with fibroids of a significant size. In addition they are generally more invasive, associated with significant risks, and have implications for fertility. Therefore finding an effective and agreeable treatment for these women poses a particular challenge and is the focus of considerable ongoing research. Currently UK national guidelines state that in the presence of symptomatic fibroids of 3 cm or over, myomectomy, uterine artery embolization, and hysterectomy should be offered [6].

Learning Point Treatment ladder in menorrhagia

Treatments for menorrhagia may be considered in Figure 1.3. The patient's wishes will ultimately determine which treatments are given, and in which sequence.

Clinical tip GA vs outpatient hysteroscopy

Traditionally hysteroscopy has been performed under general anaesthetic (GA) in an operating theatre. Outpatient hysteroscopy is usually performed without anaesthetic or with a cervical block, ideally in a dedicated treatment room. This holds a number of advantages including greater convenience, faster recovery, avoidance of risks of general anaesthetic, and reduced risk of uterine perforation. In addition it is significantly more cost-effective, both for the patient and for healthcare providers.

Expert comment

Increasingly operative hysteroscopy such as the removal of small polyps, resection of small fibroids, endometrial ablation, and trans-cervical sterilization are also performed in the outpatient setting, dependent upon facilities available and operator experience. For women in whom the anticipated procedure does not necessitate general anaesthetic, outpatient hysteroscopy should be offered.

Learning point Fibroids and menorrhagia

- Fibroids are common, affecting 20–40% of women of reproductive years, with a higher prevalence in Afro-Caribbean populations.
- Although fibroids are often asymptomatic, their association with heavy menstrual bleeding is well established [5].
- Symptoms are likely to be related to the number, size and location of fibroids.
- Submucous fibroids, which may disrupt and expand the endometrium, are particularly implicated.

Expert comment

The choice of treatment will depend upon the pattern of fibroids, the patient's desires regarding retention of the uterus and fertility and their preferences regarding undergoing surgery. Overall myomectomy is associated with greater blood loss than hysterectomy and patients should be warned of the small risk of proceeding to hysterectomy should catastrophic bleeding ensue.

Learning point Myomectomy

This is the excision of fibroid tissue from the uterus. It may take the form of trans-cervical resection of fibroid (TCRF), open myomectomy, or laparoscopic myomectomy.

- TCRF is a hysteroscopic procedure in which the uterine cavity is distended by fluid and an electrocautery loop used to excise the fibroid. This technique is suitable for submucous fibroids extending more than 50% into the endometrial cavity (grade 0 or grade 1 fibroids) whilst resection of fibroids which extend < 50% into the myometrium (grade 2 fibroids) may carry an increased risk of treatment failure and uterine perforation.
- Open myomectomy is the excision of fibroids via laparotomy. This is the traditional method but carries with it the operative risks and longer recovery period of open surgery.
- Laparoscopic myomectomy is offered increasingly widely and is suitable for subserous and intramural fibroids, depending on their size, number, and distribution.

The patient returned for review 6 months following surgery. Unfortunately she felt her symptoms had deteriorated over time and were becoming increasingly disruptive. She was offered further pelvic imaging and the treatment options were discussed once more:

a) Further hysteroscopy with TCRF or endometrial ablation as appropriate
b) Uterine artery embolization
c) Myomectomy
d) Hysterectomy

The procedures, risks, recovery, and likely success of each treatment modality were explained in detail, and she was counselled that having undergone three caesarean sections, she may have formed significant intra-abdominal adhesions and a thin anterior uterine scar. These would increase the risks of endometrial ablation and of any further surgery. In addition the patient was undecided as to whether her family was complete and expressed a preference for treatments which would allow her the option of conceiving in future.

Evidence base Endometrial ablation

This is the destruction or removal of the endometrium. It should be considered in women with a uterus under 10–12 week-size (depending on technique) or fibroids measuring < 3 cm in diameter, who do not wish to conceive in the future. Overall, the average rate of amenorrhoea at 12 months is around 40%. A Cochrane review in 2013 showed that overall 90% of patients reported satisfactory reduction in menstrual loss at one-year follow-up. It further demonstrated that 20–30% patients required secondary treatment at two-year follow-up (9).

First-generation techniques

- These involve resection or ablation of the endometrium under direct hysteroscopic vision using electro-cautery (monopolar or bipolar) and include TCRE (transcervical resection of endometrium), rollerball, and laser.
- The MISTLETOE study (10) found rollerball ablation to be safer than loop resection and a 4.4% rate of significant complications including two deaths in just over 10 000 women.
- Potential complications are associated with dilutional hyponatraemia (cerebral oedema, seizures, and death) if excessive absorption of 1.5% glycine which is used as a distention medium occurs.
- These techniques require a considerable amount of training and experience in order to be performed safely. However, where hysteroscopic myomectomy is to be performed concurrently, the use of first-generation technique is appropriate.

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Second-generation techniques

- These are newer techniques which do not require hysteroscopic guidance, and are generally quicker. Some can be performed in the outpatient setting.
- Examples include microwave endometrial ablation (MEA), fluid-filled thermal balloon endometrial ablation and impedance-controlled bipolar radiofrequency ablation.
- They should be used as first line where no structural or histological abnormality is present.
- The overall success rates and complication profile are reported to be favourable when compared to first generation techniques [11].
- The long-term hysterectomy rate post second-generation technique treatment is low at 16% [12].
- Randomized controlled trials (RCT) comparing various second-generation ablation techniques show no significant differences in complication rates, amenorrhoea rates, or quality of life post procedure [13]. Therefore, choice of instrument will depend on operator experience and local availability of equipment.

Learning point Uterine artery embolization

This is a minimally invasive procedure performed under moderate sedation and local anaesthesia by interventional radiologists. It has been increasingly used since the late 1990s. The femoral artery is canulated using 5F vascular sheath. The uterine arteries are then catheterized using micro catheters (2.7F) and micro embolic particles (350–900 micron) are injected in order to partially occlude the uterine arteries. Fibroid necrosis and shrinkage then follows. Patients are usually discharged within 24 hours with a relatively swift return to normal activities. Short-term symptoms including pain and fever are normal. Serious complications are uncommon although systemic infection due to septic fibroid degeneration is a recognized consequence and reported to be less than 1%.

Uterine artery embolization (UAE) is an alternative treatment for women with menorrhagia secondary to fibroids. It is less invasive and recovery time is faster when compared to myomectomy and hysterectomy and therefore it is an attractive option for women who wish to avoid surgery.

Trials have demonstrated that UAE alleviates symptoms in 60–90% of women, and that the effects last for an average of 5 years [14,15]. There is a mean uterine volume reduction of 40% post procedure. [16]. The HOPEFUL study, a retrospective cohort study comparing UAE and hysterectomy, found that 20% of patients required further intervention at 4–5-year follow-up [17]. Serious complications are rare and there are no major safety concerns associated with UAE. However, in most centres, prophylactic antibiotics are given at the time of the procedure to reduce infective complication rates. The effects on fertility and pregnancy following UAE are unclear; therefore patients should be counselled appropriately prior to undertaking this procedure.

Evidence base Myomectomy vs uterine artery embolization

Both myomectomy and UAE are suitable for women with fibroids who wish to retain their uterus. Women in this situation will naturally wish to understand the relative risks and efficacy of these interventions. Only one small RCT, involving 63 women, has been published directly comparing the two procedures [18]. UAE was associated with shorter hospital stay (mean difference 1.6 days) and shorter time to resumption of normal activities (mean difference 16 days) as compared to myomectomy. Despite a suggestion of increased minor complications in the UAE group, there was no significant difference between the groups for need for antibiotics, need for blood transfusion, re-admission to hospital, or major complications. Relief from fibroid-related symptoms at 6-months follow-up was also comparable. However, the proportion of women requiring further intervention for their fibroids was markedly higher (odds ratio 8.97) in the UAE group as compared to the myomectomy group. In addition a number of cohort and observational studies have reported on this subject. Some have found lower transfusion and complication rates with UAE.

Overall the results support the conclusion that avoidance of surgery with UAE has benefits in terms of shorter hospital stay and reduced impact on lifestyle. However, as we might expect with a treatment which gives a variable degree of fibroid shrinkage, the proportion of patients requiring

(continued)

Guest expert comment (radiology)

A recent randomized trial (FEMME) comparing UAE and myomectomy, funded by NIHR, has started in UK and the first report is expected in 2014.

Guest expert comment (radiology)

Current evidence is conflicting regarding the use of GnRHa prior to uterine artery embolization. Despite the lack of clear evidence, almost all interventionists prefer to do UAE at least 4–6 weeks post GnRHa due to concerns that this hormone could lead to vasospasm and prevents injection of adequate embolic material.

further treatment (usually surgical) is higher with UAE. Evidence regarding complication rates remains conflicting, but the less invasive procedure (UAE) is also associated with re-admissions and occasionally significant adverse effects.

Evidence base Pre-treatment preparation with GnRH analogues

Administration of gonadotrophin releasing hormone analogues (GNRHa) leads to a down regulation of the hypothalamic–pituitary–ovarian axis. The reduction in gonadotrophins and ovarian sex steroid production can also lead to thinning of the endometrium and fibroid shrinkage. Long-term treatment is not recommended due to the effective induction of the menopause in patients. However, clinicians have often utilized short courses prior to surgery for menorrhagia, with the rationale that this may increase the effectiveness and reduce complications of treatment. A systematic review of over 20 RCTs considering GnRHa treatment prior to myomectomy was published in 2001 [19].

- Women treated with GnRHa had a significant reduction in uterine volume and a significant rise in haemoglobin concentration prior to surgery.
- As expected, they did experience more menopausal symptoms than those not treated or given placebo.
- Intra-operatively, women pre-treated with GnRHa required fewer vertical incisions, and there was some evidence of reduced blood loss.
- There was no difference in rates of blood transfusions or operating time (it has been postulated that administration of GnRHa can increase the difficulty of finding surgical planes and therefore increase surgical time).
- There was conflicting evidence regarding an increased rate of fibroid recurrence in women who were pre-treated, and insufficient evidence to assess implications for fertility.

In view of this, routine GnRHa treatment prior to myomectomy is not recommended. However, 3–4 month courses should be considered in patients with a greatly enlarged uterus or significant anaemia.

A new drug, Ulliprista, is now available and can be used as a substitute for GnRH analogues to reduce the size of fibroids [20].

Learning point Fertility and treatment of menorrhagia

The majority of treatments for menorrhagia have an influence on fertility. Many pharmacological treatments are contraceptive, including the Mirena IUS. However, these are reversible methods of contraception, providing the patient with the option of pregnancy in the future.

Other treatments may have more permanent effects:

Endometrial ablation Ablation is unsuitable for women who wish to conceive in the future. Destruction of the endometrium impairs implantation and therefore reduces fertility. In addition the literature suggests that those pregnancies which do follow ablation are associated with high rates of miscarriage, fetal loss, and other complications such as retained placenta [21]. For this reason, the requirement for contraception post ablation must be discussed with patients considering this treatment.

Uterine artery embolization In some cases embolization will directly affect fertility by inducing ovarian failure. Reduction of collateral ovarian blood supply has been documented to lead to amenorrhoea in between 0.5% and 15% of patients in different series. Although this is more likely in women aged over 45, amenorrhoea has also been reported in far younger women.

Data regarding pregnancies which do occur after this relatively new procedure are now beginning to accrue. A 2009 review of over 200 pregnancies following UAE found a miscarriage rate of 35%, pre-term delivery of 14%, Caesarean section 66%, and postpartum haemorrhage rate of 14% overall [22]. The rates of pre-term delivery and malpresentation were similar in post UAE delivery and control pregnancy with fibroids. Although it is acknowledged that women who have undergone UAE are in a poor prognostic group in terms of pregnancy (often with significant residual fibroids and generally older), these results are alarming for women considering the procedure with a view to future pregnancy.

(continued)

Myomectomy This is the traditional treatment for women with bulky, symptomatic fibroids who wish to conceive. Risks include haemorrhage (rarely necessitating hysterectomy), infection, and adhesion formation, all of which will potentially reduce fertility.

Two studies have compared pregnancy outcomes following UAE and myomectomy:

- A retrospective review of 53 pregnancies occurring after UAE, compared with 139 pregnancies occurring after laparoscopic myomectomy [23], demonstrated a significantly higher risk of pre-term delivery (odds ratio [OR] 6.2; CI 1.4–27.7) and malpresentation (OR 4.3; CI 1.0–20.5) after UAE. There was also a trend towards higher rates of miscarriage, postpartum haemorrhage and caesarean delivery, although these did not reach significance.
- An RCT comparing pregnancy outcomes post UAE ($n = 17$) with outcome following open and laparoscopic myomectomy ($n = 25$) [24] demonstrated lower pregnancy rates post UAE than myomectomy (50% versus 77.5%, $p < 0.05$) as well as significantly higher rates of miscarriage (64% versus 24%, $p < 0.05$) and lower rates of live birth (36% versus 76%, $p < 0.05$) after UAE compared with myomectomy.

Expert comment

UAE should be performed in women wishing to conceive in future only after careful counselling and explanation of potentially poor reproductive outcome compared with myomectomy.

Guest expert comment (radiology)

Repeat UAE following initial successful results has gained growing interest. Recent studies have shown that recanalization of the uterine arteries post embolization is not uncommon. Also, alternative blood supply, for example from ovarian arteries, can be blamed for the regrowth. Therefore, repeating UAE can be considered in these cases. In a study of 39 patients who underwent a repeat UAE, 94% reported significant symptomatic relief [25].

Learning point Treatment of menorrhagia after previous CS

In a patient who has undergone previous caesarean section, certain treatments may be contra-indicated and others will carry increased risk of complications. The risks after multiple previous caesareans will be further increased.

Endometrial ablation The risk of uterine perforation and subsequent damage to the abdominal viscera is increased in the presence of a thin lower segment caesarean scar. The myometrium may be deficient at the site of the previous surgical incision and any scar tissue is a point of weakness. Therefore ultrasound assessment of the scar is recommended prior to first- or second-generation ablation. A scar thickness of under 8–10 mm (depending on the particular technique) is considered a contra-indication to treatment.

Myomectomy/Hysterectomy The presence of significant adhesions following caesarean will increase the risks of laparotomy, laparoscopy, and vaginal surgery. Bowel adhesions may be present and the bladder may be high and adherent to the uterine incision, particularly after multiple previous caesareans. Any patient in this situation considering surgical management of her menorrhagia should be warned regarding the increased risk of heavy blood loss, bowel and bladder injury, and likely longer length of surgery and recovery. Therefore these patients may have a higher threshold for considering surgical management and preferentially pursue treatments such as pharmacological methods and uterine artery embolization.

Uterine artery embolization Previous surgical history does not affect the success rate of UAE.

In view of her surgical history and wish to maintain the option of a further pregnancy, the patient opted for uterine artery embolization. She was referred to a consultant interventional radiologist and the procedure was uneventful. She was reviewed six months later. She continued to have regular periods but these had become significantly less heavy. The patient was satisfied with the result and was therefore discharged.

Two years later she returned to the clinic. Her periods had become excessively heavy once again. Now aged 44, the patient felt certain that her family was complete and she requested hysterectomy. She had sought further information regarding the procedure through a number of health-related websites and in particular was keen to discuss the option of a subtotal hysterectomy.

She was counselled extensively regarding the risks of surgery, the recovery period, and potential psychological and psychosexual sequelae. The risks and benefits of total versus subtotal hysterectomy and of oophorectomy were discussed.

Learning point Route and complications of hysterectomy

Hysterectomy may be performed by laparotomy, vaginally, or laparoscopically. The route of hysterectomy will be determined by:

- Uterine size
- Size and location of any fibroids
- Uterine descent
- History of previous pelvic surgery
- Surgical expertise

A systematic review of 27 RCTs comparing routes of hysterectomy (28) concluded that the route of hysterectomy should be considered preferentially in the following order: vaginal, laparoscopic, abdominal.

Vaginal hysterectomy is associated with a quicker recovery time and reduced post-operative complications. It is also the preferred route when a pelvic floor repair is indicated. Evidence is now building regarding the benefits of laparoscopic hysterectomy. Although associated with longer operating times and possibly higher rates of urinary tract injury, this is offset by shorter recovery, reduced blood loss, and reduced infective complications. Where oophorectomy is required in addition to vaginal hysterectomy, it can have a specific role. The advantages are likely to be even greater in the obese patient, but clearly specific expertise is required to perform these procedures.

Before opting for a total abdominal hysterectomy, patients should be counselled regarding the risks associated with major surgery (infection, bleeding, damage to visceral organs, venous thromboembolism, and anaesthetic risk) The RCOG quotes an overall risk of serious complications from abdominal hysterectomy as 4 in 100 (common).

Expert comment

Hysterectomy remains the definitive treatment for menorrhagia, essentially guaranteeing amenorrhoea. A significant proportion of women will continue to require and request hysterectomy, usually where other treatments have failed. Potential benefits of retaining the cervix (subtotal hysterectomy) have been debated for decades. Only rarely, technical difficulties such as poor access or adhesions may prevent removal of the cervix and necessitate subtotal hysterectomy. It has been suggested that the reduced requirement for bladder dissection in subtotal hysterectomy is associated with a lower rate of urinary tract injury and urinary dysfunction as compared with total hysterectomy. However, this is not borne out by the three RCTs comparing the two procedures, with some evidence suggesting less urinary incontinence in women who had the cervix removed [26]. It is the concept that sexual function is less disrupted by retention of the cervix which leads many women to request subtotal hysterectomy. In fact, an improvement in sexual satisfaction has often been demonstrated with hysterectomy for clinical indications such as menorrhagia, likely to be related to relief from the underlying symptoms. The RCT evidence suggests no difference between the two operations in terms of sexual function [27]. Women considering subtotal hysterectomy must be counselled that this will necessitate continued smear tests and carries the small risks of continued bleeding from the cervical stump and cervical prolapse. Despite this, particularly in the highly subjective and sensitive area of sexual function, women who feel they will be better served by subtotal hysterectomy should be given due consideration.

Learning point Oophorectomy

Bilateral oophorectomy was previously performed regularly at the time of hysterectomy for menorrhagia. It was felt that the reduction in risk of ovarian cancer, and the potential increased difficulty of performing oophorectomy after hysterectomy should it become necessary in future, justified the procedure.

In keeping with a general trend towards more conservative treatment and away from the removal of healthy organs, routine oophorectomy is no longer advised. The effects of inducing menopause

(continued)

including increased risk of osteoporosis, loss of the cardio-protective effects of oestrogen and menopausal symptoms should be explained. It is known that a high proportion of women who intend to use hormone replacement therapy following surgery will discontinue treatment within one year. In individual cases, for example in a patient with a strong family history of breast or ovarian cancer, there may be greater indication to perform the procedure. The risks and benefits of oophorectomy should be discussed in advance of any hysterectomy.

Learning point Emerging treatments for mennorhagia

Novel treatments for menorrhagia, in particular in association with fibroids, continue to be developed. The following appear to be safe in initial studies, although most require a greater evidence base before being introduced into more widespread practice.

Laparoscopic myolysis This technique involves laparoscopic use of an energy source (laser, cryoprobe, or diathermy) to coagulate and shrink fibroids. Fibroids of up to 8 cm size have been treated in this manner, but subsequent pregnancy is not advised due to collateral devascularization of the myometrium.

MRI-guided high-intensity focused ultrasound An ultrasound beam is delivered directly to the target fibroid(s) percutaneously under ultrasound guidance. Reports suggest that due to the targeted effect of the ultrasound energy, adverse effects are reduced. However, the procedure is less suitable for women with multiple fibroids or previous abdominal surgery (burns can occur in association with scar tissue).

MRI-guided percutaneous laser ablation In this procedure, four needles are inserted into each target fibroid and laser wires are threaded through under MRI guidance. Once the tips reach the fibroid core thermal ablation is performed. Again, this procedure carries the advantages of using accurately directed energy, but may be less applicable where numerous fibroids are present.

Interstitial laser photocoagulation This procedure also employs laser fibres passing through needles directly into fibroids for treatment. However, in this case the needles are sited laparoscopically. Therefore MRI is not required and this procedure can be performed by gynaecologists.

In view of the patient's enlarged uterus and history of three previous caesarean sections, abdominal hysterectomy was advised. She opted for total hysterectomy but was advised of the small possibility that it may be necessary to retain the cervix and perform a subtotal procedure, should there be significant bladder adhesions or distortion of the pelvic anatomy related to the previous surgery. The operation was uneventful and a total abdominal hysterectomy was performed. The patient made a good recovery and was discharged from the hospital on day 3.

Discussion

Menorrhagia is a major cause of ill health in women. In addition, it is an important issue for gynaecology services, accounting for approximately 20 % of all new outpatient referrals. Despite this, until relatively recent times hysterectomy has been the only effective long-term treatment.

In the UK the number of hysterectomies for menorrhagia declined by 64 % between 1990 and 2002 [29]. There are a number of factors accounting for this dramatic change with the proliferation of effective, safer, alternative treatments such as the Mirena IUS and ablation probably the most significant. In addition there has been a shift in

attitude and a recognition that some women experience physical, psychological, and psychosexual difficulties following hysterectomy. Women are now more likely to find a solution which suits their lifestyle and wishes regarding future pregnancy.

However, challenges still exist. Clinicians are increasingly faced with women who are delaying pregnancy until later in life, yet may have severe heavy menstrual bleeding symptoms resistant to medical treatment. The options remain limited for women seeking treatment which has no impact on reproductive outcomes.

In addition, as the caesarean section rate rises, we will continue to see more patients who have previously undergone considerable pelvic surgery. This has an enormous influence on the technical difficulty and risks of surgical treatments such as myomectomy and hysterectomy. Hysterectomy continues to be a life-altering operation for many women who have suffered debilitating menstrual symptoms. At a time when falling numbers of hysterectomies mean that surgical trainees are struggling to acquire and maintain appropriate skills, the greater complexity of the operations which are performed is a major concern. The search continues for an effective, non-surgical treatment, without impact on fertility and pregnancy.

A Final Word from the Expert

Heavy menstrual bleeding remains the commonest symptom leading women to seek the advice of a gynaecologist, hence effective and sensitive handling of this complaint is central to the specialty.

The trend towards more minimally invasive, outpatient-based therapies in all aspects of medicine is also reflected here and recent advances in both medical and surgical options mean that women now have a wide range of treatments from which to choose. Despite this, hysterectomy will ultimately be the chosen treatment for many women.

Hysterectomy is an operation which carries significant cultural and social implications. Enormous variation in attitudes towards the operation exist between cultures and individuals. For some, the loss of the uterus is viewed as loss of femininity and womanhood. The high rates of hysterectomy in years gone by has also been seen an indicator of male dominance in the political and medical establishments. Although evidence regarding sexual function post hysterectomy is conflicting, it is true that proper counselling and discussion regarding psychosexual issues prior to the procedure is associated with better outcomes. The paradox for the doctor is to reassure those women with severe, intractable symptoms who are likely to be best served by hysterectomy that their overall quality of life, including sexual function, is likely to be improved following surgery, whilst explaining to those women who attend convinced that they require hysterectomy having not fully explored other options, that their symptoms may well be relieved with more conservative measures.

Hysterectomy should only be considered in women who have completed their families and where other treatments have failed or are inappropriate. In practice, this means that those hysterectomies which are performed for menorrhagia are likely to be surgically more challenging; for example, for the enlarged fibroid uterus. The increasingly surgical nature of obstetrics is also having an impact, with a large proportion of women in their 40s and 50s having undergone multiple previous caesarean sections.

As the number of hysterectomies performed dwindles, providing adequate surgical training to enable gynaecologists to meet these challenges is proving difficult. Simulation will have

a greater role and is particularly employed in training for laparoscopic surgery [30]. As technology develops effective virtual reality simulators for open surgery are likely to become more common, although their usefulness may also be limited by expense and availability.

For the foreseeable future, there is unlikely to be a replacement for the experience of operating on patients and therefore we now see a small proportion of trainees focusing on obtaining the skills required to perform more complex surgery. This trend is likely to become more pronounced, necessitating increasing specialization within gynaecology, with the majority of surgeons performing outpatient and minor procedures only. This in turn has implications for recruitment into obstetrics and gynaecology, and for the structure of services, which will need to accommodate greater referral between specialists. The priority is to maintain a system in which women have access to high calibre, appropriately trained doctors who can offer the breadth of treatments they need.

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