Uterine fibroids: impact on fertility and pregnancy loss

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Abstract
Uterine fibroids are the most common tumours of the female genital tract. Depending on their number, location and size, they may distort uterine anatomy and can adversely affect uterine physiology. It is therefore teleologically sound to suppose that fibroids could impede fertility and/or predispose to miscarriage. Their removal and a restoration of normal anatomy could thus be expected to improve fertility and reduce the risk of miscarriage. At present, it is estimated that fibroids may be associated with infertility in 5–10% women and are possibly the sole cause of infertility in 2–3%. There is good research evidence that submucous fibroids are indeed associated with subfertility, and possibly miscarriage, and that hysteroscopic resection results in improved outcomes in both conditions. There is increasing evidence that intramural fibroids may impede success in assisted reproduction technology (ART), and their removal too may improve ART outcomes. Available evidence suggests that purely subserosal fibroids have no impact on fertility or pregnancy loss. Therefore submucous fibroids found in women with subfertility and/or recurrent pregnancy loss should be subjected to hysteroscopic transcervical resection. Careful consideration should be given to myomectomy (laparoscopic or conventional) in women with intramural fibroids of considerable size undergoing ART in whom other causes of the subfertility and/or recurrent pregnancy loss have been eliminated. It is doubtful whether intervention with subserosal fibroids would be of any benefit where the only symptoms are subfertility and recurrent pregnancy loss.

Keywords fibroids; hysteroscopy; infertility; laparoscopy; leiomyoma; miscarriage myomectomy; recurrent pregnancy loss; uterine artery embolisation

Introduction
Fibroids are the most common neoplasms of the female genital tract. It is estimated that 30% of women will have a fibroid or fibroids by the age of 30 years, the figure rising with increasing age to an overall figure of 50% of women of reproductive age, although there are ethnic differences. Women of African-American and Afro-Caribbean origin and those with a family history of fibroids are more likely to have fibroids. Marshall et al in 1997 showed that rates of uterine leiomyoma in black women were significantly higher for diagnoses confirmed by ultrasound or hysterectomy (relative risk 3.25; 95% confidence interval 2.71–3.88) compared with rates among white women. However, 50% of women with fibroids are asymptomatic, thus rendering accurate estimation of prevalence difficult. With the advent of high-resolution ultrasound scanning and other diagnostic aids such as magnetic resonance imaging (MRI) and computed tomography, 1.5–4 times more women are being diagnosed with fibroids.

With regards to reproduction, issues of main concern include whether fibroids could cause subfertility, miscarriage, complications of late pregnancy such as preterm birth, labour complications such as malpresentations, obstructed labour, dysfunctional uterine contractions, and postpartum complications such as haemorrhage, sepsis and failure of uterine involution. Received wisdom suggests that 50% of women with fibroids are entirely without symptoms, while 30% may present with menorrhagia and 20–50% with pressure symptoms, the proportion presenting with reproductive compromise remaining difficult to quantify. Whether or not fibroids are symptomatic presumably depends on their size, number and location. Submucous fibroids might be expected to cause menstrual disturbance such as menorrhagia and intermenstrual bleeding, and as they distort the uterine cavity, they are likely to cause or be associated with sub fertility and/or miscarriage. The impact of intramural fibroids is more likely to be critically dependent on their size – the bigger the fibroid, presumably the more symptomatic it is – although their location too may be important, large fibroids in the lower uterine segment being likely to complicate labour and delivery. Subserous fibroids are least likely to be symptomatic, but if pedunculated they could cause pain if they underwent torsion.

Impact of fibroids on fertility
Since the vast majority of women with fibroids are fertile and largely asymptomatic, it is patently evident that the mere presence of fibroids does not mean that reproduction will be compromised. The corollary, however, is that since fibroids are extremely common tumours, and depending on their number, size and location, they could distort uterine anatomy and adversely affect uterine physiology; there must be therefore instances in which they could indeed compromise reproduction. In such circumstances, removal of the fibroids and restoration of normal anatomy could then be expected to improve reproductive function. At present, it is estimated that fibroids may be associated with infertility in 5–10% women, and possibly be the sole cause of infertility in 2–3%. However, there is a great deal of uncertainty and controversy in this area, and much research is required before many of the issues can be resolved.

There are various mechanisms by which fibroids could impair fertility and/or cause miscarriage.

How fibroids could impair fertility: theoretical considerations
• Distortion of endometrial cavity contour. Distortion of the endometrial cavity is thought to reduce implantation rates, and the anatomical location of the fibroid is an important determinant of
the reduced implantation rates. A submucous fibroid located near the internal os of the cervix may prevent sperm migrating into the uterine cavity and fallopian tubes. A large intramural or submucous fibroid may obstruct sperm migration into the fallopian tubes if it is located near the cornual end of the tube. In addition, a fibroid situated near the uterine cornua may cause distortion of the fallopian tube, narrowing or kinking due to pressure, leading to tubal blockage with or without a hydrosalpinx. It is thought that due to an enlarged uterine cavity, the distance that sperm must travel increases.

- **Reduced implantation.** It has been suggested the endometrium overlying an intramural fibroid is likely to have reduced vascularity, this as well as possible discordant growth of the endometrium may lead to failure of implantation.

- **Dysfunctional uterine contractility.** Both submucous and intramural fibroids can lead to dysfunctional uterine contractility and thereby alter the sperm migration, tubal contractility and embryo nidation.

- **Changes in the endometrial cavity milieu.** Deligdish and Lowenthal in 1970 described glandular atrophy and distorted elongated glands at the site of the myoma. They also found evidence of adenomyosis and separation of muscle fibres from the basal layer of the endometrium in the curettings obtained from women with myomas. It is thought that the paracrine milieu in the uterine cavity with myomas changes such that it is not congenial to the embryo. A secretion of vasoactive amines, local inflammatory changes and a preponderance of androgens within the endometrial layer of the endometrium in the curettings obtained from women with myomas. It is thought that the paracrine milieu in the uterine cavity with myomas changes such that it is not congenial to the embryo. A secretion of vasoactive amines, local inflammatory changes and a preponderance of androgens within the endometrial layer of the endometrium in the curettings obtained from women with myomas.

**Effect of fibroids on spontaneous conception**

The issue of whether or not fibroids have a causal role in subfertility could be addressed by well-designed prospective randomised clinical studies that would compare spontaneous pregnancy rates or time taken to conceive in otherwise healthy women with and without fibroids. Unfortunately, such a study has yet to be done. Thus there are currently no data to resolve the issue of whether fibroids are causal or casual when a woman presents with subfertility while also having fibroids. In the UK, more and more women are delaying child bearing into their 30 s while they pursue professional careers. Thus, more and more women will have fibroids at the time they chose to embark on a pregnancy, and perhaps the opportunity to conduct the above suggested trial is nigh.

The information that is currently available has been obtained from studies of women who have already presented with subfertility. A good example is the report by Bulletti et al (1999), who studied 212 women who were being investigated for infertility and who were found to have fibroids. According to case–control criteria, 106 women underwent laparoscopic myomectomy, whereas the other 106 did not. They also studied another group of 106 women who had unexplained infertility and no fibroids. The findings of the study were fascinating: women who underwent laparoscopic myomectomy had better pregnancy rates (42%) compared with women who attempted conception with fibroids in situ (11%). In the unexplained infertility group, conception rates were 25%. Therefore, on the face of it, it is tempting to conclude that fibroids impair fertility, and their removal dramatically improves outcome, not only surpassing outcome for women whose fibroids have not been removed, but also in women with otherwise unexplained subfertility. However, the study was not without significant flaws, which warrant that the results are interpreted with caution: the type and size of fibroid and the presence or absence of cavity distortion were not stated, yet these are important confounding variables. In addition, the follow-up was limited to 9 months.

**The effect of fibroids on outcomes in assisted reproduction technology**

The potential mechanisms by which fibroids could compromise reproductive function have already been described. It is postulated that uterine fibroids are associated with poorer reproductive outcomes in assisted reproduction technology (ART), but the evidence to support this is scanty and often controversial. There is a general acceptance or consensus that submucous fibroids impede fertility. There also appears to be a general recognition that subserous fibroids are unlikely to compromise fertility or cause miscarriage, both on the basis of teleology and on the limited research evidence available. The major controversy relates to the possible role or impact of intramural fibroids. The short comings of the available literature include inconsistencies in describing the size, number or position of fibroids, whether there is cavity distortion and the methods of assessing any such distortion. It is virtually impossible to conduct any meaningful meta-analyses on the basis of the available studies due to these disparities between the studies.

There are only five prospective studies to date evaluating the effect of fibroids on fertility and pregnancy loss. Three of these have shown a reduction in implantation rates with intramural fibroids. Check et al (2002) have calculated that, in order to detect a difference in spontaneous abortion and delivery rates of 15% at the 0.05 level of significance with 80% power, 163 patients would be required per group. They have suggested that the only way forward would be to conduct a multicentre study in order to resolve the issue of the effect of fibroids (with no intracavitary involvement in fertility. All the studies until 1998 used hysterosalpinography (HSG) and transvaginal ultrasound scanning (TVS) to diagnose the intracavitary involvement of fibroids. Since then, the importance of defining cavitary involvement with hysteroscopy or saline hysterosonography has been recognised (Table 1).

Although Eldar-Geva et al (1998) specifically looked at intramural fibroids not distorting the cavity, the assessment of cavity distortion was made on the basis of TVS alone (Table 1). Therefore submucous fibroids with less than 50% projecting into the cavity might have inadvertently been included in this group of patients. TVS has been shown to be less sensitive and specific than either hysterosonography or hysteroscopy when these three modalities are compared against surgical pathology specimens. HSG has been shown to have sensitivity as low as 50% and a positive predictive value as low as 28.6% for identifying intrauterine abnormalities. As a diagnostic test, hysterosonography has been shown to be superior to TVS or HSG and is comparable to hysteroscopy. It is therefore important to evaluate the uterine cavity with either hysteroscopy or hysterosonography prior to ART in women with fibroids. These tests can achieve a sensitivity, specificity and positive predictive value of almost 100% with respect to uterine cavity distortion.

As already alluded to, women with fibroids distorting the uterine cavity are likely to have reduced implantation and pregnancy rates. Some studies have shown a decrease in pregnancy.
rate, whereas others have not confirmed these findings. A recent systematic review of the available data showed that only fibroids with an intracavitary component result in decreased fertility rates. Benecke et al (2005) recently reviewed the literature and concluded that patients with intramural fibroids had a lower implantation rate per cycle. What is not clear, however, from the six studies that they included in their review is the size of the fibroids distorting the cavity. Only one study had addressed this issue. Unfortunately, Benecke et al did not stratify their data according to the presence or absence of cavity involvement, thus limiting the conclusions that can be derived from their study.

Should women with fibroids and subfertility who have been recommended ART undergo myomectomy prior to fertility treatment? Three authors have stated that myomectomy should be advised prior to in vitro fertilisation depending on the size of the fibroids: fibroids over 7 cm and over 10 cm, and uterus over 12 weeks’ size, respectively. If the uterus is over 12 weeks in size, with large intramural fibroids at any site, myomectomy should perhaps be performed in order to reduce the future morbidity of the operation should the fibroids grow further. Intramural fibroids less than 5 cm without cavity distortion should be treated on individual merit, taking the history of the patient into consideration. Proper counselling regarding the after-effects of the procedure is important.

Non-surgical alternatives to myomectomy include uterine artery embolisation and MRI-guided focused ultrasound therapy, but the impact of these relatively new treatments on fertility remains uncertain.

### Submucous fibroids, infertility and the impact of hysteroscopic resection

It makes teleological sense to suppose that submucous fibroids are highly likely to be symptomatic. Anatomically, when they are pedunculated without intramural extension, they are classified as type 0; when sessile with less than 50% intramural extension they are called type I; and when sessile with more than 50% intramural extension they are called type II. Submucous fibroids frequently present with menorrhagia and/or intermenstrual bleeding. These symptoms by themselves may reduce the frequency of coitus and thereby impair fertility, but the very presence of a space-occupying lesion is likely to impair fertility by a mechanical effect or by any of the other mechanisms already postulated (see above).

The good news is that most submucous fibroids can be easily excised by transcervical hysteroscopic resection with relatively little morbidity compared with any other form of myomectomy. Compared with open myomectomy, hysteroscopic myomectomy is associated with a lower risk of scar rupture during subsequent pregnancy and vaginal delivery. Pelvic adhesions, which commonly occur following conventional myomectomy, can be avoided. The risks of hysteroscopy include bleeding and hypotatraemia, both related to the complexity and duration of the procedure, repeat procedure to complete the resection and intrauterine scarring. However, these are rare complications, and there is therefore little controversy regarding the removal of submucous fibroids for the enhancement of fertility.

But what does the research say? A resection of submucous fibroids leading to improved pregnancy rates has been reported by several authors (Table 2). In a study of 134 infertile women undergoing hysteroscopic myomectomy with Nd:Yag laser or scissors, Ubaldi et al (1995) reported a pregnancy rate of 58.9%. Unfortunately, no control group was included, although the authors were happy to conclude that hysteroscopic myomectomy

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**Table 1**

<table>
<thead>
<tr>
<th>Cavity assessment</th>
<th>Mean size of fibroid (cm)</th>
<th>Study group</th>
<th>Control group</th>
<th>Statistically significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVS ± HSG</td>
<td>1.9 ± 1.3</td>
<td>31.5 DR</td>
<td>32 DR</td>
<td>No</td>
</tr>
<tr>
<td>TVS ± HSG</td>
<td>1.8 ± 0.1</td>
<td>37.7 DR</td>
<td>22.9 DR</td>
<td>No</td>
</tr>
<tr>
<td>Hysteroscopy ± TVS</td>
<td>3.1 ± 2</td>
<td>30.2 PR</td>
<td>33.2 PR</td>
<td>No</td>
</tr>
<tr>
<td>TVS ± hysterosonography</td>
<td>2.3 ± 1.1</td>
<td>28.3 PR</td>
<td>15.1 PR</td>
<td>Yes</td>
</tr>
<tr>
<td>TVS</td>
<td>2.4 ± 0.7</td>
<td>30.1 PR/transfer</td>
<td>16.4 PR/transfer</td>
<td>Yes</td>
</tr>
<tr>
<td>TVS ± HSG</td>
<td>2.9</td>
<td>33 DR</td>
<td>48.4 DR</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Note:** DR, delivery rate; HSG, hysterosalpingography; PR, pregnancy rate; TVS, transvaginal sonography.
is a safe and effective procedure for enhancement of fertility. Keltz et al (1998) has reported improved pregnancy rates in women who underwent polypectomy and hysteroscopic myomectomy during routine hysteroscopy for uterine cavity assessment as part of infertility work-up compared with infertile women with normal uterine cavities.

Bernard et al (2000) reported fertility and the outcome of pregnancies after hysteroscopic myomectomy according to the characteristics of the submucous myomas and the association with intramural myomas. A higher delivery rate was observed in women with one submucous myoma resected compared with those with two or more fibroids (P = 0.02). No difference in pregnancy and delivery rates was seen based on size and location of submucous myoma. In contrast, in patients without associated intramural myomas, the delivery rate was significantly greater (P < 0.03) and the delay in conception was significantly shorter (P = 0.05) than those found in patients with submucous and intramural myomas (3.1 months and 4.8 months, respectively).

In summary, as the benefits of hysteroscopic myomectomy are obvious and the risks of surgery are few, the resection of submucous myomas to enhance fertility in a woman with no other obvious cause of infertility should be advocated.

Intramural and subserous fibroids, subfertility and the impact of myomectomy

Conventional open myomectomy. Historically, abdominal myomectomy is known to be associated with significant operative and postoperative morbidity. Infection leading to compromised tubal function, damage to internal organs, the risk of blood or blood product transfusion, conversion to hysterectomy and a high rate of postoperative adhesion formation, especially with posterior incisions, has been reported with open myomectomy. Recurrence of leiomyoma (at a rate of 15%) adds to the morbidity of the procedure. Added to that is the risk of uterine rupture (1%) and an increased likelihood of caesarean section (50%) in any future pregnancies. There are thus many reasons to be wary of myomectomy where indications are unclear.

In one series of 677 major procedures carried out for fertility enhancement between 1970 and 1980, fibroids as the sole indication for surgery accounted for 2.4% of cases, whereas the corresponding rate in the series by Verkauf was 1%. This would suggest that fibroids were not perceived as a common cause of infertility. Several retrospective and prospective studies have reported improved pregnancy rates following abdominal and laparoscopic myomectomy (Table 3). The overall pregnancy rates reported is 50–68% with a miscarriage rate of up to 40%.

Allowing for the inadequacies of the research that has been published, the overall impression is that myomectomy as a reductive procedure improves conception and delivery rates. The best results are obtained in the younger woman with a single fibroid. Open myomectomy should be the option of choice when there are large subserosal fibroids or multiple (more than five) fibroids. A duration of infertility that is short, which is probably linked to the younger age group and the absence of additional factors accounting for the infertility, increase the chances of success postoperatively. Myomectomy should not be withheld from any woman with fibroids who is desirous of fertility and in whom no other aetiology for the subfertility is identified.

Planning the optimum time for surgery is important as the patient’s best chance of conception is in the first year after surgery. The procedure should be carried out using the principles of microsurgery. The minimum number of vertical incisions should be used and posterior incisions avoided if possible. There is insufficient information regarding the effect of breaching the uterine cavity and subsequent fertility and/or the risk of scar rupture during a subsequent labour. More relevant to outcome is the detection and removal of submucous fibroids, or fibroids impinging on the endometrial cavity.

Laparoscopic myomectomy. Laparoscopic myomectomy has been reported as treatment for symptomatic myomas including those associated with infertility. In the very first series of results that were published by Dubuisson in 1991, the outcome in terms of subsequent pregnancy was comparable to that of a laparotomy-based approach. Laparoscopic myomectomy offers shorter hospitalisation, faster recovery, fewer adhesions, low postoperative pain, a reduced risk of haemorrhage and minimal aesthetic damage compared with the conventional open approach. However,
it is clear that, even in highly trained hands, patients must be well selected for the procedure based on the number, size and location of the fibroids. Concern has been expressed regarding the integrity of the scar and its ability to withstand labour.

Hurst et al (2005) reviewed laparoscopic myomectomy and concluded that it is an acceptable if not preferable procedure compared with the open procedure, especially in women trying to conceive. Seracchioli et al (2006) studied a total of 514 patients who underwent laparoscopic myomectomy, in whom 158 pregnancies were achieved; there were 27.2% spontaneous abortions and 2.6% ectopic pregnancies. The vaginal delivery rate was 25.5%, whereas 74.5% underwent a caesarean section. No instance of uterine rupture was noted in this particular series.

The current available reports would seem to suggest that reproductive outcomes are similar following laparoscopic and open myomectomy. However, any fibroid that can be removed laparoscopically can also be removed by the open procedure, although the converse is not true. Where there are more than two fibroids with a total uterine size in excess of 12 weeks, few surgeons have the skills to remove the fibroids laparoscopically. In reality therefore, few women are suitable for laparoscopic myomectomy, and it is often necessary to leave some fibroids, which undoubtedly grow and eventually become symptomatic.

**Uterine artery embolisation and reproduction.** Uterine artery embolisation (UAE) is a relatively new, albeit very popular alternative treatment for symptomatic fibroids – the National Institute for Health and Clinical Excellence has recommended that it should be offered to women as an alternative to hysterectomy. The procedure involves bilateral block of the uterine arteries, with the fibroids undergoing shrinkage while the myometrium is presumably spared by the collateral circulation from the vaginal and ovarian arteries.

The first report of the successful use of UAE for uterine fibroids emerged in 1995 from the French group led by the radiologist Dr Ravina and his colleagues. Since then, well in excess of a million procedures have been performed worldwide, and the results from the point of view of symptom relief are very encouraging.

While fibroid shrinkage is reported in the range 40–70%, it is clear that many women experience significant improvement in symptoms including menorrhagia, dysmenorrhoea and some pressure symptoms even when fibroid shrinkage appears to be minimal. From the outset, concerns have been raised about the possible negative impact of UAE, with theoretical assumptions being made on the possible risks of abnormal placentation leading to intrauterine growth restriction, miscarriage, preterm birth and postpartum haemorrhage. Caution has been advised when offering UAE to women who might wish to conceive in the future, since data on the impact of UAE on pregnancy are scanty and there are no randomised trials on it to date. However, there has been a series of case reports.

In 2002, Goldberg and his colleagues reported data analysis from 50 pregnancies following UAE and showed that these women were more likely to develop postpartum haemorrhage, preterm delivery, caesarean delivery and malpresentation in labour compared with the general population. Walker and colleagues (2006) reported their series of 56 completed pregnancies identified in approximately 1200 women after UAE. Thirty-three out of the 56 (58.9%) pregnancies had a successful outcome, whereas 30.4% ended in miscarriage. Most series are retrospective, and there are many confounding variables including the fact that women undergoing UAE tend to be older, are not usually planning a pregnancy and often have other fertility issues: all one can confidently conclude is that some women will have successful pregnancies after UAE. When it is better established as a treatment for symptomatic fibroids, it may become ethical to conduct the much-needed randomised trials that would establish the place of UAE in women presenting with subfertility and uterine fibroids.

In theory, the procedure has advantages over myomectomy in being minimally invasive, avoiding the risks of major intra-abdominal surgery and affording a shorter convalescence. But amenorrhoea complicates about 1% of UAE procedures and is attributed to ovarian embolisation leading to ovarian failure or endometrial atrophy due to endometrial vascular damage. There is thus insufficient evidence to recommend UAE for women

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**Table 3**

<table>
<thead>
<tr>
<th>Studies</th>
<th>Type of surgery</th>
<th>Number of women</th>
<th>Pregnancy rate</th>
<th>Miscarriage rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serracchioli (2006)</td>
<td>Laparoscopic</td>
<td>514</td>
<td>X</td>
<td>158</td>
</tr>
<tr>
<td>Marchionni (2004)</td>
<td>Abdominal</td>
<td>72</td>
<td>28</td>
<td>70</td>
</tr>
<tr>
<td>Seracchioli (2000)</td>
<td>Abdominal</td>
<td>65</td>
<td>X</td>
<td>55.9</td>
</tr>
<tr>
<td>Campo (2003)</td>
<td>Abdominal</td>
<td>66</td>
<td>X</td>
<td>53.6</td>
</tr>
<tr>
<td>Vercellini (1998)</td>
<td>Laparoscopic</td>
<td>19</td>
<td>80</td>
<td>78.9</td>
</tr>
<tr>
<td>*Buttram (1981)</td>
<td>Abdominal</td>
<td>22</td>
<td>50</td>
<td>63.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>138</td>
<td>10</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76</td>
<td>X</td>
<td>54</td>
</tr>
</tbody>
</table>

X, No data available; *Review of three studies.
desirous of future fertility. UAE could be used in carefully selected groups of women in whom extensive pelvic adhesions following a previous myomectomy might present these women with a high possibility of hysterectomy, or where women choose, after counselling, to avoid major surgery.

Impact of fibroids on pregnancy loss

Fetal wastage in the presence of fibroids, where the suggestion is that the fibroids were implicated in the wastage, has been reported in several studies, with improvement following myomectomy adding credence to the assumption that fibroids could cause miscarriage. The underlying mechanisms that could lead to subfertility, as outlined previously, could also be applicable to how fibroids could cause miscarriage. For instance, it seems reasonable to suppose that implantation onto a submucous fibroid, or one that is intramural but encroaching onto the cavity, could compromise implantation and/or placenta tion and thereby predispose to miscarriage.

Reports that bleeding in early pregnancy is common in women with fibroids are commonplace, thus increasing the risk of spontaneous miscarriage. An example is shown in the population-based study of 2065 women with leiomyomas noted on hospital discharge records, who were matched randomly by birth year to women without fibroids, that was carried out in Washington DC to assess pregnancy and delivery complications. An independent association was found between leiomyoma and first-trimester bleeding (odds ratio 1.82, 95% confidence interval 1.05–3.2). Miscarriage was likely if the fibroid was submucous.

Another group of researchers from Sheffield, UK (Li et al, 1999) reported a very high first-trimester miscarriage rate of 40% and a second-trimester miscarriage rate of 17% with intramural and subserous leiomyoma. They then looked at the impact of myomectomy. In 11 patients, the indication for myomectomy was recurrent pregnancy loss. In this group of women, 22 pregnancies were lost out of a total of 28 (a miscarriage rate of 79% before compared with 33% after myomectomy). This included first- and second-trimester miscarriages and a single third-trimester loss; a 21% live birth rate was noted. Reductions in first-trimester loss from 41% to 19%, 60% to 24% and 54% to 22% have been reported by different authors following abdominal myomectomy (see Table 3). Intramural myomas are also reportedly associated with a high rate of spontaneous abortion (12.5–30.7%).

Other authors have suggested an association between intramural and subserous myomas with pregnancy loss. In a study from Italy by Vercellini and colleagues, a subgroup of 36 women underwent myomectomy with miscarriage as the sole indication. The majority of these women had had first-trimester miscarriages. There was a rise in the live birth rate from 10% to 87% after conservative surgery. A similar reduction in miscarriage rate was demonstrated by Campo et al (2003) for both abdominal and laparoscopic myomectomy. Of the 41 patients wishing to conceive, the miscarriage rate dropped from 57.1% to 13.8% following myomectomy. The mean number of fibroids removed was 2.9. The mean diameter was 6 cm in the laparotomy group and 4.4 cm in the laparoscopy group.

In other studies, leiomyomas have been reported in 14–18% of women with recurrent miscarriages. In 50% of these cases, no other detectable cause of miscarriage was found. Based on these figures, it can be estimated that leiomyomas could be the cause of miscarriages in about 7% of women with a history of recurrent miscarriage.

Summary

Submucous fibroids are likely to increase the risk of miscarriage and should be removed hysteroscopically in a woman seeking pregnancy. In women with all other types of fibroids, careful consideration of the obstetric history is important before advising intervention. Fetal wastage in the first trimester is common for a variety of reasons. Certainly, if the fibroid is more than 5 cm diameter with distortion of the uterine cavity, there is a history of two or more pregnancy losses and no other cause has been found, a consideration of myomectomy may be justified. The final decision in such cases should be individualised, based on the wishes of the woman, her obstetric history and the investigation findings. Women who have suffered pregnancy losses and are desperately trying to conceive will agree to try anything to improve their chances. It is all the more important that advice given in these circumstances should be based on evidence rather than individual anecdotal experience. Of course, evidence may be lacking, and it is vital to be honest with such women in order that expectations are realistic.

FURTHER READING

Fibroids are the most common neoplasms of the genital tract, with an estimated prevalence of 30% in women over 30 years of age. Of those with fibroids, 50% generally have no symptoms. Common symptoms of presentation are menorrhagia (30%), pressure symptoms (20–50%) and subfertility, which is difficult to quantify (estimated at 5–10%, with fibroids being the sole factor for infertility in 2–3%). Factors to be considered in formulating a plan of management in a subfertile woman with fibroids are an accurate estimation of the size, number and location of the fibroids and whether or not the uterine cavity/anatomy is distorted. TVS and hysteroscopy can achieve a sensitivity and specificity of 100% in the evaluation of uterine cavity distortion.

It is reasonable to consider a hysteroscopic myomectomy for submucosal fibroids in a subfertile woman as this entails relatively little morbidity compared with an open myomectomy. Open myomectomy should be considered where there are large subserosal/intramural fibroids and they are multiple (>5). Patients should be carefully counselled about the intraoperative risks, risks of recurrence of leiomyoma (15%), uterine rupture (1%) and increased likelihood of caesarean section (50%) in future pregnancies. Uterine artery embolisation is a popular new option, but there is limited evidence of the benefits in a woman desirous of children. It has a definite role in selected and well-counselled groups of women with fibroids. Leiomyomas, particularly the submucous variety, are likely to increase the risk of miscarriage, and a hysteroscopic resection should be considered. For all other types of leiomyoma, evaluation of the obstetric history and the informed choice of the woman should be sought prior to any intervention.