Surgical correction of congenital uterine anomalies

SJF Matts, TJ Clark, KS Khan, JK Gupta

Congenital uterine abnormalities have been associated with poor reproductive outcome. Anatomical corrections utilizing open or endoscopic surgery has been recommended to improve these outcomes. This article assesses the available evidence.

The incidence of congenital uterine anomalies is estimated to be around 5%. They can be associated with adverse reproductive sequelae and therefore there has been considerable interest in surgically correcting the underlying anatomical defects (metroplasty). Open abdominal procedures were originally described, but are associated with morbidity relating to the laparotomy incision, such as adhesion formation, which may further impair fertility. Minimally invasive hysteroscopic approaches are therefore increasingly being used to avoid such side-effects. The efficacy of all such interventions is not established.

This article will review the use of metroplasty in congenital uterine abnormalities and reproductive function from the few large reported retrospective and prospective case series.

METHODS

A literature review was conducted to investigate hysteroscopic metroplasty. A Medline search from 1966–98 of English language papers, using the search terms 'metroplasty', 'hysteroscopy' and 'uterine anomaly', produced 124 papers on the subject. There were no randomized controlled trials (RCTs). Therefore the evidence available from all the studies should be regarded as of poorer quality as a result of their less robust methodological designs.

UTERINE ANOMALIES

The rate of uterine anomalies in the UK is not accurately known, although estimates in other populations vary between 3 and 5% (Acien, 1997). However, the rate of uterine abnormalities has been reported to be as high as 43% in high

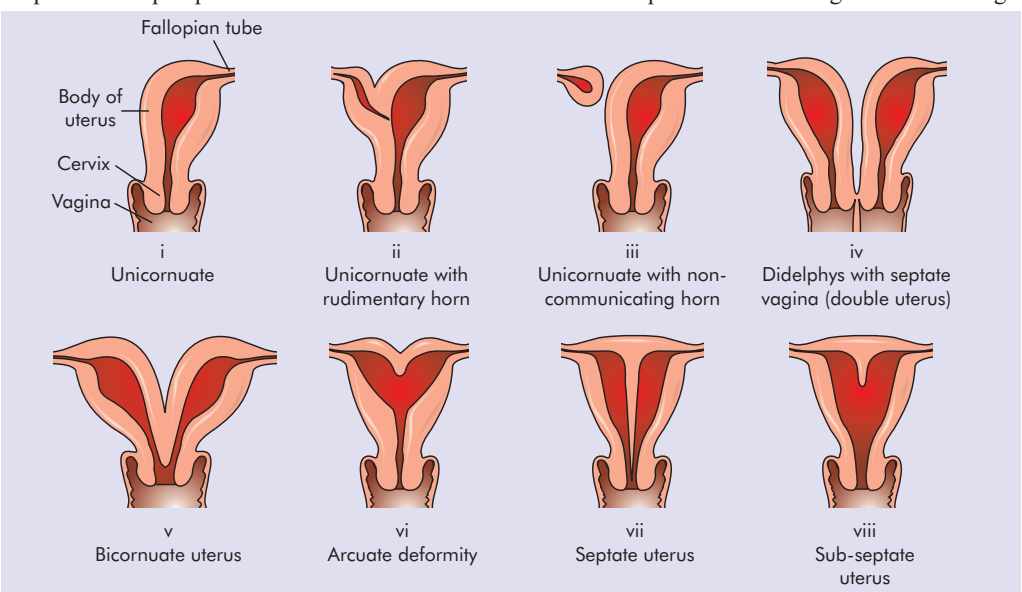

Figure 1. Types of uterine anomalies. Only a septate or subseptate uterus is amenable to hysteroscopic surgery.

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TABLE 1.
Fetal survival rates in untreated uterine anomalies

	Fetal survival rate (%)	
Type of uterine anomaly	Acien (1993) *n* = 176	Heinonen et al (1982) *n* = 182
Unicornuate	71	40
Didelphys	72	64
Bicornuate	44	64
Septate	59	86
Subseptate	69	89

risk populations with infertility and recurrent pregnancy loss. The various types of uterine anomaly are illustrated in *Figure 1*.

Uterine malformations have been associated with recurrent miscarriage, second trimester abortion, late fetal loss, preterm labour, malpresentation and increased incidence of caesarean section (Acien, 1993; Heinonen et al, 1982; Heinonen, 1997). In addition, fetal survival rates among women with uterine malformations are lower than those in women with normally-formed uteri. Fetal survival rates may be expected to correlate with the type of uterine anomaly present, but no consistent pattern is apparent from the literature (*Table 1*). In view of the morbidity associated with uterine structural anomalies there has been a trend in gynaecological practice towards their surgical correction.

SURGICAL TREATMENT

The traditional surgical procedure used in the treatment of uterine anomalies has been metroplasty, which was the term originally used by Strassman to describe unification of the double uterus. Indications for metroplasty have included recurrent first trimester miscarriage, second trimester fetal loss and late fetal wastage associated with congenital uterine anomaly. This operation was originally performed using a vaginal and later an open, abdominal approach, but more recently endoscopic techniques have been employed.

Strassman (1952) and later Jones and Wheeless (1969) described techniques of wedge resection via laparotomy, and Tompkins (1974) described the open excision of septae to correct uterine morphology. Hysteroscopic metroplasty was proposed as early as 1974 and the technique has been refined with more recent advances in endoscopic technology. The resectoscope is most commonly used, although some surgeons prefer the neodymium:yttrium-aluminium-garnet (Nd:YAG) laser. Preoperative endometrial preparation using danazol or gonadotrophin analogues does not appear to produce superior results.

Hysteroscopic methods reduce postoperative morbidity associated with a laparotomy scar and published data have reported shorter operating times and inpatient stay. Furthermore, reduced peri- and postoperative complication rates have lead to a shorter delay in attempting future pregnancies (Daly et al, 1983; Colacurci et al, 1998). Delivery of future pregnancies treated hysteroscopically does not necessitate caesarean section as has traditionally been recommended following abdominal metroplasty, as this method involves hysterotomy (Israel and March, 1984). Hysteroscopic surgery is therefore recommended as first-line treatment of uterine septae. However, this minimally invasive approach is contraindicated in bicornuate and didelphic uteri where an open method should still be undertaken.

QUALITY OF EVIDENCE FOR METROPLASTY

Some authors contend that conducting a RCT would be unethical as metroplasty is established and effective (March and Israel, 1987), and they have argued against comparing abdominal with hysteroscopic metroplasty. However, the historical use of abdominal metroplasty was for different indications than those used to justify the hysteroscopic procedure in the 1990s. The longstanding accepted treatment of abdominal metroplasty has not always been shown to improve obstetric outcome. A retrospective case-control study of women who had undergone abdominal metroplasty for didelphic and non-didelphic uterine anomalies (Kirk et al, 1993) did not show any significant difference in obstetric outcome between cases and controls. However, the majority of published reports on abdominal metroplasty suggest improvement in outcome following this intervention (Rock and Jones, 1977).

Hysteroscopic metroplasty was introduced into routine practice as an alternative to the traditional open procedures in women with septate or subseptate uteri, with no direct randomized comparison of outcomes, pregnancy rates or complications. The best available evidence for hysteroscopic metroplasty is in the form of case series, varying in size from two to 973, although the majority contain fewer than 20 cases (March and Israel, 1987; Colacurci et al, 1998; Daly et al, 1989). Case series have been compiled sometimes over several decades and are therefore subject to confounding factors associated with improved pregnancy outcomes (Heinonen, 1997; Daly et al, 1989).

Women with uterine malformation and primary and secondary infertility, dysmenorrhoea, or poor previous obstetric outcomes (recurrent first trimester miscarriage, second trimester miscarriage and late fetal loss) (March and Israel, 1987; Colacurci et al, 1998) have been subject to hysteroscopic metroplasty. In addition, it has been suggested that hysteroscopic metroplasty should be considered prophylactically in women identified with congenital uterine anomalies to protect against putative future reproductive problems.

The majority of studies have been heterogenous, containing women with infertility, recurrent early pregnancy loss and late pregnancy loss, and it is thus difficult to ascertain the utility of the procedure for women with different individual indications for metroplasty. In addition, the majority of studies have failed to consider other causes of recurrent pregnancy loss, such as antiphospholipid syndrome, now recognized as a major contributor to recurrent miscarriage in the first trimester.

Heinonen (1997) reported a study of 247 women with septate and subseptate uteri treated either with abdominal metroplasty between 1962 and 1989, hysteroscopic metroplasty between 1986 and 1995 or who underwent no treatment. The group was heterogenous, containing women with both recurrent and late pregnancy loss and with infertility. Eighty-seven per cent of these infertile women had another attributed cause for their failure to conceive. Critical appraisal of the paper suggests the groups were not comparable as the infertility rate was higher in women undergoing hysteroscopic metroplasty compared to those who did not have any surgery. Furthermore, the conception rates in the fertile women are lower following surgery compared to preoperative rates (60% postoperatively compared to 85% preoperatively in the abdominal metroplasty group and 63% postoperatively compared to 75% preoperatively in the hysteroscopic group). Among the 140 women who were untreated, 83% conceived, the miscarriage rate was 28%, term delivery rate was 60% and the fetal survival rate was 67%. This study showed that surgery conferred no advantage and, worse still, appeared to reduce conception rates and did not produce a significant improvement in pregnancy rate or fetal survival (*Figure 2*).

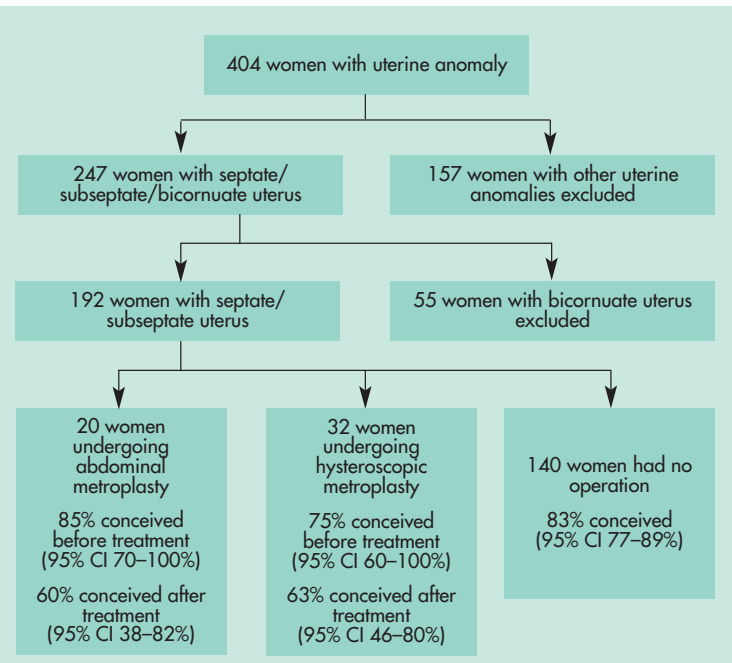

Figure 2. Conception rates following abdominal or hysteroscopic metroplasty compared with conservative management, from Heinonen (1997). CI = confidence interval.

The largest series consisted of a retrospective review of 10 years' experience of hysteroscopic metroplasties, performed for recurrent miscarriage, infertility and prophylaxis with a view to future pregnancies (Colacurci et al, 1998). Of the 973 metroplasties performed, there are pregnancy outcome data in only 344 women, representing only 35% of the subjects. Of these selected cases, 78% of pregnancies reached term with a 14% first trimester and 4% second trimester miscarriage rate.

INFERTILITY AND HYSTEROSCOPIC METROPLASTY

Subgroup analysis in the studies reported by Colacurci et al in 1996 and Daly et al in 1989, looking at the role of metroplasty in infertility, demonstrated that conception rates were not different to the general infertile population after hysteroscopic metroplasty and that metroplasty did not 'cure' infertility.

RECURRENT PREGNANCY LOSS AND HYSTEROSCOPIC METROPLASTY

The majority of the studies concerning recurrent miscarriage failed to investigate the women for immunological abnormalities, such as antiphospholipid syndrome, now recognized as a major cause of recurrent abortion and late pregnancy loss (March and Israel, 1987; Colacurci et al, 1996; Daly et al, 1989). Indeed, March and Israel's study, which looked specifically at 79 women with recurrent abortion and septate uterus, included women with only one or more miscarriages or a second trimester loss as 'recurrent abortion'. The group also included 43 women with another adverse reproductive factor

such as cervical incompetence, balanced translocation and ovulation defects. Of these women who decided to conceive, 84% succeeded with 87% of pregnancies proceeding beyond the first trimester.

A summary of the fetal survival rates aggregated from 35 case series (*Figure 3*) suggests that both hysteroscopic and abdominal metroplasty produce similar overall rates of fetal survival. There may be a trend towards improved fetal survival compared with conservative management, but until adequate prospective RCTs are undertaken, no meaningful conclusions can be drawn.

CONCLUSION

The majority of women with uterine abnormality will successfully achieve a pregnancy without intervention, although the incidence of miscarriage, malpresentation and caesarean section are increased (Heinonen et al, 1982; Acien, 1993). Pregnancies should always be treated as high risk and supervised accordingly. The evidence for the benefit of hysteroscopic metroplasty in recurrent abortion is of poor quality and should be interpreted with caution. This is because there are no reported RCTs, eligible groups are heterogeneous and follow up is incomplete. In women with second trimester loss and preterm labour, metroplasty may improve pregnancy outcome, but they remain at increased risk of preterm delivery, although the data are again of poor quality. Furthermore, hysteroscopic metroplasty does not improve outcome or 'cure' unexplained infertility.

We recommend careful counselling of all patients with uterine anomalies and a detailed past obstetric history should be obtained. Underlying reproductive problems such as infertility should be addressed instead of focusing on the uterine anomaly, the presence of which does not necessarily imply causation. Patients with pure septate or subseptate uteri should be considered for surgical intervention only in a research trial setting. RCTs of sufficient power are urgently needed. HM

Conflict of interest: none.

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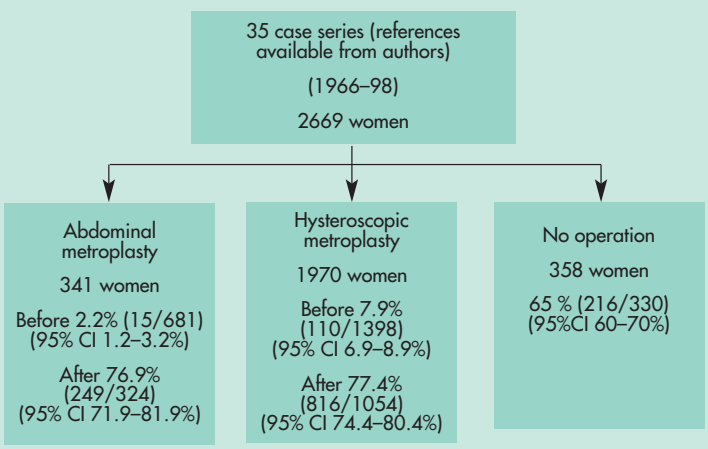

Figure 3. Summary of evidence available on fetal survival rates from case series on abdominal and hysteroscopic metroplasty in septate uteri. Rates are calculated per pregnancy, not per woman.

KEY POINTS

- Abdominal metroplasty has been replaced by hysteroscopic metroplasty in the treatment of septate and subseptate uterus in the last decade.
- Evidence supporting hysteroscopic metroplasty is of poor quality.
- Metroplasty in recurrent abortion and infertility appears to reduce conception rates, but may improve fetal survival rates.
- Other causes for pregnancy loss and infertility should be excluded before embarking on surgery for uterine anomaly.
- Until a multicentre randomized controlled trial is conducted to address the efficacy of surgery on uterine anomaly, reliable conclusions cannot be drawn.