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Preconception transabdominal cervicoisthmic cerclage

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KEY WORDS
Transabdominal cervicoisthmic cerclage
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Objective: The purpose of this study was to report pregnancy outcome and complication rates for women with recurrent late pregnancy loss who were treated with preconception transabdominal cervicoisthmic cerclage.

Study design: This was a case note review of 19 women at high risk for second trimester loss and early preterm delivery who were treated with preconception transabdominal cervicoisthmic cerclage at Queen Charlotte's and Chelsea Hospital from 1994 to 2003.

Results: Preconception transabdominal cervicoisthmic cerclage was associated with a postoperative fetal survival rate of 100% for pregnancies that reached >12 weeks of gestation, compared with a preoperative fetal survival rate of 12%. There were no significant intraoperative, antenatal, intrapartum or neonatal complications.

Conclusion: Within this case series, preconception transabdominal cervicoisthmic cerclage was a safe alternative to transabdominal cervicoisthmic cerclage that was performed in pregnancy with no risk to a fetus. It should be considered in appropriate cases in women seen for prepregnancy counseling.

Transabdominal cervicoisthmic cerclage (TCC) was first described by Benson and Durfee[1] in 1965 as an alternative to transvaginal cervical cerclage for the treatment of cervical incompetence. Since then there have been several published series that reported its use in several hundred women with recurrent second trimester loss or early preterm delivery in whom transvaginal cervical cerclage has been ineffective or who have very short or scarred cervices. Its use has been limited strictly to women who have been at very high risk. The reported high success rates makes a prospective randomized trial difficult to justify on ethical grounds, and the small numbers that are involved mean that such a trial is unlikely to ever be undertaken.

Postoperative success rates that approach 90% are reported generally. Novy[2] performed a meta-analysis of 13 series (9 series in pregnancy and 4 series preconception) and demonstrated a fetal survival rate of 85% after the operation, compared with only 19% before TCC. The advantages of this procedure are clear; however, several disadvantages have also been reported, which include the need for 2 laparotomy procedures in pregnancy, intraoperative hemorrhage,[3] miscarriage and

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fetal death after operation,[2,4] and intrauterine growth restriction and rectovaginal fistula.[4]

Most series have described TCC placement in pregnancy towards the end of the first trimester; however, preconception or interval placement of TCC has also been described and may offer some benefits over TCC placement in pregnancy. We have favored preconception TCC, and a review of these cases suggests that it has comparable fetal outcomes, with a possible reduction in complications compared with TCC placement during pregnancy.

Methods

TCC placement was performed in 19 women between 1994 and 2003 at Queen Charlotte's and Chelsea Hospital, London. Nine women were referred from other obstetric units within the United Kingdom. Data were obtained retrospectively from case note reviews from 1994 to 1999 and prospectively from 2000 onwards. Data concerning obstetric history, other risk factors, operative complications, and pregnancy outcomes were collected.

Strict selection criteria were applied when considering the cases for this procedure. All women had a history of second trimester loss or early preterm delivery and at least 1 previous failed transvaginal cervical cerclage or no cervix palpable vaginally, which excluded transvaginal cervical cerclage.

Women were counseled preoperatively regarding the advantages and risks of TCC. The procedure was performed with general anaesthesia through a transverse suprapubic incision (Figure). The peritoneum overlying the bladder and uterus was divided, and the bladder was pushed caudally. The uterine vessels were then identified and displaced laterally, and a double-loop number 1 polyamide monofilament (Ethilon; Ethicon, Johnson & Johnson, Brussels, Belgium) suture was then passed anterior to posterior on both sides of the cervix at the level of the internal os. The suture was tied posteriorly to allow the suture to be removed by posterior colpotomy, if required. It is difficult to assess how tight the suture was tied; however, at the end of the procedure, cervical patency was assessed by the insertion of a size 6 Hegar's dilator through the internal os.

Once each woman was pregnant, the referring obstetrician provided additional care, which included bed rest, antibiotics, progestogen therapy, and prostaglandin synthesis inhibitors. Elective delivery by cesarean delivery was planned at 38 weeks of gestation, and TCCs were left in place for future pregnancies.

Results

The mean maternal age at TCC placement was 34.7 years, and the mean time since suture insertion is 2.1 years (range, 1 month to 9 years).

Obstetric history

These women had a mean of 3.4 second-trimester losses and early preterm deliveries before suture placement (52 second-trimester losses and 14 early preterm deliveries [<30 weeks of gestation]). Seven women had a total of 10 live children, with a mean gestation of 30 weeks 5 days (4 children were born at term); the remaining women had no surviving children.

Seventeen women (89%)had at least 1 previous transvaginal cerclage placement (total, 31 placements; range, 1- 5 placements); in 4 of these cases, only transvaginal emergency cerclage had been used. The remaining 2 women had no palpable cervix vaginally, 1 as the result of a traumatic forceps delivery that caused uterine, cervical, and bladder rupture and the other as a result of a short cervix and bicornuate uterus. There were a further 4 cases that were known to have congenital uterine abnormalities (bicornuate uterus, 2 women; double uterus, 1 woman; and double cervix, 1 woman). Two women had ≥2 suction terminations of pregnancy. Table I shows the obstetric history before TCC for each case. Table II shows additional treatment that was given to women in pregnancies after TCC.

Complications

Complications occurred in 3 cases. In the first case, there was intraoperative hemorrhage; however, the hemorrhage was not large enough to require a blood transfusion. This bleeding arose from scar tissue that was the result of uterine, cervical, and bladder rupture after a traumatic forceps delivery in a previous pregnancy.

In the second case, the patient was delivered at 27 weeks of gestation in the referring hospital because of an abnormal fetal heart rate pattern. There was no evidence of intrauterine growth restriction or any other fetal compromise and no signs of chorioamnionitis, cervical change, preterm prelabor rupture of membranes or myometrial contractions. This infant has been followed to 18 months of age and is currently well. In the third case, preterm prelabor rupture of membranes occurred at 34 weeks of gestation in a woman in her second successful pregnancy after TCC (the first pregnancy had been delivered at term).

Outcome

There have been a total of 21 pregnancies in 12 women after TCC placement, which includes 7 first-trimester miscarriages of which 5 cases required an evacuation of retained products of conception. These were all performed with no complications through the TCC, which was left in place for future pregnancies. There have been no second-trimester losses and 14 third-trimester deliveries. Of those women who were delivered in the third

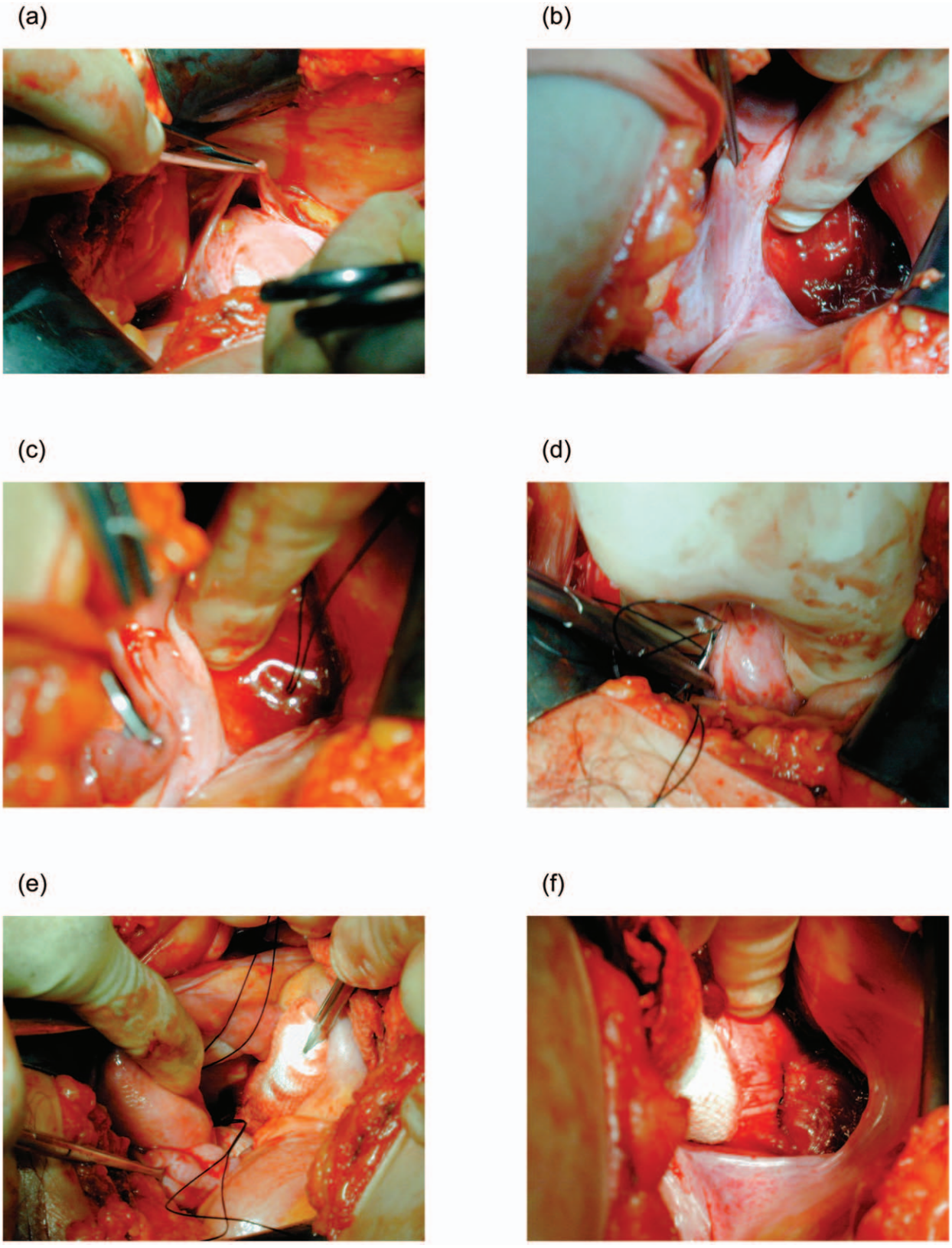

Figure Laparotomy for the insertion of preconception TCC. **A**, Division of vesical peritoneum. **B**, The peritoneum is pushed caudally to expose the cervicoisthmic junction. **C**, The suture is passed anteriorly to posteriorly on the right side of the cervix. **D**, The suture is passed anteriorly to posteriorly on the left side of the cervix. **E**, Suture threads are visible on the posterior side of the cervix. **F**, The suture indentation can be seen on the anterior surface at the cervicoisthmic junction.

Table I Obstetric history before TCC placement

Patient	First trimester loss (n)	Second trimester loss/<30 wk (n)	>30 wk (n)	Surviving children (n)	Elective transvaginal suture (n)	Emergency transvaginal suture (n)	Uterine abnormality (n)	Cervical surgery (n)
1	0	7	0	2	6	0	0	0
2	1	4	2	1	2	0	0	0
3	3	6	0	0	3	0	0	0
4	1	3	0	0	0	0	Bicornuate uterus	0
5	0	3	0	0	1	2	Uterus didelphys	0
6	2	2	0	0	1	0	0	0
7	0	1	2	2	0	0	0	0
8	2	6	0	0	1	0	0	0
9	0	3	0	1	1	0	0	0
10	0	4	0	0	1	0	Double cervix	0
11	0	3	0	0	1	2	0	0
12	0	3	0	0	0	1	0	0
13	0	3	0	0	1	0	Bicornuate uterus	0
14	0	2	0	0	1	0	0	0
15	1	2	0	0	1	0	0	Cone biopsy
16	2	4	0	0	2	0	Bicornuate uterus	0
17	1	4	0	2	0	1	0	0
18	0	2	0	1	0	2	0	0
19	1	2	0	1	0	1	0	0

Table II Additional treatment administered to women in pregnancies after TCC placement

Treatment	N (%)
Progestogen therapy	11 (79)
Antibiotics	7 (50)
Prostaglandin synthesis inhibitors	4 (29)

Table III Fetal survival rates before and after TCC placement

	Before the procedure (n/N)	After the procedure (n/N)
All pregnancies	8/82 (10%)	14/21 (67%)
All pregnancies >12 weeks of gestation	8/68 (12%)	14/14 (100%)

trimester (mean gestation, 36 weeks 2 days), only 2 women have been delivered before 36 weeks of gestation (abnormal fetal heart rate pattern at 27 weeks of gestation and preterm prelabor rupture of membranes at 34 weeks of gestation). All women have been delivered by caesarean delivery, with no significant complications and a fetal survival rate of 100%. Table III shows a comparison of before and after procedure survival rates. The mean time period from suture insertion to conception was 4.1 months (range, 1-14 months). One woman underwent subfertility investigations but conceived spontaneously.

Seven women have still failed to conceive. Of these women, 2 procedures were performed within the last 9 months. Of the remaining 5 women, 4 women were aged > 36 years at the time of TCC placement, and 3 women had known factors that may contribute to subfertility. A 26-year-old woman was found to have dense adhesions at the time of TCC placement, and the operation note concluded that chances of conception were reduced. A 37-year-old woman had conceived both pregnancies before TCC by in vitro fertilization and currently is awaiting further treatment. A patient who underwent TCC placement at the age of 40 years subsequently has undergone fertility investigations, and her partner was found to have suboptimal semen analysis.

Comment

The high anatomic placement of TCC compared with transvaginal cervical cerclage is believed to lead to significantly improved results in an appropriately selected group of women at very high risk for second trimester loss and early preterm delivery. It is accepted as the treatment of choice in women at high risk with previously failed vaginal cerclage or very short vaginal portions of cervix.

This is the largest reported series of preconception TCC. Most published studies are of TCC placement in the first trimester of pregnancy, with some authors suggesting its superiority over preconception TCC but with little evidence to support this argument. Gibb and Salaria[4] suggest that a preconception TCC placement that is left in for a long time may be more difficult to remove by posterior colpotomy. However, they report that all women within their series who were delivered in the third trimester elected to be delivered by caesarean delivery, and therefore removal of suture was not required. The

suture was left in place if women wanted to consider further pregnancies. In 1 case, the suture was removed successfully by posterior colpotomy in a woman who requested a termination of pregnancy in her third pregnancy after TCC placement, which suggests that the removal of a preconception TCC would be possible, if desired. However, for most women, it can be left in situ without any adverse events.

Novy[2] has also suggested there may be some disadvantages associated with preconception TCC. In particular, dysmenorrhea, infertility, and difficulty with spontaneous abortion. None of the patients within our series have complained of dysmenorrhea; 2 women have had complete spontaneous first trimester abortion, and 5 cases of first trimester abortion have been managed successfully, with an evacuation of retained products of conception through the TCC.

Investigators who favor TCC placement in pregnancy have suggested that tissues are softer and more pliable, which makes manipulation of tissues in pregnancy easier. We have found no problems in cerclage placement in the nonpregnant uterus and feel that there is likely to be an advantage in manipulation of the smaller uterus with no risk to a fetus. Because the pelvic area is more vascular in pregnancy, the risk of hemorrhage is also likely to be greater. Anthony et al[5] have described 1 case of TCC placement in pregnancy with an estimated blood loss of 1300 mL; in a series by Cammarano et al[3] of 24 cases of TCC in pregnancy, 4 women (17%) required a blood transfusion after operation.

In the largest published single series of TCCs in pregnancy, 3 pregnancies were lost in the immediate postoperative period; in 1 case, after difficult manipulation of the uterus, the fetus was found in the vagina at the end of the procedure.[4] The advantages of preconception TCC include the need for only 1 intra-abdominal operation in pregnancy, with suture placement causing no immediate risk to a fetus. Recently 3 cases of preconception laparoscopic placement of TCC have been reported with 2 successful term pregnancies.[6] Laparoscopic placement of TCC avoids the need for a laparotomy; however, women in this report were still delivered by cesarean delivery. We have not adopted this procedure, although it reduces initial in-patient hospital stay; however, at the conclusion of the pregnancy, the woman has more abdominal scars than with a traditional open TCC.

We acknowledge that future fertility may be of concern. However, within our series, those women who have not conceived were of more advanced maternal age or had other identifiable reasons that may explain the infertility. Studies of TCC placement in pregnancy have described >1 successful pregnancy with the same suture, which suggests that the presence of the suture should not affect fertility. In view of our findings, we recommend that women, particularly of advanced maternal age, should be counseled carefully regarding this issue and that long-term follow-up of all women is essential to assess this potential complication properly.

In this series, the outcome for women who reached the second trimester after preconception TCC placement was excellent. Additional care with treatments (such as bed rest, antibiotics, progestogen therapy and prostaglandin synthesis inhibitors) was given at the discretion of the referring obstetrician. This may have influenced outcome within this uncontrolled series; however, in a population at such high risk for pregnancy loss, it was not justifiable ethically to withhold additional treatment.

In our case series, preconception TCC placement shows comparable fetal survival rates to TCC placement in pregnancy in a group of women with similar risks, with a 100% survival rate with good neonatal outcome for pregnancies reaching >12 weeks of gestation. Because the numbers of patients whose conditions are suitable for TCC placement are small and the overall outcomes in appropriately selected groups are good, randomized trials of preconception TCC placement versus TCC placement in pregnancy are not practical. However, our data suggest that preconception TCC placement has outcomes that are similar to TCC placement in pregnancy and may reduce complication rates and that preconception TCC placement should be considered in women who seek treatment before conceiving.

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