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Cervicoisthmic Cerclage: Transabdominal Versus Transvaginal Approach

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Abstract

OBJECTIVE—To compare the outcomes of cervicoisthmic cerclage (CI) using traditional transabdominal (TA) approach versus the lesser utilized transvaginal (TV) approach.

STUDY DESIGN—A retrospective cohort study of women who underwent placement of a CI cerclage.

RESULTS—Prior to CI placement, the abdominal group had a total of 100 pregnancies that continued beyond the first trimester and had 27 (27%) surviving infants. After cerclage placement, there were 34 pregnancies and 24 (71%) surviving infants. Before cerclage placement, the vaginal group had a total of 90 pregnancies that continued beyond the first trimester and had 11 (12%) surviving infants. After cerclage placement, there were 29 pregnancies and 20 (69%) surviving infants.

The vaginal cerclage group had a significantly shorter mean operative time of 33 minutes versus 69 minutes, and shorter hospital stay, 0.5 days compared to 3.2 days.

CONCLUSION—Both TV and TA CI cerclage offers select patients with cervical insufficiency improved rates of neonatal survival. The transvaginal placement of a CI has less morbidity than the transabdominal approach with a comparable neonatal survival rate.

Keywords

Transabdominal Cervicoisthmic Cerclage; Transvaginal Cervicoisthmic Cerclage

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INTRODUCTION

Cervical insufficiency is a diagnosis based on an obstetric history of a second or early third trimester fetal loss, following painless cervical dilation, prolapse or rupture of the membranes, and expulsion of the fetus despite minimal uterine activity.[1] It is a diagnosis of exclusion of other causes of preterm delivery such as preterm labor or placental abruption. The incidence is difficult to estimate as there are not strict diagnostic criteria. The incidence of cervical insufficiency is reported to be 1.7–10 per 1000 births, depending on the country or region reporting the data and the definitions used to define the syndrome.[2] Treatment has generally consisted of a transvaginally placed cervical cerclage which was initially described by Shirodkar[3] and McDonald.[4] In 1965, Benson and Durfee proposed the transabdominal placement of a cerclage at the level of the cervicoisthmic junction.[5] This approach is different from the traditional McDonald and Shirodkar cerclages which are placed at the junction of the cervix and the vaginal fornix. The TA CI cerclage was originally suggested as an alternative for women with a history of cervical insufficiency but with anatomy that precluded a transvaginal cerclage. Indications have expanded beyond the original approach to include women with a history of a previously failed transvaginal cerclage.

The literature on TA CI has shown high neonatal survival rates. Several small series of patients treated with TA CI cerclages have been published with perinatal survival rates ranging from 69–95%.[6–14] In a systematic review by Zaveri et al, TA CI was associated with a lower likelihood of perinatal death or delivery before 24 weeks of gestation compared to the traditional cervical cerclage, but had a higher rate of serious operative complications, such as the need for transfusion or damage to surrounding viscera.[15] In addition, a TA CI cerclage requires two laparotomies. The first is for cerclage placement and the second is for Cesarean delivery. In efforts to reduce the operative morbidity, transvaginal and laparoscopic approaches to placement of a cervicoisthmic cerclage have also been described with perinatal survival rates ranging from 79–100%. [16–19]

The aim of this retrospective cohort study was to review and compare the outcomes with the cervicoisthmic cerclage, placed in the traditional transabdominal approach versus the transvaginal approach, at the University of North Carolina Hospitals from 1983–2005.

MATERIALS AND METHODS

This was an IRB approved retrospective cohort study of all patients who underwent placement of a cervicoisthmic cerclage at the University of North Carolina with the Department of Obstetrics and Gynecology between 1983–2005. Hospital medical records were reviewed for patient demographic characteristics, obstetric history, operative details, postoperative course, and obstetric outcome. Outcome information was also obtained from referring providers. The outcome data concerning the index pregnancy only were analyzed. The index pregnancy was defined as the pregnancy during which the cerclage was placed or the first pregnancy after interval cerclage placement.

The TA CI cerclages were all placed in a similar fashion by one of two surgeons(WAB or JMT). The patients were placed under general or spinal anesthesia and the abdominal cavity was entered through either a Maylard or Phannesteil transverse incision. After the bladder flap was developed, the uterus was gently elevated out of the pelvis and held by the first assistant to allow visualization of the uterine vessels, the isthmus, and the uterosacral ligaments. The uterine artery at the point of the bifurcation at the cervicoisthmic junction was identified and gently grasped between the surgeon’s thumb and forefinger and retracted laterally. This exposed an avascular area between the uterus and the bifurcation of the uterine artery through which a 5-mm Mersilene band with a swaged needle (RS21 with blunt

tip, Ethicon, Somerville, NJ) was passed in either an anterior or posterior direction. The suture was passed above the uterosacral ligaments. The Mersilene band was then passed through the avascular space on the other side of the uterus in the same manner. The band was tied firmly either posteriorly or anteriorly, after which the visceral peritoneum was closed. Most of the patients in this series were treated with preoperative ibuprofen (600 mg orally) or ketorlac (30 mg intramuscularly or intravenously) and prophylactic Cefazolin (1 or 2 g intravenously).

All TV CI cerclages were performed by one surgeon (JMT). The TV CI approach was adopted at the retirement of the senior surgeon and used exclusively thereafter. The patients were placed under general or spinal anesthesia and placed in the dorsal lithotomy position with the feet and ankles supported in candy cane stirrups. The peritoneal cavity was entered via a posterior colpotomy which was then extended laterally. Then an incison was made along the anterior cervical mucosa at the cervicovaginal junction and dissection performed until access to the lower uterine segment was reached and the bladder was displaced out of the operative field. A 5-mm Mersilene band with a swaged needle (RS21 with blunt tip, Ethicon, Somerville, NJ) was passed through the lateral cervical tissue, from anterior to posterior, just superior to the level where the uterosacral ligaments meet the cervix. This level was determined by digital palpation. This was performed on the contralateral side in a similar fashion. The knot was tied posteriorly and the posterior colpotomy and anterior bladder dissection were closed. Most of the patients in this series were treated with preoperative ketorlac (30 mg intramuscularly or intravenously) and prophylactic Cefazolin (1 or 2 g intravenously). There were no postoperative restrictions on either physical or sexual activity in either group.

All viable pregnancies were delivered by Cesarean section. The primary outcome was perinatal survival.

Data analysis was performed using Equal Variance T-Test, Unequal Variance T-Test, and Fisher’s Exact Test.

RESULTS

A total of 70 women underwent placement of a CI cerclage. Of those, 37 had the procedure performed transabdominally, with 30 placed during pregnancy and 7 placed as an interval procedure. 33 women had the cerclage placed transvaginally, with 10 placed during pregnancy and 23 placed as an interval procedure.

Patient characteristics in the TA CI and TV CI groups are shown in Table 1. There was no difference between the groups in age, history of DES exposure in utero, history of LEEP or cold knife cone, or history of previous cerclage. The TV CI group had significantly more patients of the Non-Caucasian race than the TA CI group(13/37 versus 23/30; P=.001). The TV CI group also had a significantly greater body mass index than the TA CI group(26.8 versus 32.6; P=.012).

Prior obstetric history is summarized in Table 2. The two groups had similar numbers of pregnancies prior to cerclage placement. In the TA CI group, out of 100 pregnancies that continued beyond the first trimester, there were only 27 living children, for a survival rate of 27%. The TV CI group had a significantly worse obstetric history with a total of 90 pregnancies that continued past the first trimester and only 11 living children for a survival rate of 12%. The difference between two groups was statistically significant with P<.001.

The primary outcome analyzed was perinatal survival and the results are shown in Table 3. In those patients who had the cerclage placed transabdominally, outcome data was available

for 34 of the 37 pregnancies. Of those 34 patients, there was one twin pregnancy in which both fetuses were lost at separate times and counted as individual losses for a total of 11 fetal losses. There were 24 living children out of 34 pregnancies for a 71% perinatal survival rate. In the TV CI group, there was outcome data for 29 patients. There were 20 living children out of 29 pregnancies for a 69% perinatal survival rate. There was no difference between the groups in perinatal survival rate.

When reviewing the fetal losses, a complication of particular interest was fetal loss related to the procedure. Since only patients that were pregnant at the time of cerclage placement could have a loss related to the procedure, we analyzed the subgroup of patients who had the cerclage placed while pregnant. We arbitrarily defined losses that occurred within 2 weeks of the procedure as procedure related fetal losses. There were 30 patients who underwent placement of a TA CI cerclage while pregnant and 7 had losses within 2 weeks of the procedure. Two patients had miscarriages on POD#0 and 3 patients had no cardiac activity seen prior to hospital discharge. The remaining two patients had no cardiac activity detected at a prenatal visit within two weeks of the procedure. In the TV CI group, there were 10 patients that had the cerclage placed while pregnant and one patient had an incomplete miscarriage one week after the procedure. The difference between the groups was not significant.

Operative details were also compared and are shown in Table 4. There was no significant difference in the estimated blood loss between the two groups. The TV CI approach had a significantly shorter mean operative time of 33 minutes versus 69 minutes in the TA CI approach, P<.001. The TV CI group also had a significantly shorter postoperative hospital length of stay of 0.5 days versus 3.2 days, P<.001.

In addition, complications including significant blood loss requiring transfusion, damage to surrounding structures, prolonged hospitalization or readmission for a postoperative complication were examined. The incidence of any of these complications was rare in both groups.

COMMENT

TA CI cerclage placement as treatment for cervical insufficiency has generally been limited to those women with a cervix that is too short or scarred for a traditional transvaginal cerclage. Indications have also expanded to include those women who have previously failed a traditional transvaginal cerclage. While the reported incidence of improved perinatal survival is higher, there is additional risk and morbidity associated with the surgery. Less invasive techniques, both vaginally and laparoscopically, for placement of a CI cerclage have been described. Our study supports the finding that CI cerclage offers patients with a history of cervical insufficiency improved rates of perinatal survival. In addition, the TV CI approach is a reasonable alternative to TV CI placement. The TV CI approach appears to be associated with less morbidity, a shorter procedure time, a shorter hospital length of stay, and no diminution in ultimate outcome.

There was also a nonsignificant trend towards a difference in the procedure related fetal loss rate between the two approaches, however the numbers of patients undergoing placement of the TV CI cerclage while pregnant in this study are small. While this difference was not statistically significant, it may be clinically important in counseling patients about the risks of the procedure. A decrease in procedure related fetal loss with the TV CI approach is biologically plausible as there is less manipulation of the uterus, which may stimulate uterine contractions, compared to the TA CI approach. In addition, readers should note that

this change in practice that resulted in more interval TV CI cerclages over time may have influenced results.

The study is limited by its retrospective nature and that the cases serve as their own controls. However, a prospective randomized trial with this patient cohort with a no cerclage group would be practically difficult in this high risk group. Additionally, since our institution has been performing the TV CI cerclage, the frequency with which the TA CI cerclage has been performed has decreased and is only placed in those patients who are not felt to be candidates for the TV CI cerclage. Moreover, the interval from which our retrospective cohort was gathered is long with numerous changes in neonatal care that culminated in improved survival. These improvements could have biased our results.

An additional weakness of this study is that the results may be confounded by the use of 17-a hydroxyprogesterone caproate. With recent evidence supporting the efficacy of the use of 17-a hydroxyprogesterone caproate to prevent recurrent preterm birth, patients with a history of a spontaneous preterm birth, including those whose history is consistent with cervical insufficiency, have been offered both cerclage and progesterone in hopes of achieving an improved pregnancy outcome. Given this additional intervention, improved perinatal survival cannot be assumed to be attributed to the cerclage alone.

Our large series has a lower perinatal survival rate for TA CI cerclage than has been previously reported. An alternative conclusion is that our TV CI equivalency claims to TA CI cerclages stem from some deficiency in our performance of TA CI cerclages. Clearly, superiority or lack thereof can only be determined with confidence by a prospective, randomized trial. Also, these results prompt speculation that vaginal cerclages placed higher using the Shirodkar approach might have similar efficacy while avoiding morbidity and the need for abdominal delivery inherent to CI cerclages by either the TA or TV route. Again, that is a question that can only be answered via well done clinical trials.

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Table 1

History of patients undergoing placement of cervicoisthmic cerclage

Variable	Abdonminal (n=37)	Vaginal (n=33)	P value
Age (y)	31.9±5.0	31.0±5.6	NS
Body mass index	26.8±5.6	32.6 ±8.2	0.001
Non-white	13 (35)	23 (70)	0.012
History of DES	6 (16)	1 (3)	NS
History of LLEP/conization	14 (38)	6 (18)	NS
History of cerclage	28 (76)	29 (88)	NS

Table 2

Obstetric history of patients undergoing placement of cervicoisthmic cerclage

Variable	Abdominal	Vaginal
No. of previous pregnancies	149	128
First-trimester loss	49	38
Total births	100	90
Second-trimester birth	72	80
Third-trimester birth	28	10
Perinatal survival	27 (27)	11 (12)

Table 3

Index pregnancy outcomes after placement of cervicoisthmic cerclage

Variable	Abdominal (n=37)	Vaginal (n=33)	P value
Total pregnancies	34	29	NS
Losses	10 (29)	9 (31)	NS
Perinatal survival	24 (71)	20 (69)	NS