

Patients with a prior failed transvaginal cerclage: A comparison of obstetric outcomes with either transabdominal or transvaginal cerclage

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OBJECTIVE: Our purpose was to compare the incidence of preterm birth after a prior failed vaginal cerclage in patients who had a subsequent transabdominal or a transvaginal cerclage.

STUDY DESIGN: We conducted a retrospective cohort study of singleton pregnancies in women who had undergone (9-14 weeks) either a transabdominal or a transvaginal prophylactic cerclage after ≥ 1 prior failed transvaginal cerclage. *Prior failed transvaginal cerclage* was defined as a preterm birth at <33 weeks' gestation in the immediate prior pregnancy despite a transvaginal cerclage. All transabdominal cerclage procedures were performed by a single attending physician (George Davis, DO). Patients with a cervix too short for transvaginal cerclage placement, placenta previa, or major fetal anomalies were excluded. Primary outcome was preterm birth at <35 weeks' gestation.

RESULTS: Forty transabdominal and 24 transvaginal cerclage pregnancies were analyzed. These 2 groups were similar in race and payer status but differed in age (34.0 ± 4.2 vs 31.3 ± 4.6 years, respectively; $P = .01$). The transabdominal cerclage group had more prior failed cerclage procedures per patient (1.8 ± 1.0 vs 1.1 ± 0.3 ; $P = .02$) and more prior 14- to 24-week spontaneous abortions per patient (2.4 ± 1.3 vs 1.5 ± 1.0 ; $P = .02$) than the transvaginal cerclage group. Preterm delivery at both <35 and <33 weeks' gestation was less common in the transabdominal cerclage group (18% vs 42%, $P = .04$; 10% vs 38%, $P = .01$; respectively) than in the transvaginal cerclage group. Gestational age at delivery was 36.3 ± 4.1 weeks in the transabdominal cerclage group and 32.8 ± 8.6 weeks in the transvaginal cerclage group ($P = .03$). Preterm premature rupture of membranes also occurred less often in the transabdominal cerclage group than in the transvaginal cerclage group (8% vs 29%, $P = .03$).

CONCLUSION: In patients with a prior failed transvaginal cerclage, transabdominal cerclage is associated with a lower incidence of preterm delivery and preterm premature rupture of membranes in comparison with transvaginal cerclage. (Am J Obstet Gynecol 2000;183:836-9.)

Key words: Cervical incompetence, cervix uteri, cerclage, transabdominal cerclage

Cerclage is usually performed transvaginally in women with prior painless second-trimester pregnancy losses or other history suggestive of cervical weakness (ie, cervical incompetence). There is little evidence that such transvaginal cerclage prevents preterm birth,¹⁻⁴ and it is not uncommon that treatment of high-risk pregnancies with prophylactic transvaginal cerclage results in recurrent preterm births. The management of the subsequent pregnancy is difficult and controversial. Transabdominal cerclage has been proposed as an alternative to repeated transvaginal cerclage in these patients who have previously delivered very early despite a prophylactic trans-

vaginal cerclage.⁵⁻²⁵ In fact, this is the most common and accepted indication for transabdominal cerclage in the literature.⁵⁻²⁵ Despite 21 series of transabdominal cerclage procedures in the literature,⁵⁻²⁵ none has provided matched controls for comparison, except the patient's history. Our objective was to compare the incidence of preterm delivery in patients with prior failed transvaginal cerclage who subsequently had either a transabdominal or a transvaginal cerclage.

Material and methods

We conducted a retrospective cohort study of singleton pregnancies in women who had prophylactically undergone (at 9-14 weeks) either a transabdominal (1988-1999) or a transvaginal (1993-1999) cerclage after ≥ 1 prior failed transvaginal cerclage procedure. *Prior failed transvaginal cerclage* was defined as preterm birth at <33 weeks' gestation after transvaginal cerclage in the immediate prior pregnancy. Patients were selected to have either transabdominal or transvaginal cerclage prophylacti-

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Table I. Demographic characteristics

	<i>Transabdominal cerclage (n = 40)</i>	<i>Transvaginal cerclage (n = 24)</i>	<i>Statistical significance</i>
Age (y, mean ± SD)	34.0 ± 4.2	31.3 ± 4.6	<i>P</i> = .01
Race (No.)			<i>P</i> = .2
White	22 (55%)	9 (38%)	
Black	12 (30%)	13 (54%)	
Other	6 (15%)	2 (8%)	
Health provider (No.)			<i>P</i> = .09
Private	38 (95%)	19 (79%)	
Clinic	2 (5%)	5 (21%)	

cally (ie, before 14 weeks' gestation and before any cervical changes were detected by manual or ultrasonographic examination). Assignment to either transabdominal or transvaginal cerclage was at the discretion of the managing obstetricians. Patients having a transabdominal cerclage because of a cervix that was too short for transvaginal cerclage placement were excluded, as were those with placenta previa or major fetal anomalies.

All transabdominal cerclage procedures were performed by a single maternal-fetal medicine attending physician (George Davis, DO), who had kept records of each procedure. These records were confirmed and expanded by medical records and prematurity database review. This prematurity database has been prospectively updated on a regular basis since 1994 and includes all patients at Jefferson University Hospital with risk factors for preterm birth.

Transabdominal procedures were performed with the patients under subarachnoid or epidural block in the majority of cases, with a Pfannenstiel incision and placement of a 5-mm Mersilene (Ethicon, Somerville, NJ) band at the internal os. After digital displacement of the uterine vessels laterally, the Mersilene band was guided through the broad ligament at the junction of the cervix and lower uterine segment by blunt perforation with a right-angle clamp. One dose of cefazolin, 1 to 2 g given intravenously as antibiotic prophylaxis, and progesterone, 100 mg in oil given intramuscularly, were used 30 to 60 minutes before the procedure, and 1 indomethacin 50-mg suppository was given in the recovery room. Postoperative care was similar to that given after cesarean delivery, with an inpatient stay of 2 or 3 days. The patients underwent scheduled cesarean delivery at 38½ to 39 weeks. The transabdominal cerclage was always left in place.

Transvaginal cerclage pregnancies were identified by review of the prematurity database, with confirmation by medical records. All transvaginal cerclage procedures were performed on an outpatient basis by the McDonald technique,²⁶ with a 5-mm Mersilene band as the preferred suture. No antibiotic or tocolytic prophylaxis was used. Patients having either procedure were counseled regarding modified bed rest after 20 to 24 weeks' gestation. Primary outcome was preterm birth at <35 weeks' gestation. Only the pregnancy immediately after the one

with failed transvaginal cerclage was used for analysis, so patients with transabdominal cerclage placement in >1 pregnancy had only the pregnancy immediately after the one with failed transvaginal cerclage used for analysis. The *t* test was used for continuous variables and the Fisher exact or χ^2 test was used for categorical variables, as appropriate. A *P* value of < .05 was considered significant.

Results

Ninety-six pregnancies in 82 patients with transabdominal cerclage were identified—18 pregnancies were excluded because the cervix was too short for transvaginal cerclage placement, 9 because they were twin pregnancies, 6 because the cerclage placement was done because of digital or ultrasonographic cervical changes, 9 because of lack of follow-up, and 14 because the pregnancy was not that immediately following the one with failed cerclage (ie, the women had a prior pregnancy with a transabdominal cerclage in place after a prior pregnancy with a failed transvaginal cerclage). Forty pregnancies (in 40 patients) with prior failed transvaginal cerclage and subsequent prophylactic transabdominal cerclage were analyzed and were then compared with 24 pregnancies (in 24 patients) with prior failed transvaginal cerclage and subsequent repeated prophylactic transvaginal cerclage. Seven additional pregnancies with prior failed transvaginal cerclage were identified but were excluded because the women had had neither a prophylactic transabdominal cerclage nor a prophylactic transvaginal cerclage (4 had no cerclage placed at all, 2 had a therapeutic cerclage placed, and one had a pessary placed). Demographic characteristics in the transabdominal and transvaginal cerclage groups were similar, except for older mean age in the transabdominal cerclage group (Table I). Both groups had very poor obstetric histories, with 98% of the transabdominal cerclage group and 88% of the transvaginal cerclage group having had ≥ 1 prior second-trimester spontaneous pregnancy loss (Table II). The transabdominal cerclage group had more prior failed transvaginal cerclage procedures, more prior second-trimester spontaneous abortions, more prior painless second-trimester spontaneous abortions, and more instances of ≥ 2 curettage procedures for therapeutic abortion per patient, in comparison with the transvaginal cerclage group

Table II. Distribution of patients by risk factors

<i>Risk factors</i>	<i>Transabdominal cerclage (n = 40)</i>	<i>Transvaginal cerclage (n = 24)</i>	<i>Statistical significance</i>
Prior failed transvaginal cerclage (No. per patient, mean \pm SD and range)	1.8 \pm 1.0 (1-5)	1.1 \pm 0.3 (1-2)	<i>P</i> = .02
Prior failed transvaginal cerclage (No. prophylactic/No. salvage)	34/16	12/12	<i>P</i> = .2
Prior 14-wk to 24-wk loss (No.)	39 (98%)	21 (88%)	<i>P</i> = .3
Prior 14-wk to 24-wk loss (No. per patient, mean \pm SD and range)	2.4 \pm 1.3 (1-5)	1.5 \pm 1.0 (1-3)	<i>P</i> = .005
Prior 14-wk to 24-wk painless loss (No. per patient, mean \pm SD and range)	1.8 \pm 1.4 (1-4)	1.0 \pm 0.8 (1-2)	<i>P</i> = .02
Müllerian anomaly (No.)	4 (10%)	1 (4%)	<i>P</i> = .6
Cone biopsy (No.)	3 (8%)	0 (0%)	<i>P</i> = .3
Diethylstilbestrol exposure (No.)	6 (15%)	0 (0%)	<i>P</i> = .08
≥ 2 Curettage procedures for therapeutic abortion (No.)	23 (58%)	5 (21%)	<i>P</i> = .005

Table III. Outcome

<i>Outcome</i>	<i>Transabdominal cerclage (n = 40)</i>	<i>Transvaginal cerclage (n = 24)</i>	<i>Statistical significance</i>
Gestational age at delivery (wk, mean \pm SD)	36.3 \pm 4.1	32.8 \pm 8.6	<i>P</i> = .03
Preterm delivery <35 wk (No.)	7 (18%)	10 (42%)	<i>P</i> = .04
Preterm delivery <33 wk (No.)	4 (10%)	9 (38%)	<i>P</i> = .01
Preterm delivery <28 wk (No.)	1 (3%)	5 (21%)	<i>P</i> = .02
Preterm delivery <24 wk (No.)	1 (3%)	4 (17%)	<i>P</i> = .06
Birth weight (g, mean \pm SD)	2877 \pm 851	2519 \pm 1384	<i>P</i> = .2
Preterm premature rupture of membranes (No.)	3 (8%)	7 (29%)	<i>P</i> = .03
Preterm labor (No.)	11 (28%)	9 (38%)	<i>P</i> = .4

(Table II). All transabdominal cerclage placements were done during pregnancy. Gestational age at cerclage placement was 11.9 \pm 1.6 weeks in the transabdominal group and 12.7 \pm 1.3 weeks in the transvaginal group (*P* = .04). No perioperative complications (eg, bleeding >100 mL, infection, injury to bowel or bladder) occurred in the transabdominal or transvaginal cerclage groups.

The primary outcome, preterm delivery at <35 weeks' gestation, was significantly less common in the transabdominal than in the transvaginal cerclage group (18% vs 42%, *P* = .04). Preterm delivery at <33, <28, and <24 weeks' gestation was also less common in the transabdominal cerclage group than in the transvaginal cerclage group (Table III). Gestational age at delivery was 36.3 \pm 4.1 weeks in the transabdominal cerclage group and 32.8 \pm 8.6 weeks in the transvaginal cerclage group (*P* = .03), with neonates in the transabdominal group approximately 350 g heavier (Table III). Preterm premature rupture of membranes occurred less often in the transabdominal cerclage group than in the transvaginal cerclage group (8% vs 29%, *P* = .03; Table III).

Comment

Once a patient with presumed cervical incompetence has had a very preterm delivery despite early prophylactic transvaginal cerclage placement, successful management of the subsequent pregnancy can be a difficult obstetric challenge. If a transvaginal cerclage has previously failed to ensure a term delivery, the patient who is offered a similar therapy again (ie, transvaginal cerclage) in a subsequent pregnancy can feel quite discouraged by the lack of alternatives, even if the prior cerclage did not prove, by itself,

the existence of true cervical incompetence. Since 1965,⁵ transabdominal cerclage has been suggested as an alternative to repeating the transvaginal cerclage. The most common indications for transabdominal cerclage are a prior failed transvaginal cerclage and the lack of an intravaginal portion of the cervix (making transvaginal cerclage technically impossible or difficult). Twenty-one series of transabdominal cerclage have been reported,⁵⁻²⁵ almost all with excellent results, summarized by an 89% success rate in review articles.¹⁶ Unfortunately, no appropriate control population has been reported, with prior series reporting either no controls or patients' prior pregnancies as historic controls. Clearly there is no appropriate control population for patients with no intravaginal cervix (except a no-cerclage group), but patients with a prior failed transvaginal cerclage sometimes undergo another transvaginal cerclage in the subsequent pregnancy, making these patients an appropriate control group for patients with a similar history who undergo instead a transabdominal cerclage. This is the first report of a large series of transabdominal cerclage procedures, all performed for the same indication (prior failed transvaginal cerclage), with a control population with a similar history but another transvaginal cerclage in the subsequent pregnancy.

In our series transabdominal cerclage pregnancies gained 3.5 additional weeks and had less than half the incidence of preterm birth, in comparison with transvaginal cerclage pregnancies (Table III). This significantly better outcome was achieved even though the obstetric history for transabdominal cerclage cases was much worse than that for the transvaginal cerclage control group (Table II). Whereas 28% of patients with transabdominal cerclage

pregnancies had preterm labor, only 8% had preterm premature rupture of membranes, significantly less than the control subjects (29%, $P = .03$). This improved outcome and reduced incidence of preterm premature rupture of membranes could be caused by several factors. First, the transabdominal procedure is sterile by nature, whereas the transvaginal procedure can be compromised by the presence of bacteria in the vagina, which can affect the efficacy of the cerclage at the time of the procedure and throughout pregnancy. Second, transabdominal cerclage is placed at the internal os, much more cephalad than a transvaginal cerclage, which is placed at the middle portion of the cervix.²⁷ This better placement of the suture by transabdominal cerclage may be better at preventing any funneling at the internal os,²⁷ and decreased funneling may lead to prevention of preterm rupture of membranes.²⁸ Third, patients in the transabdominal cerclage group had antibiotic, progesterone, and indomethacin prophylaxis at the time of the procedure. However, there is no evidence that these prophylactic therapies prevent preterm birth when used as in our study.

Any benefit of transabdominal cerclage must be weighed against its increased operative risks. Patients undergoing transabdominal cerclage must undergo 2 laparotomies in the index pregnancy, one for placement of the cerclage and one for the cesarean delivery. Although no major complications were observed in this series, laparotomies are associated with higher risks of bleeding, injury to other organs, infection, and thromboembolism. All patients undergoing such procedures should be made aware of these potential risks. Given these facts, patients may not believe that the benefits outweigh the risks. Furthermore, longer hospital stays because of the laparotomies may influence the cost-benefit ratio of this procedure. Transabdominal cerclage should therefore be performed only by experienced operators and only for very clear, defined indications. From the literature and our experience, such indications include prior failed transvaginal cerclage or an absent intravaginal portion of the cervix, making transvaginal cerclage impossible.

In summary, in patients with a prior failed transvaginal cerclage, transabdominal cerclage was found to be associated with better outcomes than repeated transvaginal cerclage. Ideally, this finding should be tested by randomized trials, but because the limited number of appropriate cases may preclude such studies, other series similar to ours need to be reported to confirm that the uncommon patient with this poor history can be offered transabdominal cerclage.

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