

A Review of Management Options for Previous Failed Transvaginal Cervical Cerclage

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ABSTRACT

Cervical insufficiency affects up to 1% of all pregnancies. Most of these women are best treated by an elective transvaginal cerclage in the late first trimester. Even under optimal circumstances, up to 20% of these procedures may fail, resulting in pregnancy losses or severe preterm birth. We conducted a review of the available literature to evaluate the optimal management for such cases.

These cases pose a clinical dilemma as a repeat transvaginal cerclage has been shown to have a success of up to 85% at best. The use of transabdominal cerclage for these patients has been shown to reduce the rate of early pregnancy loss, early preterm birth and preterm rupture of membranes, with a success rate of up to 94%.

The increased success rate of the transabdominal approach though, is associated with an increased risk of operative complications. This review also evaluates new techniques and modifications to both the transabdominal as well as the transvaginal approaches to make such procedures safer and more effective.

Keywords: Cervical insufficiency, cervical cerclage, transvaginal cerclage, transabdominal cerclage, cervicoisthmic cerclage

INTRODUCTION

Cervical insufficiency (previously known as cervical incompetence) is defined by an inability to retain a pregnancy till term due to functional or structural

defect of the cervix.^{1,2} The condition is classically characterized by painless cervical dilatation followed by pregnancy loss in the second or early third trimester. It is estimated to affect 1% of all pregnancies and up to 8% of those with second and early third trimester pregnancy losses.³ The diagnosis is usually based on obstetrical history, physical exam, hystero-graphic studies, assessment of cervical length on ultrasound or a combination of one or more of these.

The treatment has traditionally been advising bed rest and/or cervical cerclage although there is no clear, objective evidence that cervical cerclage prevents second trimester pregnancy loss.⁴ There have been reports of use of vaginal pessaries^{5,6} e.g., Smith-Hodge, Arabin, Herbich etc for the treatment of cervical insufficiency as adjuncts to cerclage or in patients not suitable for cerclage eg those with defective connective tissue in Ehlers-Danlos syndrome⁵. However, more randomized controlled trials are needed to establish the efficacy of these modalities.

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There are various routes as well as techniques of placement of cervical cerclage. The most commonly used methods involve a transvaginal approach using the McDonald or Shirodkar techniques. The McDonald stitch is a purse string cerclage taking four to six bites around the cervix, incorporating enough cervical stroma without entering the cervical canal.⁷ The Shirodkar⁸ cerclage is similar but involves the initial dissection of the vaginal mucosa from the cervix and taking two larger bites through the cervical stroma. Cases where transvaginal cerclage fails, especially more than once, represent a management difficulty. This article is a review of the available literature for treatment options for these cases, which include a transabdominal cerclage and modifications of transvaginal cerclage enabling placement of suture higher on the cervix.

TRANSABDOMINAL CERCLAGE (TAC):

Indications for the placement of a cerclage through the transabdominal route include: (1) congenitally short or extensively amputated cervix, (2) marked scarring of the cervix, (3) multiple deeply notched cervical defects, (4) penetrating lacerations of the fornix, (6) wide or extensive cervical conization, (7) cervicovaginal fistulae and (8) one or more previous failed transvaginal cerclages.⁹ Previous failed transvaginal cerclage (TVC) is the commonest indication for a transabdominal cerclage.

Contraindications to the procedure include: bulging or ruptured membranes, intrauterine infections, vaginal blood loss, intrauterine death, labor and life threatening maternal condition.

Operative Technique:

The basic principles of the operative technique follow the procedure originally described by Benson and Durfee in 1965.¹⁰ The procedure has largely remained unchanged with a few modifications to reduce the operative morbidity.^{11,12} The cerclage was traditionally performed during pregnancy near the end of first trimester. The abdomen is opened by low Pfannenstiel incision, under epidural or general anesthesia. The uterovesical fold is dissected and the bladder advanced downward to expose the cervicoisthmus junction. On both sides, the avascular area between the pulsating ascending and descending branch of the uterine artery and the cervical isthmus, just below the uterine "waist" is identified by digital palpation. With one hand placed behind the pregnant uterus and guided by a posterior finger just above the insertion of uterosacrals, the uterine vasculature on 1 side is gently displaced laterally. This avascular window is punctured from anterior side with the tip of a long right-angled clamp with tapered jaws through to the posterior leaf of broad ligament. A Mersilene band

grasped between the jaws of a clamp is gently pulled through the paracervical space from posterior to anterior. The procedure is repeated on the opposite side. The band is pulled tight around the cervix and ascending branches of the uterine artery palpated to confirm the presence of pulsations. The band is then tied snugly on the anterior side of the cervix and the cut ends attached back to the band with nonabsorbable sutures. The peritoneal bladder fold is closed over the band. During the whole procedure the uterus is kept warm and moist inside the peritoneal cavity. The patient needs to be delivered by an elective caesarean section above the level of the band between 36 – 38 weeks and the band is left in situ. Fetal survival rates approaching 90% have been reported following the transabdominal cerclage compared to 20% in cases which did not have a cerclage.¹³ The higher success rate of the technique may be due to stronger circumferential support of the uterine isthmus and reduced slippage of the suture due to its abdominal placement above the cardinal and uterosacral ligaments. There is added advantage of lack of foreign body in the vagina that could precipitate infection and preterm labor as well as the ease of leaving the cerclage in situ in between the pregnancies. In case of early pregnancy loss or fetal anomaly, the suction evacuation or dilatation and curettage can be performed with the abdominal cerclage in situ.

Disadvantages of the procedure include the need for two laparotomies for placing the suture and then to deliver the baby.

Laparoscopic transabdominal cerclage:

Multiple laparotomies during pregnancy increase the morbidity of the procedure: fever, adhesion formation, ileus, and venous thrombosis. In an effort to reduce these morbidities, many centres have performed the procedure laparoscopically.¹⁴⁻¹⁶

The first reported laparoscopic cerclage on a pregnant patient was described in 1998 by Lesser et al.¹⁷

The hospital stay is reduced and recovery is faster with less postoperative pain after a laparoscopic procedure. Cerclage can be done with minimal uterine manipulation and minimal dissection. Few authors have used disposable laparoscopic suturing device (Endoclose, Tyco Healthcare) to pierce the broad ligament medial to the uterine vessels instead of dissecting them and creating a window, thereby reducing the risk of complications.^{14,18}

Complications of TAC and modifications to reduce them:

Bleeding from the parametrial veins during dissection of uterine vessels to develop the avascular window is the main complication.^{10, 12} This can be avoided by determining the vessel free area by digital palpation

and pushing the vessels and ureter laterally during puncture of the paracervical tissue. Novy reported decreased blood loss by elevating the uterus out of the pelvis thus allowing visualization and manual retraction of the vessels¹⁹. However excessive uterine manipulation can precipitate uterine activity and abortion.

Olatunbosun et al developed a technique of using fibreoptic lighting to illuminate the uterine vasculature thus reducing the risk of vessel injury and perioperative blood loss²⁰. Adjunctive use of vaginal sonography during the procedure facilitated high suture placement and monitoring of the fetus. There has been a recent report of utilizing hydro dissection during the laparoscopic cerclage, where warm saline is injected to separate the anatomic planes, instead of conventional dissection techniques (sharp, blunt or cautery guided). This method may be able to further minimize uterine manipulation and bleeding²¹. In order to avoid erosion of the lower uterine segment by the polyester tape, laparoscopic placement of an abdominal cerclage using a polypropylene mesh has also been described²².

Timing of placement of TAC:

Abdominal cerclage has been placed in the pregnant as well as non-pregnant state both by laparotomy and laparoscopy. There is no direct comparison study regarding the best time for placement of an abdominal cerclage²³. Novy reported that fetal survival rates are similar¹⁹. During pregnancy it is best done between end first trimester and early second trimester. At this stage of pregnancy, risk of spontaneous miscarriage in presence of fetal cardiac activity is small. Also, major fetal anomalies can be detected before placing the cerclage. The disadvantage is increased risk of bleeding due to a highly vascular pelvic area during pregnancy. Theoretical risks of performing laparoscopy during pregnancy include: technical difficulties associated with trocar insertion because of gravid uterus, possibility of inducing preterm labor, potential to cause fetal malformations and effects of pneumoperitoneum on fetus²⁴. However, to date, laparoscopic procedures performed during pregnancy appear to be safe to both mother and fetus. Advantages of performing the procedure preconception include easy manipulation with no risk to a fetus and minimal bleeding. A potential disadvantage of the interval procedure is that pregnancy may either never occur or may result in early loss. The cervicoisthmic cerclage may also contribute to dysmenorrhea or infertility. The use of a 8mm dilator as a calibrator, as described by Scibetta et al helps to prevent postoperative cervical stenosis allowing a dilatation and curettage to be performed in case of early pregnancy loss¹⁸.

Use of Da Vinci robot to assist placement of abdominal cerclage:

Traditional laparoscopic instruments are limited by counterintuitive movements and restricted range of motion creating difficulty in intracorporeal knot tying and in precision of tissue dissection. Barmat et al recently reported the use of Da Vinci robot to facilitate placement of abdominal cerclage²⁵. The Da Vinci robot offers many of the advantages of open surgery (three dimensional view of operative field with endowristed instruments allowing seven degrees of freedom of motion) to allow complete, precise placement of the cerclage using minimally invasive approach.

MODIFICATIONS OF TRANSVAGINAL CERCLAGE:

The favorable results attributed to abdominal cerclage are due to higher location of the suture providing a better support and reducing the slippage rates. The most commonly used method of transvaginal cervical cerclage is using the McDonald technique. In cases of previous failed transvaginal cerclage other transvaginal approaches have been attempted, either using the Shirodkar technique or its modifications in order to place the suture at a higher level in the cervicoisthmic region (above the cardinals and uterosacrals) thus reproducing the placement of cerclage by the abdominal route^{26,27}. This involves the initial anterior colpotomy and retraction of the bladder away to expose the cervicoisthmic junction, followed by the posterior dissection. The paracervical tissue is retracted to keep the major blood vessels away and the suture is placed at the cervicoisthmic junction, above the level of cardinal ligaments, the location of which is determined by digital palpation. The improved fetal outcome compared favorably with the transabdominal one; however there have been no controlled trials. The main serious complication encountered was bladder laceration in a patient with extensive vaginal scarring due to multiple previous procedures²⁷. This might be a limitation to this technique and transabdominal method might be the preferred way in such patients. Recently, polypropylene sling has been used for transvaginal cervicoisthmic cerclage²⁸. Another new surgical method of placement of mesh cerclage has been described in women with dilated cervix and membrane herniation²⁹.

CONCLUSION

In some cases of previous failed transvaginal cerclage the cervix is very scarred and short due to previous procedures and it is technically not possible to insert the cerclage transvaginally. Such cases are best managed by a cerclage through a transabdominal

route. In other cases where there is enough length of cervix available, the repeat cerclage can be inserted either transabdominally or transvaginally ensuring the placement of suture at a higher level. In patients with prior failed transvaginal cerclage, transabdominal cerclage was found to be associated with better outcomes than repeated transvaginal route³⁰. A recent systematic review concluded that there was a lower risk of perinatal death or delivery at <24 weeks of gestation with transabdominal cerclage, but a higher risk of serious operative complications than transvaginal cerclage³¹. Multicentre randomized controlled trials with sufficient numbers need to be undertaken to provide a more reliable unbiased

estimate of benefits and risks.

Preoperative counselling of the patient regarding the risks of transabdominal cerclage is essential before this procedure is undertaken. It should be performed only by experienced surgeons and only for clear defined indications where transvaginal cerclage is not technically possible.

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REFERENCES

- Golan A, Barnan R, Wexler S, Langer R, Burkovsky I, David MP. Incompetence of the uterine cervix. *Obstet Gynecol Surv* 1989; 44:96-107.
- Shortle B, Jewelewicz R. Cervical incompetence. *Fertil Steril* 1989; 52:181-188.
- Drakeley AJ, Roberts D, Alfirevic Z. Cervical stitch (cerclage) for preventing pregnancy loss in women. *Cochrane Databse Syst Rev* 2003; 1:CD 003253.
- Barth WH Jr. Cervical incompetence and cerclage: unresolved controversies. *Clin Obstet Gynecol* 1994; 37 : 831-41.
- Leduc L, Wasserstrum N. Successful treatment with Smith-Hodge pessary of cervical incompetence due to defective connective tissue in Ehlers- Danlos syndrome. *Am J Perinatol* 1992; 9(1) :25-7
- Newcomer J. Pessaries for the treatment of incompetent cervix and premature delivery. *Obstet Gynecol Surv* 2000; 55(7): 443-8.
- McDonald IA. Suture of the cervix for inevitable miscarriage. *J Obstet Gynecol Br Emp* 1957; 64: 346-50.
- Shirodkar VN. A new method of treatment for habitual abortions in the second trimester of pregnancy. *Antiseptic* 1955; 52: 299-300.
- Cammarano CL, Iferron MA, Parer JT. Validity of indications for transabdominal cervicoisthmic cerclage for cervical incompetence. *Am J Obstet Gynecol* 1995; 172:1871-5.
- Benson RC, Durfee RB. Transabdominal cervicouterine cerclage during pregnancy for the treatment of cervical incompetency. *Obstet Gynecol* 1965; 25: 145-55.
- Wallenburg HC, Lotgering FK. Transabdominal cerclage for closure of the incompetent cervix. *Eur J Obstet Gynecol Reprod Biol* 1987; 25:121-9.
- Mahran M. Transabdominal cervical cerclage during pregnancy: A modified technique. *Obstet Gynecol* 1978; 52(4): 502-506.
- Novy MJ. Transabdominal cervicoisthmic cerclage for the management of repetitive abortion and premature delivery. *Am J Obstet Gynecol* 1982; 143: 44-54.
- Al-Fadhli R, Tulandi T. Laparoscopic abdominal cerclage. *Obstet Gynecol Clin N Am* 2004; 31: 497-504.
- Ghomi A, Rodgers B. Laparoscopic abdominal cerclage during pregnancy: a case report and a review of the described operative techniques. *J Min Invasive Gynecol* 2006; 13: 337-41.
- Carter J, Soper D. Laparoscopic abdominal cerclage. *J Soc Laparoendoscopic Surg* 2005; 491-3.
- Lesser B, Childers J, Surwit E. Transabdominal cerclage: A Laparoscopic approach. *Obstet Gynecol* 1998; 91: 855-6.
- Scibeta JJ, Sanko SR, Phipps WR. Laparoscopic transabdominal cervicoisthmic cerclage. *Fertil Steril* 1998; 69: 161-3.
- Novy MJ. Transabdominal cervicoisthmic cerclage: a reappraisal 25 years after its introduction. *Am J Obstet Gynecol* 1991; 164: 161-3.
- Olatunbosun O, Turnell R, Pierson R. Transvaginal sonography and fiberoptic illumination of uterine vessels for abdominal cervicoisthmic cerclage. *Obstet Gynecol* 2003; 102: 1130-3.
- Aboujaoude R, Maloof P, Alvarez M, Al Khan A. A novel method for laparoscopic abdominal cerclage utilizing

minimally invasive hydrodissection. J Reprod Med 2007; 52:428-30.

22. Kjollesdal M, Nielsen S, Stjerdahl J-H, Engh AE. Laparoscopic cervicouterine cerclage using polypropylene mesh for the treatment of cervical incompetence. *Acta Obstet Gynecol Scand* 2005 ; 84: 823-824.
23. Gibb D, Salaria D. Transabdominal cervicoisthmic cerclage in the management of recurrent second trimester miscarriage and preterm delivery. *Br J Obstet Gynecol* 1995; 102: 802-806.
24. Reedy MB, Kallen B, Kiehl TJ. Laparoscopy during pregnancy: a study of five fetal outcomes parameters with use of the Swedish health registry. *Am J Obstet Gynecol* 1997; 177: 673-9.
25. Barmat L, Glaser G, Davis G, Craparo F. Da Vinci – assisted abdominal cerclage. *Fertil Steril* 2007; 1437.e1-3.
26. Golfier F, Bessai K, Paparel P, Cassignol A, Vandoyer F, Raudrant D. Transvaginal cervicoisthmic cerclage as an alternative to the transabdominal technique. *Eur J Obstet*

gynecol Reprod Biol 2001; 100: 16-21.

27. Katz M, Abrahms C. Transvaginal placement of cervicoisthmic cerclage: Report on pregnancy outcome. *Am J Obstet Gynecol* 2005; 192: 1989-94.
28. Deffieux X, De Tayrac R, Leuafi N, Gervaise A, Bonnet K, Frydman R, Fernandez H. Novel application of polypropylene sling: transvaginal cervicoisthmic cerclage in women with high risk of preterm delivery. *J Minim Invasive Gynecol* 2006 May-Jun; 13(3): 216-21.
29. Luznik M. Use of mesh cerclage in prevention of early preterm delivery: A promising new surgical method for women with dilated cervix and membrane herniation? *Wein Klin Wochenschr* 2006; 118(suppl 2) : 76-79.
30. Davis G, Barghella V, Talucci M, Wapner RJ. Patients with a prior failed transvaginal cerclage: a comparison of obstetrics outcomes either transabdominal or transvaginal cerclage. *Am J Obstet Gynecol* 2000; 183(4) : 836-839.
31. Zaveri V, Aghajafari F, Amankwah K, Hanna M. Abdominal versus vaginal cerclage after a failed transvaginal cerclage: a systematic review. *Am J Obstet Gynecol* 2002; 187: 868-872 .