

# Manipulation of Pregnant Uterus with Penrose Drain During Abdominal Cerclage: A Novel Method

## Abdominal Serklaj Sırasında Penrose Dren ile Gebe Uterusunun Manipülasyonu: Yeni Bir Yöntem

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### ABSTRACT

Most of the first line cerclage operations are performed by transvaginal route, TAC (Transabdominal Cerclage) is the surgical procedure of choice in cases with transvaginal cerclage failure or short cervix due to excisional procedures. In this report, we are presenting two cases of TAC operation in which uterine manipulation was provided with a novel atraumatic method. Broad ligament of the uterus was dissected from both anterior and posterior aspects and trans-ligamentary windows were created bilaterally. Bilateral Penrose drains were passed through windows on the broad ligament elevating and retroflexing the uterus. The broad ligament window was extended down to the uterovesical fascia and the bladder was rejected with sharp dissection. Double-needled, 5mm mersilene tape suture was passed through the cervical stroma from posterior to anterior direction bilaterally and tied on the anterior cervical surface. Our novel modification to TAC may have a potential role in advanced pregnancies.

**Keywords:** Cerclage, abdominal cerclage, penrose drain

### ÖZET

Serklaj operasyonlarının çoğu transvajinal yolla yapılır, TAC (Transabdominal Serklaj) transvajinal serklaj başarısızlığı veya eksizyonel işlemlere bağlı olarak serviksın kısa olduğu durumlarda tercih edilen cerrahi prosedürdür. Bu raporda, yeni bir atravmatik yöntemle uterus manipülasyonunun sağlandığı iki TAC operasyonu vakasını sunuyoruz. Uterusun geniş ligamenti hem ön hem de arka yönlerden diseke edildi ve bilateral olarak transligamentar pencereler oluşturuldu. Geniş bağ üzerindeki pencerelerden iki taraflı Penrose drenleri geçirildi ve uterusu yükseltip retrofleks etti. Geniş bağ penceresi uterovezikal fasyaya kadar uzatıldı ve mesane keskin diseksiyonla reddedildi. Çift iğneli, 5 mm mersilen suture servikal stromadan bilateral olarak arkadan öne geçirildi ve anterior servikal yüzeye bağlandı. TAC'deki yeni modifikasyonumuz ileri gebeliklerde potansiyel bir role sahip olabilir.

**Anahtar Kelimeler:** Serklaj, abdominal serklaj, penröz dren

Cervical cerclage (CC) is a surgical procedure whereby the uterine cervix is closed or reinforced by unabsorbable suture. It is performed for preventing or arresting second trimester losses and preterm delivery. Indication for CC are, history indicated, ultrasound indicated, elective and salvage based.<sup>1-3</sup> Transabdominal cerclage (TAC) or cervico-isthmic

cerclage; as it's name implies is the placement of cerclage suture via abdominal incision to the most proximal point of the cervico-isthmic junction. Though most of the first line cerclage operations are performed by transvaginal route, TAC is the surgical procedure of choice in cases with transvaginal cerclage failure or short cervix due to excisional proce-

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dures. Other indications for TAC include; congenital anomalies, cervical laceration or trachelectomy. TAC has the great advantage of occluding the cervix from the most proximal part as well as not exposing the suture to the vaginal bacterial flora and thus, reduced infection.<sup>4</sup> In a review conducted by Burger and colleagues, concluded that abdominal cerclage is associated with excellent results with high fetal survival rates and minimal complications during surgery and pregnancy.<sup>5</sup> However, it is technically challenging, has a higher risk of visceral injury and requires cesarean section for the delivery.<sup>6</sup> In addition, when its performed in pregnant women, the procedure has a higher risk of pregnancy loss due to the mechanical trauma during the surgery as a result of manual manipulation of the uterus.<sup>7</sup> In this report, we are presenting two cases of TAC operation in which uterine manipulation was provided with a novel atraumatic method. Both patients provided informed consent for the surgeries and writing of this report.

## CASE 1

31 years-old G4P2 pregnant patient was referred to our outpatient clinic at 7<sup>th</sup> week for one previous second trimester loss. Her obstetric history revealed that she had two-term vaginal, uncomplicated deliveries at 39 and 40 weeks. After two term deliveries, she had undergone cervical conization due to high grade cervical intraepithelial neoplasia (HCIL) and one year later, she had her second conization because of persistent HCIL. One year after the second cerclage, she had and spontaneous abortion at 14 weeks due to ruptured membranes. Her current cervical length was 13mm at time of first evaluation. TAC was planned for the ongoing pregnancy at 9 weeks and 3 days. Under general anesthesia, abdominal cavity was entered via Pfannenstiel incision. Broad ligament of the uterus was dissected from both anterior and posterior aspects and trans- ligamentary windows were created bilaterally. Penrose drains were passed through windows on the broad ligament and uterus was elevated, and retroflexed. Broad ligament window was extended down to the uterovesical fascia and the bladder was rejected with sharp dissection. Cervix and the level of internal cervical ostium were palpated and noted. Double-needled, 5mm mersilene tape suture

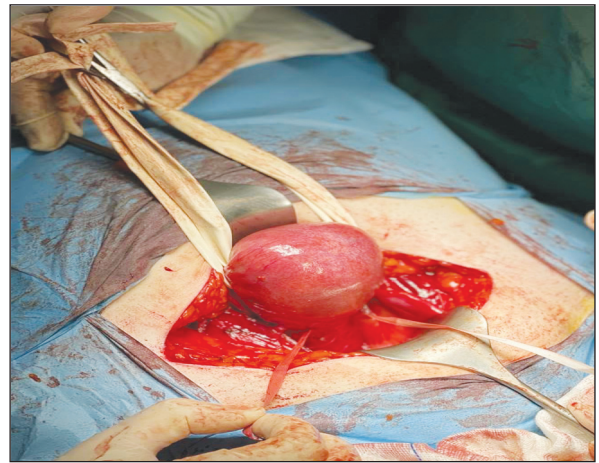


FIGURE 1: Manipulation of the uterus during the abdominal cerclage procedure is atraumatic. Mersilene cerclage tape has been passed around the cervix.

was passed through the cervical stroma from posterior to anterior direction bilaterally and tied on the anterior cervical surface (Figure 1). Windows on the broad ligament were closed with 2-0 absorbable sutures to prevent intestinal herniation. Abdominal layers were closed accordingly. Postoperative course was uneventful, and the patient was discharged from the hospital one day after the surgery. 200mg transvaginal micronized progesterone was given until 34<sup>th</sup> week. Pregnancy progressed without complication and she delivered a baby-girl, weighing 3570gr, with APGAR scores of 9/10, at 1 and 5 minutes, respectively, at 39 weeks with elective cesarean section. Cerclage suture was removed due to patient's request. The surgery duration was 50 minutes.

## CASE 2

36-years-old G3P1 pregnant patient was referred to our department for two previous pregnancy losses at 16<sup>th</sup> and 20<sup>th</sup> weeks. In her second pregnancy, she had undergone prophylactic transvaginal cerclage operation and the pregnancy was lost at 20<sup>th</sup> weeks due to premature rupture of membranes. Her obstetric and personal history were otherwise unremarkable. After the confirmation of fetal viability at ninth week, TAC was performed as presented for case 1. 200-mgr transvaginal micronized progesterone was given until 34<sup>th</sup> week. The course of pregnancy was uneventful. At 36weeks 6 days, she was admitted to the obstetric

ward due to contractions and rupture of membranes. 3340 gr/49cm, male baby was born via cesarean section. Postnatal evaluation was normal and first and five minute APGAR scores were 9 and 10. Cerclage suture was removed from the cervix due to the erosion of the posterior uterine wall resulting from uterine contractions. Informed consent was obtained from the patients who underwent the procedure. The surgery duration was 55 minutes.

## DISCUSSION

TAC can be performed both before the pregnancy as an interval procedure or during the pregnancy after the documentation of fetal viability. Though interval TAC is surgically less challenging and carries less risk for the growing fetus, some patients may come to the clinical attention after the pregnancy. Or they might not opt for the interval TAC due to financial reasons before evident pregnancy. The most important surgical challenge of the TAC procedure during pregnancy is the uterine manipulation. Uterine manipulation comes with a risk of abortion and vascular injury due to pelvic congestion and hypervascularization.<sup>8</sup> In addition, pregnant uterus at around 11-13 weeks; softens and slumps into the Douglas space and makes manipulation harder. Also, the presence of conceptus makes uterine vaginal manipulator during the laparoscopic (LS) surgery almost impossible. Similarly, manual traction of the uterus during abdominal surgery, in order to expose the uterine arteries and internal cervical ostium is not preferred by surgeons for fear of risk of abortion. We experienced that, our sensible uterine manipulation technique, enabled us to apply the necessary traction to the uterus and allow easy access to the uterine vessels and the cervical ostium. In addition, effective uterine traction provided us more surgical space and thereby reduced surgical trauma and bleeding. In the previous studies, TAC surgery was performed via vertical abdominal incision, which is associated with longer recovery time, infectious complication and less satisfying cosmetic results.<sup>9</sup> In our two cases, we did not need to extend the primer Pfannenstiel incision or switch to wider incision types.

With advancement of minimally invasive surgical techniques, LS- TAC became the preferred

method of TAC. LS-TAC provides unique advantages of rapid recovery, less abdominopelvic adhesion, less infection and better cosmetic results.<sup>10</sup> Additionally, LS-TAC showed equal and better neonatal outcomes compared with open TAC.<sup>10</sup> Moreover, open TAC requires two major open surgical procedures (TAC and cesarean) within a short frame of time, which is an undesirable outcome for a prophylactic surgery. On the other hand, with laparoscopy, even at expert hands, anteroposterior manipulation of the uterus is difficult, surgical time is longer, perioperative pregnancy loss and conversion to laparotomy are higher especially after 13 weeks.<sup>11</sup> Moreover, in a recent meta-analysis Marchard et al showed that both laparoscopic cerclage and open TAC had a positive effect by increasing the gestational age at time of delivery, increasing the neonatal survival rate, increasing the neonatal weight, and prevention of all deliveries at gestational ages <24 weeks. In addition, when they compared the prevention of births prior to 34 weeks in particular, placement of an open abdominal cerclage showed a statistically significant decrease in these births, while placement of a laparoscopic cerclage did not. This may indicate that specifically in the prevention of births between 34 and 37 weeks, a laparoscopic approach may be less effective.<sup>12</sup>

Our novel modification to TAC may have a potential role in advanced pregnancies. Opening of the broad ligament leaflets at the beginning of the surgery provides not only space for traction drain but also a clean dissection plane for rejecting the bladder from the anterior uterine surface. By pulling the uterus to posterior and superior directions with a penrose drain, we easily exposed the vesical fold and did not need more anteroposterior space to prepare the bladder for the passing of the sutures. One important concern for the presented technique may be the potential harm caused by compression of the ovarian vessels by the drains. However the incision we created in the broad ligament is small and the “Penrose drain” material we used to manipulate the uterus is soft and pliable, therefore iatrogenic injury to the ovarian vessels is carefully avoided. Additionally, we did not see any threatened abortion after the procedures. Secondly, it’s known that

grater majority of uterine perfusion in pregnancy comes from uterine arteries and ovarian arteries have only compensatory role. Thirdly, a recent previous report demonstrated, that even the bilateral ligation of the uterine arteries did not cause fetal loss, growth restriction or threatened abortion during the TAC.<sup>13</sup> It is evident from the aforementioned discussion that with time and experience, LS-TAC seems to be the procedure of choice in the future for abdominal cerclage. However, despite all the advantages of LS-TAC, it is not only a relatively challenging procedure, but minimal training in this technique makes it less commonly performed among providers and consequently accessible to patients worldwide.<sup>9</sup> In conclusion, in resource poor settings, advanced pregnancies, and in medical conditions that make laparoscopy unsafe (heart and pulmonary disease etc) abdominal TAC will still be a reasonable option. Our clinical results with this new technique are promising but they are based on two cases and as such, should be confirmed with larger studies comparing the presented technique and manual traction of the uterus.

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### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

**Idea/Concept:** Mehmet Sedar Kutuk, Çağlar Çetin; **Design:** Mehmet Sedar Kutuk, Çağlar Çetin, Ayşe Filiz Gökmen Karasu; **Control/Supervision:** Mehmet Serdar Kutuk; **Data Collection and/or Processing:** Çağlar Çetin; **Analysis and/or Interpretation:** Ayşe Filiz Gökmen Karasu, Mehmet Sedar Kutuk; **Literature Review:** Mehmet Sedar Kutuk, Çağlar Çetin; **Writing the Article:** Çağlar Çetin, Ayşe Filiz Gökmen Karasu; **Critical Review:** Mehmet Sedar Kutuk; **References and Fundings:** Mehmet Sedar Kutuk, Çağlar Çetin; **Materials:** Mehmet Sedar Kutuk, Çağlar Çetin, Ayşe Filiz Gökmen Karasu.

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