



## **Transabdominal Cerclage: A Comprehensive Prospective Overview**

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### **ABSTRACT**

*Research indicates that the TAC technique was initially employed as an alternative for patients who experienced unsuccessful transvaginal cerclage five decades ago. Furthermore, extensive research has demonstrated the remarkable efficacy of this surgical treatment for an incompetent cervix. Furthermore, studies have indicated that women afflicted with this condition often have a cervix that is insufficiently thick to support a full-term pregnancy, leading to a higher likelihood of experiencing a miscarriage in the second trimester. Research has demonstrated that TAC surgery has allowed numerous individuals worldwide to achieve something that may have seemed impossible in the past: pregnancies and births that are both secure and in good health. Thus, in our review, we have reviewed TAC with the help of indication, contraindication, risk associated, treatment, postoperative complications and outcomes.*

**Key words:** TAC, Indiction, Contraindication, Risk Associated, Treatment, Postoperative Complications, Outcomes.

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### **INTRODUCTION**

Research has indicated that transabdominal cerclage (TAC), which is also referred to as transabdominal cervicoisthmic cerclage.[1] Furthermore, studies have indicated that a TAC is a slender yet highly durable synthetic band that is intricately woven and positioned at a higher point on the cervix. This band provides protection to the cervix, helping to alleviate the strain caused by the growing fetus. Additionally, it offers support along the entire length of the cervix. A band is placed to prevent the cervix from opening, thus ensuring the continuation of the pregnancy.[1] Studies have shown that TAC was first reported as a method for treating cervical insufficiency (CI) fifty years ago. CI is a condition that cannot be cured with any other surgical procedures.[2] Various have done researches and estimated that, the incidence of cervical incompetence (CI) ranges from 0.01% to 1%.[3,4,5] At least 15% of habitually premature births (defined as occurring between 16 and 28 weeks of gestation) are attributable to CI.[6] Studies have also shown that the inability to carry a pregnancy to full term owing to a functional or structural abnormality in the cervix is CI.[4,6,7] Thus, in our review we were evaluating and discussing TAC.

### **INDICATION [8]**

1. One or more unsuccessful cervical cerclages
2. Congenital very short or absent cervix (DES; hypoplasia of the cervix)
3. Acquired very short or absent cervix (amputated cervix, conization)
4. Scarring, lacerations or defects of the cervix
5. (trauma; failed previous cervical cerclages)
6. Subacute cervicitis

### **CONTRAINDICATION [8]**

1. Bulging membranes
2. Ruptured membranes
3. Intra-uterine infections
4. Vaginal blood loss
5. Intra-uterine fetal death
6. IUGR
7. Labour
8. Life threatening maternal condition

### **RISK**

Studies have shown that among the outcomes examined were loss of fetal viability, organ damage, hemorrhage requiring blood transfusion, and wound infection. Furthermore, studies have shown that this

analysis found that the incidence of receiving a blood transfusion was lower than one percent, despite the fact that we had previously mentioned the risk of hemorrhage.[9,10,11] According to the majority, the migration of the synthetic band through the cervical wall (probably as a result of pressure from the growing and possibly contracting uterus) appears to occur rarely. However, another study reported that this occurred in 25% of successfully completed pregnancies.[12]

## **TREATMENT**

Studies have also concluded that a Hegar 8 cannula is placed transcervical for the purpose of uterine mobilization while the patient is under general anesthesia and undergoing the regular surgical and preparatory procedures at our facility. Additionally, studies revealed that the cannula is subsequently secured in position with a Pozzi clamp that has been placed in the frontal labia of the cervix. Further studies have shown that pneumoperitonium was manufactured with the use of a Veress needle and the standard closed procedure. Both the working pressure and the entry pressure were set at 12 mm Hg, with the entrance pressure being set at 20 mm Hg.[13] An intratraumbilically placed 10mm trocar was employed in order to prepare for the insertion of a 10mm zero-degree Hopkins optic. In addition to this, studies concluded that under the surgeon's direct supervision, two trocars, each with a diameter of 5 millimeters, were placed into the iliac fossas. When both the pelvic and abdominal cavities have been thoroughly examined, the therapeutic process may then start.[13]

Studies have also found that the anterior peritoneal reflection, which is above the plica uterovesicalis, is opened first with a harmonic scalpel and graspers. Studies have also concluded that after that, the incision is made wider laterally until the uterine artery can be seen clearly on both sides of the incision. Furthermore, studies have also concluded that after that, the cervical avascular space of the vesicle is reached, and then an atraumatic mobilization of the bladder is performed.[13] Studies have also concluded that a straight needle and a Mersilene tape with a width of 5 mm are introduced into the abdominal cavity via a suprapubic trocar incision. A thorough identification of the uterine vessels on both sides using atraumatic graspers is performed after the proximal part of the needle has been held at a right angle. Studies have also concluded that this stage occurs before the identification of the uterine vessels on both sides of the uterus. Studies have further concluded that posteriorly, with the help of cranial and posterior uterine mobilization, the needle is directed through the right broad ligament in the avascular space generated on the anterior leaf, medially from the uterine artery, and into the posterior face, immediately above the uterosacral ligament.[13] This procedure is performed after the uterus has been mobilized cranially and posteriorly. Studies have further concluded that, because of synchronous uterine mobilization, it is now possible to complete all of the steps. The procedure is then performed contralaterally, progressing from posteriorly to anteriorly, in accordance with the same anatomical and technical principles.[13]

Studies have also shown that the tape is knotted seven times in front of the cervicoisthmic junction once the mesh has been placed and confirmed to be far from the ureter and in the middle of the uterine arteries.[13] When that happens, a Caprofyl 2-0 stitch is made to fix the knot, and the knot is left in a horizontal position when the stitch is completed. Thus, studies have further concluded that the procedure is subsequently completed after the anterior peritonization, which covers the whole plica uterovesicalis and the mesh. This results in the patient having extra space inside their peritoneum. Throughout the whole of the surgery, we will be taking a number of crucial precautions, some of which are as follows: When doing LAC, it is essential to have a good visualization of the blood vessels. Studies have also found that to be sure of this, the procedure should be done from front to back, starting with opening the plica uterovesicalis and going through the wide ligament in the avascular space medially from the uterine artery and ending above the uterosacral ligaments. This will ensure that the procedure is carried out correctly.[13]

## **DIFFERENT VARIATION IN TREATMENT**

Researchers have also found that inserting a certain tape medially to the uterine artery and right to the cardinal and uterosacral ligaments at the upper cervico-isthmic level has the best results for the main goal of the surgery.[14] This is true regardless of the technique used in the process of carrying out the procedure. Studies have further concluded that this can only be done to a limited degree via the vaginal route, and it nearly always needs significant surgical dissections to do. Furthermore, studies have also concluded that laparoscopic surgery makes dissection and surgery itself simpler, and it eliminates the need for vaginal exposure, which theoretically reduces the risk of infection at the surgical site on both sides.[14]

Researchers have also found that when the anatomy has been changed or lost as a consequence of previous surgeries and/or pregnancy, the technique becomes more difficult to use. Thus, it may be a

tricky condition. The installation of the cerclage is not a difficult procedure since it just requires co-mm. Furthermore, studies have also concluded that it has been done using a number of different materials, the most frequent of which is a large needle that is linked to merisilene, prolene, or any other form of tape that contains a polyester component. Scientists have also found that it goes through a round opening in the broad ligament, which is next to the cervix on the side, the uterine vessels on the middle, and the uterosacral and cardinal ligaments on the front.[15,16] Studies have also concluded that after that, it is threaded through a non-sharp tunnel in the wide ligament. These tapes usually have a normal macro-pore mesh in them, which has been linked to quick action and a lower risk of getting adhesions, infections, or allergic reactions inside the abdomen.[17]

Researchers have also found that the technique, which was published in Surgical Science in 2013 by a team from Belgium headed by Marilien Gebreuers and Yves Jacquemin, is really one of the most often performed procedures. They showed their simplified method, which was used on 12 patients with cervical incompetence and treated with LAC after tissue was cut without hurting the patient and a cerclage tape was taken off with a needle.[18,19]. Studies have also concluded that this technique was used after the patients had shown satisfactory obstetric outcomes. Studies have also concluded that after performing an atraumatic dissection of the tissue and having the cerclage tape removed using a needle, the patients were treated with LAC. There are four stages to the technique, each of which must be finished in the same sequence that they were introduced. After the patient has been given general anesthesia, they will be positioned in dorsal lithotomy, a Foley catheter will be inserted, and then the uterine manipulator will be placed. Studies have also concluded that a 10 mm intraumbilical trocar and two 5 mm auxiliary trocars are placed in each iliac fossa. Establishing the vesicovaginal and paravesical spaces is the initial part of the procedure. This is conducted with the help of an injection of a solution of vasopressine that is placed underneath the peritoneum of the uterovesical reflection and laterally into the lower uterus.[19] This procedure is performed in order to achieve the desired result. Studies have also found that the next step is to make a hole in the broad ligament, find branches of the uterine vessels, and avoid those branches so that the final atraumatic perforation of an avascular area can be done with an atraumatic grasper. This procedure is performed medially on the uterine vessels on both sides.[13] This grasper has a clear path that it follows as it navigates its way through the posterior leaf and punctures it medially to the uterosacral ligament. Researchers have also found that during the third phase of the surgery, the suture material is threaded through the broad ligament window. This is the most significant departure from the traditional abdominal technique, which Al-Fadhli and Migione detailed in 2003 in the journal Human Reproduction.[19] The journal was titled "Human Reproduction." The United Arab Emirates was the location of the journal's publication. Studies have also concluded that the use of the umbilical port allows for the painless insertion of a 5 mm polyester tape into the pelvic cavity without the need for needles.[13] Studies have concluded that after that, the tape is threaded through the hollows that have been formed in the broad ligament, and both free ends are left on the anterior side of the body. Studies have also concluded that this completes the procedure. Because the window is located medially to the uterosacral ligaments, it is not necessary to join the loop because a small portion of the cervical tissue is already integrated into the loop. This is due to the fact that the loop already contains some of the cervical tissue. In addition, there is no need to anchor the loop in any way, since this is not a prerequisite suture to uterus.[13]

Researchers have also found that the last step is tying three knots to connect the cerclage to the anterior side of the uterus. This creates a loop around the cervix that is free of tension and is located slightly above the point where the uterosacral ligaments are placed. It is not thought essential to close the peritoneum, and preoperative antibiotics are not given to the patient. In another study, Both surgeons at the PIVET medical facility in Australia adhered to the same conceptual frameworks for their surgical procedures. These concepts included the development of an avascular plane that was between 5 and 6 mm in width on both sides of the broad ligament. They will reflect the bladder in a caudal direction after the uterovesical fold has been opened. Studies have also concluded that the most significant change occurred when they let the free ends of the Mersilene tape dangle freely posteriorly at the level of the sacral crus. Furthermore, studies have shown that this was the moment when they realized the difference. The subsequent step is to tie intracorporeal knots on the posterior side of the uterus. The ureter and the well-perfused uterus are regularly verified before the procedure is completed.[14]

Researchers have also found that in an essay that was published in 2015 in the Journal of Clinical Case Report, researchers went into depth about their experience working with the Gebreuers classic technique. Studies have also concluded that during an operative laparoscopy, the early operations of generating pneumoperitoneum and installing the trocar are quite similar to the steps that are conducted during the actual procedure.[13] Studies have also concluded that before beginning any dissection, the Grebauer technique involves injecting a solution of vasopressine under the peritoneum of the utero

vesicle. This step takes place before any additional dissection is performed. It is thus feasible to perforate the cardinal ligament from anterior to posterior in an area free of blood vessels, which is located on the median side of the uterine vessels. The location of the uterine artery and vein branches makes this possible. Furthermore, studies have also concluded that the use of large needles in the abdominal cavity should be avoided in favor of using an atraumatic straight clamp. After tying three knots in the tape, leaving the free side linked to the anterior side of the uterus, they released the tension in the tape. During this procedure, the peritoneum is not brought together over the knot.[19]

Researchers have also found that in a case report from the year 2016, researchers provided an overview of her surgical technique, stating that she used the same concepts as she did with LAC. They started by inserting a Mersilene anterior ligament posteriorly, mentioning that this entry had to be performed one centimeter superiorly and laterally to the insertion of the uterosacral ligaments. Later on, they continued by saying that this entrance had to be performed one centimeter superiorly and laterally to the entry of the uterosacral ligaments. After six intracorporeal knots had been performed, the tape was secured with a Vicryl 2-0 stitch. There is always a visual confirmation that the right tape position has been reached on the posterior side before the procedure is finished.[20] Another study that looked at a similar procedure did the same things: they used a closed Veress technique to make a pneumoperitoneum, put in ports for operative laparoscopy, made an area without blood vessels over the back leaf, and then used a Mersilene tape pass from the front peritoneum. They made an anterior knot in the tape and then left both ends of the tape free. In addition to this, they will inject 500 cc of Ringer solution into the peritoneum cavity, which will help to keep the cerclage in place, and they will tie a knot in the posterior region of the isthmus, which will also help to keep the cerclage in place. Thus, studies revealed that in subsequent pregnancies, they will never again employ the tape in the isthmus; instead, they will always use the peritoneum to cover the region.[21]

Researchers have also found that the "Goldfinger" device, which is produced by Ethicon End surgical, is an example of the kind of instrument that has the potential to be used during a LAC procedure. Studies have also concluded that the initial goals of the creation of this instrument were to facilitate laparoscopic gastric band placement as well as distal pancreatectomy surgeries. Studies further concluded that the device had a bending tip and a blunt end, which allowed the surgeon to easily travel between structures while also limiting the likelihood of injuring nearby tissues. This was accomplished via the device's malleable tip. Studies have also concluded that in 2015, Bolla said that there were 18 patients who were successfully treated with Goldfinger. The average surgical time was 55 minutes, and there were no major intraoperative or postoperative complications. All of the patients were released from the hospital within three days after the surgery, and there were no complications for any of the term births that were obtained.[22,23]

## **OUTCOMES**

Studies have shown that the overall success rate of this method for achieving pregnancy is only about 95%. This may be because of the extra risks that come with these types of pregnancies.[11] Furthermore, studies have shown that the second success criteria (birth beyond 28 weeks) is especially relevant to multifetal pregnancies.<sup>13</sup> In addition to this, studies have shown that the TAC's technical failure to prevent cervix opening in the second trimester will undoubtedly occur, but hopefully rarely.[24]

## **POSTOPERATIVE COMPLICATION**

The incidence of uterine rupture is described as being significantly greater in patients who have undergone periviable classic cesareans, according to a recent study.[25] However, studies have also shown that uterine rupture after TAC insertion in a uterus that has already been scarred is very unusual, and in our experience, it has only occurred once.[10, 26] Studies have concluded that both a hysterotomy scar and a unicornuate uterus were seen.[24] However, some studies have also shown that uterine rupture is particularly crucial to think about because of the potential dangers it poses to the health of the mother and the unborn child.[24] Studies have also shown that the very rare occurrence of tears in the uterine wall above the cerclage during rapidly progressing labor highlights the need for extra care when planning a cesarean delivery. This is especially important when the labor starts before due dates.[24] Addition to this, the rising rate of vaginal deliveries in one study from Egypt further demonstrates the need for prenatal surveillance in these pregnancies.[12]

## **CONCLUSION**

Studies have shown that the transabdominal cervical cerclage can be performed for either prophylactic or diagnostic purposes, and it has a higher success rate. Studies have also proved that in cases of severe CI, the use of the TAC technique is a highly recommended option among the various available treatments.

Thus, this treatment may be beneficial for specific women, especially those with a severely damaged or nearly absent cervix.

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