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The Role of Abdominal Cerclage in Managing Multiple Pregnancy Losses. Case Report

El Papel del Cerclaje Abdominal en el Manejo de Pérdidas Gestacionales Múltiples: Reporte de Caso

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Abstract:

Cervical incompetence is a recognized cause of recurrent pregnancy losses in the second trimester. Abdominal cerclage, a less commonly used surgical technique compared to transvaginal cerclage, may be a viable option in cases where transvaginal procedures have failed or are contraindicated. This report describes the case of a 34-year-old patient with severe cervical incompetence, with a history of recurrent pregnancy losses in the second trimester, despite having undergone multiple transvaginal cerclages without success. It was decided to perform an abdominal cerclage by laparotomy, with the placement of a permanent suture around the upper portion of the cervix, at the transition to the uterine isthmus. A direct comparative intervention was not performed, since previous attempts with transvaginal cerclage had failed. However, a theoretical comparison with transvaginal techniques is discussed in terms of efficacy and safety. The intervention allowed the patient to carry a pregnancy to term, resulting in a cesarean delivery without significant obstetric complications. Postoperative follow-up revealed no complications resulting from the abdominal cerclage. Abdominal cerclage proved to be an effective therapeutic option in this patient with severe cervical incompetence, where transvaginal methods had failed. This case highlights the importance of considering abdominal cerclage in patients with refractory cervical incompetence, emphasizing its potential for successful pregnancies.

Keywords: *Abdominal cerclage, cervical incompetence, cervical cerclage.*

Resumen:

La incompetencia cervical es una causa reconocida de pérdidas gestacionales recurrentes en el segundo trimestre. El cerclaje abdominal, una técnica quirúrgica menos común que el cerclaje transvaginal, puede ser una opción viable en casos donde los procedimientos transvaginales han fracasado o están contraindicados. Este informe describe el caso de una paciente de 34 años con incompetencia cervical severa, caracterizada por pérdidas gestacionales recurrentes en el segundo trimestre, a pesar de haber recibido múltiples cerclajes transvaginales en distintas ocasiones, sin éxito. Por lo que se decidió realizar un cerclaje abdominal mediante laparotomía, colocando una sutura permanente alrededor de la porción superior del cuello uterino, en la transición hacia el istmo uterino. No se llevó a cabo una intervención comparativa directa, ya que los intentos previos con cerclaje transvaginal no tuvieron éxito. Sin embargo, se aborda una comparación teórica con las técnicas transvaginales en términos de eficacia y seguridad. La intervención permitió a la paciente llevar un embarazo a término, culminando en un parto por cesárea sin complicaciones obstétricas significativas. El seguimiento postoperatorio no reveló complicaciones derivadas del cerclaje abdominal. Este método terapéutico demostró ser una opción terapéutica efectiva en esta paciente con severa incompetencia cervical, donde los métodos transvaginales habían fracasado. Este caso resalta la importancia de considerar el cerclaje abdominal en pacientes con incompetencia cervical refractaria, subrayando su potencial para lograr embarazos exitosos.

Palabras Clave*: Cerclaje abdominal, incompetencia cervical, cerclaje cervical*

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INTRODUCTION

During pregnancy, the cervix plays a crucial and dynamic role, undergoing a series of essential anatomical changes. These include dilation and effacement, critical processes that facilitate labor. However, maintaining an adequate physiological and anatomical balance before, during, and after pregnancy presents a significant challenge for both maternal and fetal health. The successful culmination of pregnancy, measured by the well-being of both the mother and the newborn, largely depends on this balance. Any alteration in the function of the cervix, such as isthmic-cervical incompetence, can have severe consequences for the viability of the pregnancy. Therefore, understanding and appropriately managing these conditions is essential to ensure the well-being of both the mother and the fetus.[1]

One of the clinical issues complicating pregnancy is isthmic-cervical incompetence, a significant cause of pregnancy loss during the second trimester and, in some cases, also in the early third trimester.[1] This disorder is defined as the inability of the internal cervical sphincter to maintain the pregnancy until term, in the absence of bleeding or symptoms suggesting infection.[2] Isthmic-cervical incompetence can lead to premature cervical dilation, often resulting in preterm labor or pregnancy loss.[2]

In the early stages of pregnancy, cervical incompetence may not present with obvious symptoms. However, some women might experience mild discomfort or spotting before receiving a diagnosis, typically before 24 weeks of gestation. The diagnosis is primarily based on medical history and may include a transvaginal ultrasound to assess the length of the cervix, as well as to detect signs of cervical dilation or protrusion of the fetal membranes.[2]

Cervical Incompetence

Cervical incompetence is a condition that, if not diagnosed early, can lead to severe complications during pregnancy, such as preterm birth or fetal loss. Therefore, early detection is crucial, as it allows for implementing preventive measures, such as cervical cerclage. This procedure involves suturing the cervix to keep it closed during pregnancy, which reduces the risk of preterm labor. Women with a history of preterm births or recurrent pregnancy losses must undergo careful and ongoing evaluation to detect signs of cervical incompetence as early as possible. Timely diagnosis and constant monitoring are essential to improving perinatal outcomes and preventing major complications.[2]

The diagnosis of cervical incompetence in non-pregnant women is based on three fundamental components:

- Medical history: A review of the patient's history of recurrent miscarriages or preterm births, which increases the risk of developing cervical incompetence.
- Physical examination: The search for evidence of cervical dilation or weakness, particularly in women with a history of pregnancy losses.
- Transvaginal ultrasound: Evaluation of cervical length; a measurement of less than 25 mm is indicative of cervical incompetence, even in the absence of pregnancy.

In some cases, the diagnosis may be supplemented with additional tests, such as hysterosalpingography, which helps identify potential structural abnormalities of the cervix. The combination of these diagnostic methods is crucial for the early identification of the condition and the implementation of appropriate preventive measures.[2]

Cervical cerclage is a surgical procedure used to prevent cervical insufficiency and reduce the risk of preterm labor in women with a short cervix or a history of recurrent pregnancy loss. It is particularly recommended in cases where the cervical length is less than or equal to 25 mm, as detected by transvaginal ultrasound, and becomes more urgent when the length is below 20 mm or there are clear signs of cervical insufficiency.[3] The procedure is commonly performed between 12 and 14 weeks of gestation,[4] although in some cases, it may be extended to weeks 10 to 16.[5] This procedure is contraindicated in cases of active infection, bleeding, or preterm rupture of membranes. After week 17 of gestation, emergency cerclage carries higher risks due to morphological changes in the cervix,[6] and after week 26, it is associated with an increased risk of membrane rupture and the potential to trigger preterm labor,[7] making its use not recommended during these stages. However, some specialists still consider its use in more advanced pregnancies[8], especially in emergengy cases or when significant cervical changes occur. These strategies are discussed in Table 1.[8]

Table 1. *Additional Techniques to Optimize Cervical Cerclage.*[8]

Amniocentesis	Extraction of amniotic fluid to reduce uterine volume and minimize the risk of membrane prolapse during the procedure. This approach also facilitates the collection of cultures to rule out intra-amniotic infections.[9]
Bladder Filling:	It is recommended to fill the bladder with approximately 1000 mL of saline solution. This method helps elevate and displace the membranes from the surgical field, reducing the risk of injury during cervical suturing.[10]
Use of a Foley Catheter	This involves inserting a Foley catheter into the cervical canal and filling it with 50 mL of saline solution. This procedure gently lifts the membranes of the lower uterine segment, facilitating the placement of the cerclage. After securing the knot, the fluid from the balloon is removed, and the Foley catheter is extracted.[11]

Cervical Cerclage Techniques

Several techniques exist for performing cervical cerclage, including those developed by Shirodkar, Wurm, McDonald, and Espinosa Flores, each with specific characteristics depending on the clinical case.

- Shirodkar Technique: This technique involves introducing a submucosal band of fascia lata or Mersilene beneath the vaginal mucosa on both sides of the cervix, ending with a knot on the anterior or posterior cervix. It is more complex and is generally indicated for prophylactic cerclages.[12,13]
- Wurm Technique: Two suture points are placed in a back-and-forth manner using non-absorbable
- Material, offering a less invasive approach with a lower risk of complications.[14]
- McDonald Technique: This is the most commonly used technique, involving a "purse-string" or circular suture around the cervix using permanent suture material. It is easy to perform, effective in preventing preterm labor, and is usually carried out between 12 and 14 weeks of gestation.[15,16]
- Espinosa Flores Modified Cerclage Technique: This technique uses the ligaments of the cervix to secure the cerclage with umbilical tape or Mersilene, distributing support anatomically and effectively.[16,17]

Post-Cerclage Management

Post-cerclage management is essential to avoid complications. Generally, it is recommended to remove the cerclage between 36 and 37 weeks of gestation or at the onset of preterm labor to prevent risks such as cervical lacerations or uterine rupture.[18,19] In cases of premature rupture of membranes (PROM), some authors suggest that cerclage removal is not necessary if a cesarean section is planned, as no significant adverse effects have been observed in future pregnancies.[20,21] However, prolonged retention of the cerclage may be associated with theoretical risks, such as inflammation or infection, although the evidence in this regard is limited and inconclusive.[22,23]

The morphology of the membranes in advanced cervical incompetence presents a series of changes that compromise the structural integrity of the cervix and amniotic membranes. Premature cervical dilation can lead to membrane protrusion, thinning, and premature rupture of the membranes. Which increases the risk of preterm labor, infections, and severe complications for both the mother and the fetus.[23] Constant monitoring and appropriate therapeutic intervention are critical, which may include the use of cervical cerclage, corticosteroids, antibiotics, and management of preterm labor if necessary.[23]

Abdominal and Laparoscopic Cerclage

In more complex cases, where vaginal cerclage is insufficient, abdominal cerclage may be considered. This procedure can be performed through two main approaches: laparoscopic and laparotomic, each with specific characteristics, advantages, and disadvantages.[24]

Laparoscopic abdominal cerclage is a minimally invasive approach that has gained popularity due to its benefits in terms of recovery and reduced complications. This procedure is characterized by the use of small incisions, resulting in less postoperative pain, faster recovery times, and a lower likelihood of adhesions. Additionally, it offers better cosmetic outcomes due to the smaller incisions. A study conducted at the National Institute of Perinatology in Mexico on 71 women who underwent prophylactic cerclage between 12 and 26 weeks of gestation showed a reduction in preterm birth rates and an improvement in neonatal survival, as well as lower morbidity compared to laparotomic cerclage. However, laparoscopic cerclage requires greater surgical expertise and specialized equipment. The risk of technical complications is low, but cannot be completely excluded.[24-25]

On the other hand, laparotomic abdominal cerclage, although more invasive, remains a valid option, particularly in complex cases that require greater visibility and control during the procedure. This approach involves larger incisions, which result in increased postoperative pain, a longer recovery time, and a higher risk of adhesions. However, its enhanced visibility and the control it provides can be beneficial when faced with unforeseen surgical complications or more delicate situations.[25-26]

In Mexico, no national statistics are comparing the frequency of these procedures; however, several local studies have indicated a growing trend toward the adoption of laparoscopic abdominal cerclage due to its advantages in terms of morbidity and postoperative recovery. Research published in the *Ginecología y Obstetricia de México* journal supports the effectiveness of laparoscopic cerclage and its lower complication rate compared to laparotomic cerclage.[24-26]

The choice between laparoscopic abdominal cerclage and laparotomic cerclage should be based on a careful evaluation of the patient's individual characteristics, the surgeon's experience, and the availability of necessary resources. Both approaches have their indications and advantages, but laparoscopic cerclage has increasingly become the preferred option due to its benefits in terms of recovery, reduced pain, and decreased long-term complications. Although laparoscopic abdominal cerclage has gained acceptance for its lower impact on morbidity, the decision on which technique to use should be individualized, considering the patient's clinical condition and the surgical context.[27]

Transabdominal cerclage is performed in cases of severe cervical insufficiency when vaginal cerclage is ineffective. The main criteria are:

1. Severe Cervical Insufficiency: These are cases where vaginal cerclage has failed or is not feasible due to specific anatomical characteristics of the cervix or uterus (Figure 1).[28]
2. Negative Cultures: Cervical cultures must be free of infections to avoid postoperative complications.[29]
3. Gestational Weeks: It is typically performed between 14 and 20 weeks of gestation, when its effectiveness is greatest.[30]
4. Cervical Incompetence with a History of Gestational Losses or Preterm Births: This procedure is indicated for women with a history of recurrent miscarriages or preterm birth due to cervical incompetence (Figure 2).[31]
5. Absence of Severe Uterine Malformations: Cerclage is only performed if there are no uterine malformations incompatible with pregnancy.[32]
6. History of Failed Cerclage or Previous Cervical Surgery: It is

necessary when previous cerclages have failed or if the patient has undergone cervical surgeries that may have weakened the cervix (Figure 3).[33]

Transabdominal Cervicoisthmic Cerclage (Benson) is a surgical technique reserved for patients with high-risk obstetric conditions that require specialized intervention.

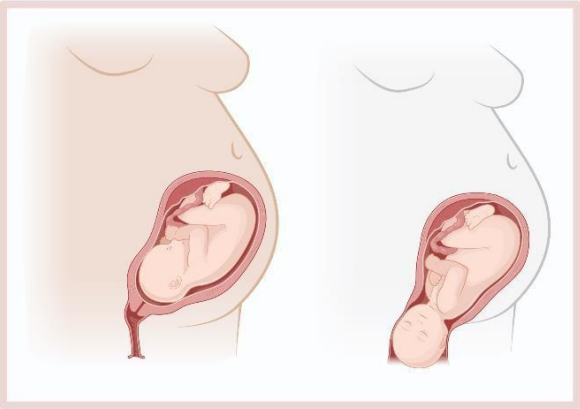

Figure 1. Schematic representation of severe cervical insufficiency. Author's own image.[28]

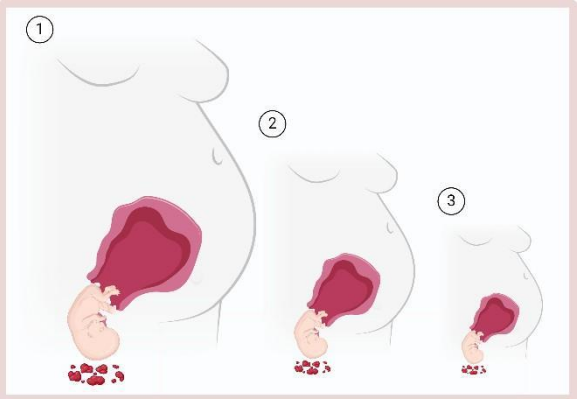

Figure 2. Recurrent Spontaneous Abortion. Author's own image.[31]

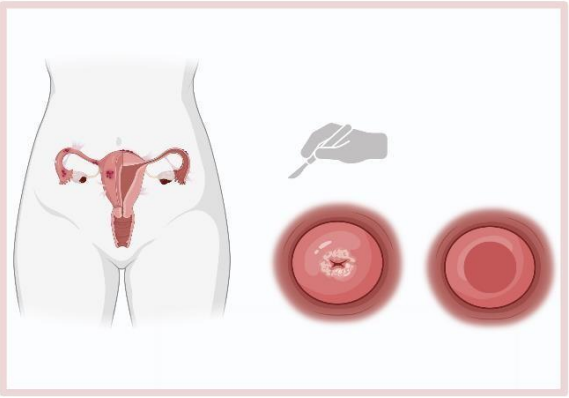

Figure 3. Anatomical alterations, previous cervical conization. Image of the author's own.[33]

The significance of this procedure lies in the strict adherence to the criteria and indications that justify its application. These criteria include, among others, failures of previous vaginal cerclage attempts, severe cervical lesions that prevent conventional cerclage, and the presence of congenital malformations affecting the anatomical integrity of the cervix.[34]

Surgical Technique

Transabdominal cerclage is performed through an abdominal incision, with sutures placed around the cervix at the lower cervical segment.

1. Transabdominal Cerclage is placed at the junction between the cervix and the uterine body (where the cervix meets the upper uterine segment).
2. This procedure involves passing the suture through the cervix, just below the internal cervical os and the uterocervical junction.
3. Specific height: The cerclage is placed at the lower portion of the cervix, approximately at the level of the junction between the cervix and the uterine body.[35]

The psychological impact of pregnancy loss is well documented, and losing a desired pregnancy at any stage is profoundly distressing, particularly when it occurs as part of a pattern of recurrent losses. Risk factors may include genetic syndromes, endocrine disorders, antiphospholipid syndrome, anatomical abnormalities, intrauterine adhesions, fibroids, and cervical incompetence, with the latter being one of the most common. Typically occurring in the second or early third trimester, cervical incompetence is defined as “initial, painless, and progressive dilation of the cervix, where preterm labor seems inevitable and unpredictable.[36]

Correct patient selection and strict adherence to these parameters are crucial for the success of the intervention. When performed under appropriate conditions and by a qualified medical team, this technique can provide highly satisfactory perinatal outcomes, significantly contributing to the preservation of pregnancy and fetal well-being. Furthermore, transabdominal cerclage is associated with a low incidence of complications both during the surgical procedure and throughout the subsequent gestational period. Therefore, this technique presents itself as a safe and effective therapeutic option, with its success depending not only on the precision of the procedure but also on the meticulous selection of cases and careful planning, maximizing clinical benefits while minimizing inherent risks.[36]

It is important to mention that transabdominal cerclage appears to be a promising intervention for women with cervical insufficiency and multiple pregnancies, especially when vaginal cerclage has failed. In a recent study on the management of cervical insufficiency in twin pregnancies, Devième et al. (2020) evaluated the effectiveness of transabdominal cerclage in seven women with a history of failed or unviable vaginal cerclage. The results indicated that the majority of pregnancies reached 34-37 weeks of gestation, suggesting that this technique is a

viable option for preventing preterm birth in this high-risk group. However, due to the small sample size, larger studies are needed to confirm these results.[37]

CASE REPORT

This case report was conducted in accordance with the Helsinki Declaration and was approved by the Ethics Committee of Hospital Español de Veracruz. The patient consented to the use of her data for the preparation of this article by signing an informed consent form.

A 34-year-old female patient, originally from Tolcayuca, Hidalgo, currently residing in Pachuca de Soto, Hidalgo, is in a common-law relationship, Catholic, with a technical degree, employed, and with blood type O Rh+. The patient reports a personal medical history of isthmic-cervical incompetence, recurrent miscarriages, and Human Papillomavirus (HPV) infection, with a diagnosis of Cervical Intraepithelial Neoplasia grade III (CIN III or Carcinoma in Situ) in 2010, which was treated with cervical conization. She has no history of substance abuse, chronic degenerative diseases, infectious diseases, trauma, or allergies.

She presented menarche at 13 years of age, with regular menstrual cycles, moderate bleeding, and intermittent dysmenorrhea. She began sexual activity at 18 years of age, maintaining a single sexual partner. She has had three previous pregnancies, two of which were spontaneous abortions: the first at 16 weeks and the second at 22 weeks. She is currently 38 weeks pregnant according to her last menstrual period (LMP).

Given her history of recurrent miscarriages and diagnosis of isthmic-cervical incompetence, the patient consulted with a specialist in gynecology and obstetrics. After a thorough evaluation and considering her desire for a successful pregnancy, it was decided to perform a Benson-type abdominal cerclage at 15 weeks of gestation. The procedure was thoroughly explained to the patient, who signed the informed consent. The cerclage was performed without complications, and the pregnancy progressed satisfactorily until 38 weeks of gestation, at which point a Kerr-type cesarean section was performed due to her obstetric history. The newborn weighed 2450 g, measured 48 cm in length, had a head circumference of 38 cm, and an Apgar score of 9 at five minutes. Both the mother and the baby were discharged without additional complications after 48 hours.

DISCUSSION

As mentioned earlier, ICI is a condition in which the cervix loses its ability to remain closed during gestation, increasing the risk of fetal loss. This pathology can be congenital or acquired. In this case, the patient has a history of cervical conization, a procedure that, by altering the structure of the cervix, may predispose to ICI. Deep conization can affect the muscular and collagen fibers of the cervix, increasing the risk of premature dilation, which justifies the surgical intervention with cerclage.[32,38]

The morphology of membranes in advanced cervical incompetence presents a series of changes that compromise the structural integrity of the cervix and the amniotic membranes. Premature cervical dilation can lead to membrane protrusion, thinning, and premature rupture of membranes, increasing the risk of preterm birth, infections, and serious complications for both the mother and the fetus. Constant monitoring and an appropriate therapeutic approach are essential, which may include the use of cervical cerclage, corticosteroids, antibiotics, and management of preterm labor if necessary.[38]

Table 2. Relevant Gynecological and Obstetric History in Patients with Transabdominal Cerclage.[40] Compared to our patient.

	Our Patient	Other Patients
Abortions	Gesta 1: 16 weeks Gesta 2: 22 weeks	90% of patients had abortion
Previous Cervical Cerclage	Performed at 5 weeks	Performed in the first trimester
Previous Cervical Surgery	Cervical conization at 6 weeks	Cervical conization in the second trimester
Previous Vaginal Infections	HPV diagnosis in 2010	Previous abortion Before cervical conization
Prenatal Care	Inadequate in previous pregnancies	Adequate, but unable to carry pregnancy to term

Although not the particular case in this patient, it is important to note that over-treatment of low-grade cervical lesions, especially those that do not require conization, is a significant concern in Latin America. Low-risk lesions are often subjected to unnecessary treatments due to the lack of standardized protocols and the overload of diagnostic and therapeutic procedures. Excessive treatment of low-grade lesions can lead to unnecessary complications such as infections, hemorrhages, and adverse effects on fertility.[38,39]

Cerclage is a surgical intervention recommended for the management of ICI. In this case, Benson-type abdominal cerclage was chosen due to its efficacy in complex cases or when vaginal cerclages have failed. This approach offers advantages such as a lower rate of postoperative complications and faster recovery. The laparoscopic technique used for performing abdominal cerclage offers reduced invasiveness and minimizes the risk of adhesions. Currently, a 98% success rate is reported for pregnancy preservation, and it has proven to be the treatment of choice in patients where transvaginal cerclage has failed, making this procedure highly effective (Table 2).[40,41]

Cervical conization, although effective in treating early cervical lesions associated with HPV, can affect the integrity of the cervix and contribute to ICI. The patient was diagnosed with CIN III, which led to her cervical conization in 2010. This treatment can increase the risk of cervical insufficiency and,

consequently, recurrent miscarriages and preterm births, as evidenced in her obstetric history. The literature shows that women with a history of conization have a prematurity rate of 18%, compared to 8% in women without this history.[42-45]

HPV is one of the leading causes of early cervical lesions, such as CIN III, as diagnosed in the patient. Appropriate treatment of these lesions, such as cervical conization, is essential to prevent the development of cervical cancer. However, the surgical procedure may alter cervical function and increase the risk of cervical insufficiency. Women with a history of CIN III should be closely monitored during pregnancy, as they have a higher risk of cervical insufficiency.[44,45]

As an additional commentary, diethylstilbestrol (DES), used between 1940 and 1970 to prevent spontaneous abortion, has been linked to significant reproductive alterations, including uterine malformations and an increased risk of cervical insufficiency and preterm birth. Although this patient did not report exposure to DES. Itis important to consider this factor in the evaluation of ICI due to its impact on cervical structure.[46]

CONCLUSION

This clinical case emphasizes the importance of an integrated and personalized approach in managing women with a history of cervical insufficiency (ICI), cervical conization, and recurrent miscarriages. Early intervention with Benson-type abdominal cerclage has proven to be effective in preventing serious complications and improving perinatal outcomes, especially when transvaginal cerclage has failed or is not feasible due to a short or damaged cervix. Transabdominal cerclage, by providing support at the isthmic-cervical junction, is superior to cervical cerclage in these cases, as it offers more robust and durable support, reducing complications and increasing the likelihood of pregnancy success. Additionally, it highlights the need for specialized follow-up to reduce obstetric risks and maximize the chances of a full-term pregnancy. Early identification of risk factors, comprehensive evaluation, and the use of available methods are essential for appropriate decision-making, ultimately optimizing outcomes for both the mother and the fetus while minimizing complications throughout pregnancy.

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