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THE IMPORTANCE OF EMERGENCY TRANVAGINAL CERVICAL CERCLAGE FOR PREVENTING PREMATURE BIRTH: LITERATURE REVIEW

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Premature birth and recurrent late miscarriage are usually treated by vaginal cerclage. Of the three methods of preventing premature birth (drug tocolytic therapy, cervical cerclage and pessary), cerclage addresses asymptomatic women who have the three favoring factors: single pregnancy; previous spontaneous preterm birth; short cervical length (< 25 mm) before 24 weeks. The main benefits of cerclage refer to stopping recurrent premature birth before 35 weeks, reduction of perinatal mortality and significant reduction of neonatal morbidity. This article argues that emergency cerclage performed outside the standard indications for prolapse of amniochorial membranes through the external cervical orifice is an effective method for prolonging pregnancy and saving the fetus, allowing for improved perinatal prognosis.

Keywords: emergency cerclage, rescue cerclage, premature birth, cervical inability / inadequency

INTRODUCTION

Premature infants account for about 11% of all live births [1]. This percentage varies from year to year and from country to country (high-income G5 countries have a lower rate than developing countries). In the United States, preterm birth rates rose from 9.4% in 1981 to as high of 12.8% in 2006 [2].

Anticipating premature birth is difficult, but the presence of a short cervix, defined as a length of the cervix less than 25 mm, measured by transvaginal ultrasound in the second trimester of pregnancy is a strong indicator. In asymptomatic women, the short cervix is the only predictor of premature birth.

There are three ways to prevent premature birth: tocolytic therapy including progestogen administration, cervical cerclage, and the use of a pessary. However, there are no clinical trials that directly compare and assess which of the three methods is the best approach for a high-risk pregnancy. Tocolytic therapy (administration of beta-adrenergic agents, prostaglandin inhibitors, magnesium sulfate, oxytocin receptor antagonists, calcium channel blockers, etc.) is only used to delay childbirth and allow for transfer to a high-grade maternity ward [3]. Vaginal progesterone is given mainly to patients with short cervix to prevent cervical maturation and premature birth. However, performing cerclage proved to have the same effect. This is why most professionals rely on a personalized approach for each patient. There are several factors that guide the choice of treatment, which are generally used as indications for cerclage: (1) single pregnancy; (2) previous spontaneous preterm birth and (3) short cervix (<25 mm) before 24 weeks. The main benefits of using a cerclage refer to stopping recurrent preterm birth before 35 weeks, reduction of perinatal mortality and significant reduction of neonatal morbidity. Compared to cerclage, intravaginal progesterone administration is proposed for women without a history of spontaneous birth [4] and the benefits are represented by stopping recurrent preterm birth before 33 weeks and reducing neonatal morbidity and mortality [2].

MATERIAL AND METHOD

This study is based on reviewing the literature accessible in online databases for therapeutic protocols proposed by other authors and comparing them with the current protocol on cervical cerclage in the case of protrusion of amniochorial membranes inside the cervical canal shortened to ≤ 25 mm. In the Guide "Premature birth" endorsed and revised in 2018 by the Romanian Society of Obstetrics and Gynecology and approved by the Ministry of Health [5], emergency cerclage is one of the contraindications for cervical cerclage. The search engines used were PubMed and Uptodate, through which a controlled evaluation of scientific articles was performed; The general keywords for the search were: cervical failure, rescue cerclage, emergency cervical cerclage.

RESULTS

The diagnosis of short cervix is usually positive if transvaginal ultrasound shows a cervical length below 25 mm (Figure 1). This type of assessment is standardized throughout the population and includes single and twin pregnancies, as well as other maternal predisposing factors, such as previous preterm birth or miscarriage beyond the first trimester of pregnancy. This is when the treatment is started and the intervention for cerclage is performed and/ or intravaginal progesterone is administered, thus decreasing the premature birth rate by 30-40% compared to the lack of intervention [1,4,6].

Cervical cerclage involves various surgical procedures, including the use of synthetic threads or bands, imagined in order to restore the continence of the internal cervical orifice of the cervix and prevent premature birth. This reduces perinatal side effects by increasing the tensile strength of the cervix. Such adverse events include prolapse of fetal membranes in the vagina, infection of the membranes, premature labor, premature birth and perinatal mortality. (Figure 1).

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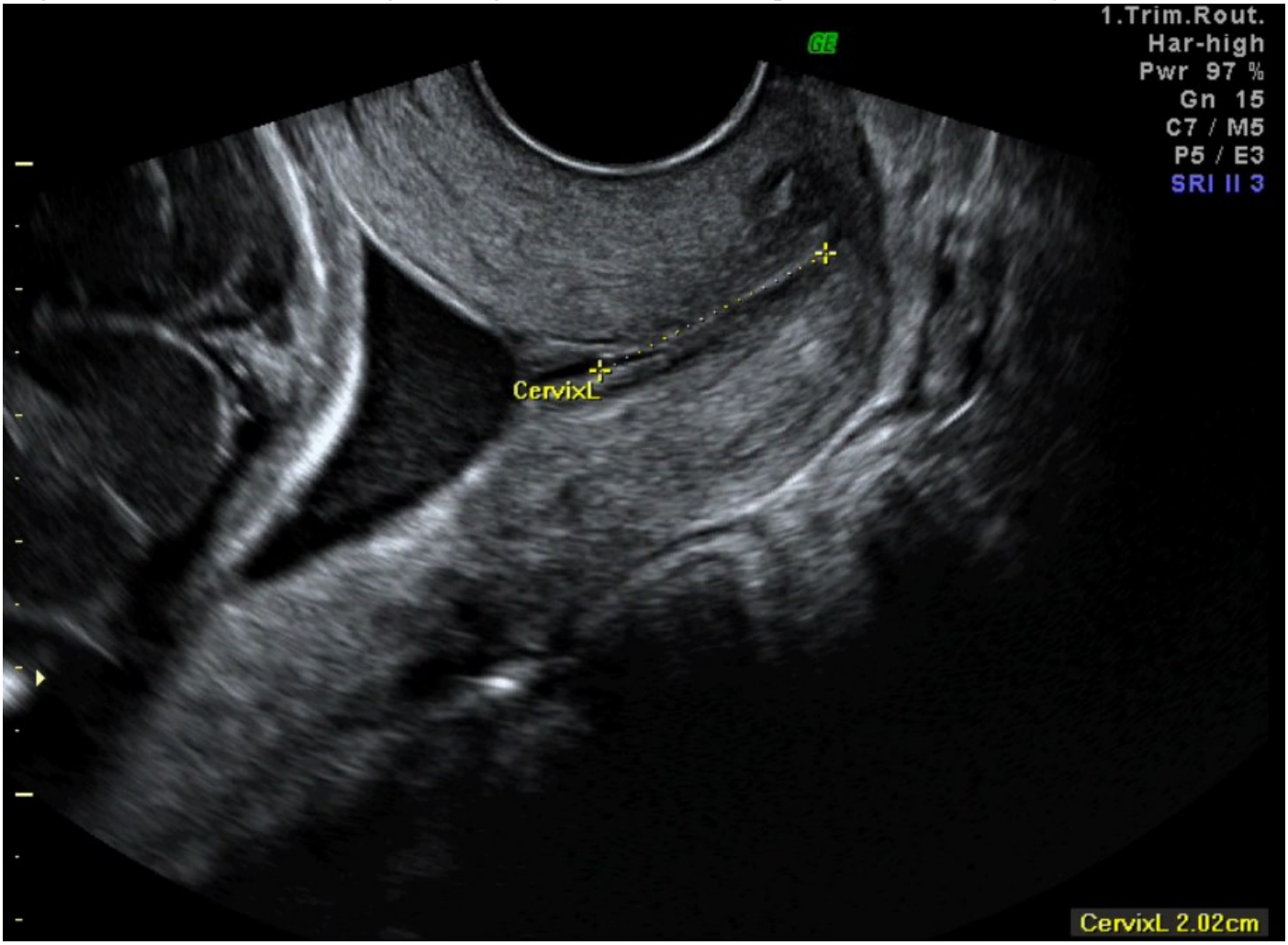
Figure 1. Standard ultrasound image showing a shortened cervix with opened internal cervical orifice



Indications of the cerclage in the literature include:

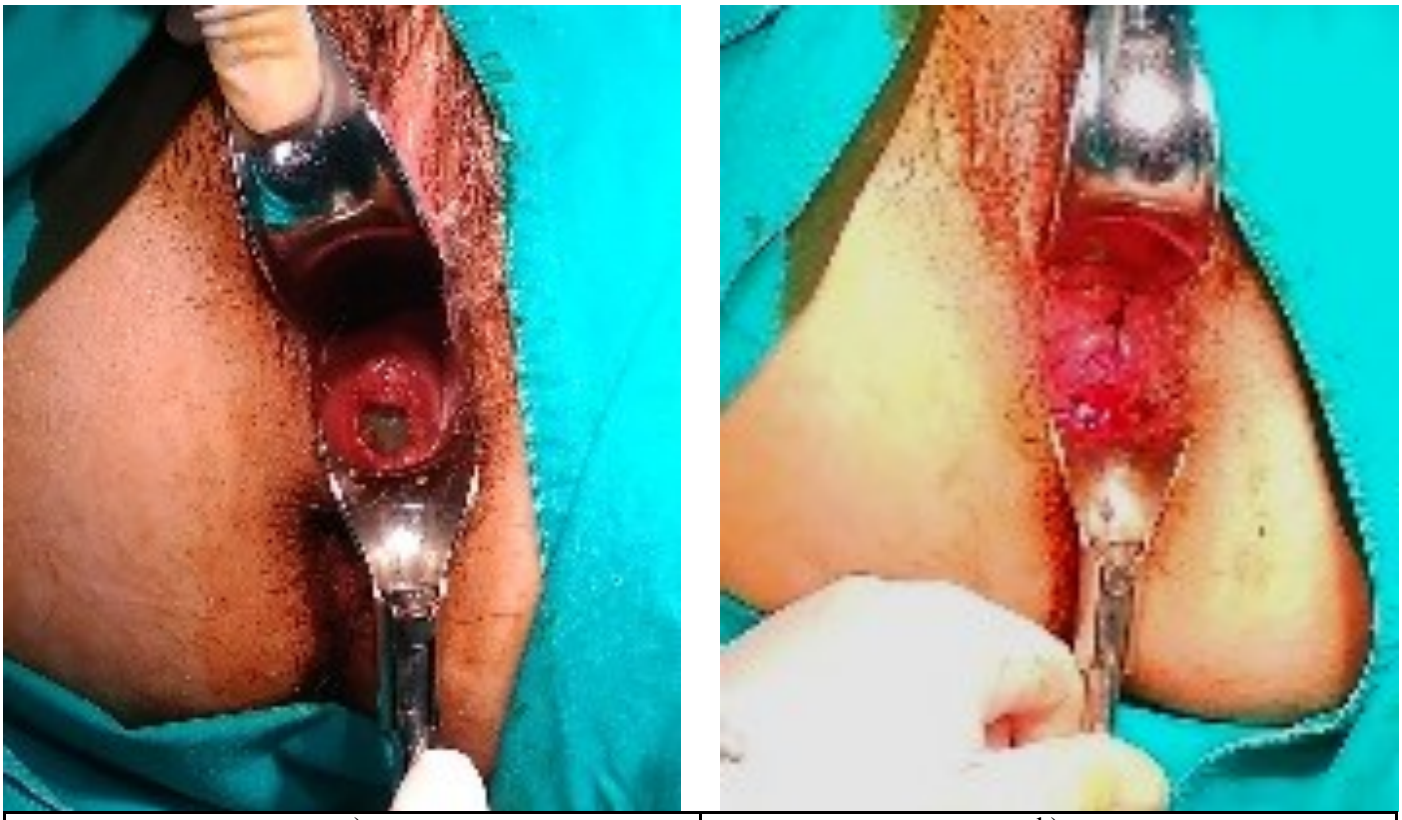
- "Historically indicated" cerclage (performed at 12-14 weeks of gestation) for women who, due to cervical insufficiency, suffered multiple losses and / or premature births in the second trimester [1].
- "Ultrasound-indicated" cerclage (16-23 weeks gestation) for women with a single pregnancy, previous preterm birth and short cervix (≤ 25 mm) diagnosed based on transvaginal ultrasound [2-4].
- The "clinically indicated" circle (at 16-23 weeks of gestation) for women with cervical insufficiency determined by clinical examination [6].

Rescue cervical cerclage should be considered when the cervix is already dilated with amniotic membranes bulging into the vagina through the cervix and without signs of labor, infection or major vaginal bleeding. Dilation of the cervix and protrusion of the membranes in the second trimester of pregnancy determine a high risk of miscarriage or premature birth. In the case of a dilated cervix, clinical examination using a speculum or vaginal valves is sufficient for diagnosis.

The protocol recommended by most authors in the literature involves transvaginal cervical cerclage by the Shirodkar or McDonald technique associated with the administration of tocolytic substances such as calcium channel blockers (nifedipine), nonsteroidal anti-inflammatory drugs (indomethacin) and oxytocin inhibitors (atosiban). The McDonald's Transvaginal Cervical Cerclage Technique used primarily in an emergency involves highlighting the dilated cervix and prominent amniotic membranes by exposure using vaginal valves or speculum. Prolapse of the amniochorial sac is easily reduced by positioning the patient in Trendelenburg, using a Gross tampon holder, or amniotic reduction with 150-250 ml of amniotic fluid increasing the risk of spontaneous rupture of the membranes; other solutions cited in the literature include filling the bladder with 250 ml of serum or using a bladder catheterization balloon. The anterior and posterior cervical lips are attached with Dobrovici or en coeur forceps and by applying traction on both, with the help of a curved needle and a thick non-absorbable thread, a continuous submucosal suture is mounted circumferentially around the cervix (4 to 6 loops), leaving at least 2 cm of cervix free, caudal to the suture (Figure 2). The two ends of the suture are tightly tied at 12 o'clock, leaving enough length at the ends for a correct grip at the time of removal.

The administration of antibioprophylaxis and indomethacin preoperatively and in the first 16 hours postoperatively, combining 3 administrations, is shown to

Figure 2. a) Ante-procedure imaging and b) post –procedure imaging



a) b)

reduce the rate of premature birth after performing the emergency cerclage with clinical indication [7].

Ultrasound follow-up is performed 24 hours after the procedure and then regularly, weekly, in an outpatient setting. Limiting physical activity as well as sexual activity are generally recommended. Exceeding the threshold of 24 weeks of gestation requires the recommendation of the standard protocol for fetal lung maturation, represented by the administration of four doses of corticosteroid therapy (6 mg dexamethasone/12 h).

As most of the data on the effectiveness of emergency cerclage come from retrospective analyzes (this is due to ethical reasons), each protocol is reported in other published studies. Thus, Magdalena Wierzchowska-Opoka et al. [8] conducted an in-depth review of cervical cerclage techniques confirming that emergency cerclage is the appropriate method to reduce the rate of premature birth in patients with advanced cervical insufficiency. Summarizing 86 articles, this study shows that cerclage prolongs gestational age and improves the chances of survival of the newborn, while reducing the risk of chorioamnionitis and premature rupture of the membranes.

Recently, Shennan et al. [9] evaluated the efficacy of transabdominal vs. transvaginal cervical cerclage. The comparative analysis in a study that included 111 pregnant women who were recruited and distributed in three groups – transabdominal cerclage (39 cases), high vaginal cerclage (39 cases) and low vaginal cerclage (33 cases) –showed more good results for transabdominal cerclage compared to lower vaginal cerclage (rates of preterm birth at < 32 weeks gestation were significantly lower in the group that underwent transabdominal cerclage compared to lower vaginal cerclage). Their conclusion was that transabdominal cerclage should be used for women at high risk of premature labor, as it is superior to low vaginal cerclage in reducing fetal loss. However, this method requires transabdominal surgery and is extremely invasive.

Another way to perform minimally invasive cerclage and increase the success rates of high-risk pregnancies is laparoscopic abdominal cerclage. Demirel et al. [10] performed laparoscopic abdominal cerclage in 40 patients with a history of preterm birth. Surgery has been effective in maintaining pregnancy to the point of viability in 84% of cases. The technique has been widely used in the last decade with some simplification of the method and has a live birth rate of 96.4% [11,12,13].

The most common, safe and effective way to terminate premature birth for pregnant women with cerclage is vaginal birth [14,15,16]. Usually, women who have a vaginal cerclage have a caesarean section, but this is not a scientifically based indication. A recent study [17] comparing the manner of birth in patients with and without cerclage confirms that cervical cerclage does not increase the risk of cesarean delivery compared to normal pregnancies.

Another study comparing cervical-isthmic vaginal cerclage versus McDonald's cerclage [18] showed that the first procedure, if applied at the right time, reduces premature birth and generates a number of benefits, including short hospital stays.

Recently, Karakus et al. [19] studied the impact of the guard suture technique on fetal and neonatal development. The guard suture is a superficial suture

placed at positions 12-3-6-9 with prolene 1.0 thread to prevent iatrogenic rupture of membranes and to narrow the cervical opening. This technique is safe and easy to apply for cervical insufficiency accompanied by prolapsed membranes, helping obstetricians to obtain better fetal and neonatal results (average gestational age at birth 33.9 weeks of gestation).

Another type of cerclage, the Shirodkar cerclage (made with a 5 mm polypropylene strip placed with 4 passages in the 4 cardinal points) [20], allowed vaginal births in 70.3% of cases, at a median gestational age of 38 for weeks of gestation.

The results identified and presented highlight the effectiveness of cerclage techniques in preventing premature birth, with only a few studies reporting unsuccessful cerclage interventions [16]. Among the complications that follow the cerclage, severe infections are the most important and surgeons must be prepared to deal with these cases [21]. This practice should be supported by healthcare professionals, primarily by updating the National Premature Birth Guide.

CONCLUSIONS

Given that prematurity is a public health problem due to neonatal morbidity and mortality and long-term sequelae affecting the social integration of the individual, involving huge costs to the public health system, the evidence from this review suggests that the emergency cerclage may be an effective method of avoiding premature birth, allowing good results on maternal and fetal prognosis. This method should be performed by trained and experienced obstetricians and gynecologists, and failures should be reported to assess the safety of the technique. Future comparative analyzes are needed and may support decisions to include this technique in medical practice protocols.

References

1. Conde-Agudelo A, Romero R, Da Fonseca E, O'Brien JM, Cetingoz E, Creasy GW, Hassan SS, Erez O, Pacora P, Nicolaides KH. Vaginal progesterone is as effective as cervical cerclage to prevent preterm birth in women with a singleton gestation, previous spontaneous preterm birth, and a short cervix: updated indirect comparison meta-analysis. Am J Obstet Gynecol. 2018 Jul;219(1):10-25.
2. Combs CA. Vaginal progesterone or cerclage to prevent recurrent preterm birth? Am J Obstet Gynecol. 2013 Jan;208(1):1-2.
3. Sanchez-Ramos L. Vaginal progesterone is an alternative to cervical cerclage in women with a short cervix and a history of preterm birth. Am J Obstet Gynecol. 2018 Jul;219(1):5-9.
4. Conde-Agudelo A, Romero R, Nicolaides K, Chaiworapongsa T, O'Brien JM, Cetingoz E, da Fonseca E, Creasy G, Soma-Pillay P, Fusey S, Cam C, Alfirevic Z, Hassan SS. Vaginal progesterone vs. cervical cerclage for the prevention of preterm birth in women with a sonographic short cervix, previous preterm birth, and singleton gestation: a systematic review and indirect comparison metaanalysis. Am J Obstet Gynecol. 2013 Jan;208(1):42.e1-42.e18.
5. Seria Ghiduri clinice pentru Obstetrică şi Ginecologie: Naşterea inainte de termen, 2018:31-32.
6. Berghella V, Rafael TJ, Szychowski JM, Rust OA, Owen J. Cerclage for short cervix on ultrasonography in women with singleton gestations and previous preterm birth: a meta-analysis. Obstet Gynecol. 2011 Mar;117(3):663-671.
7. Miller ES, Grobman WA, Fonseca L, Robinson BK. Indomethacin and antibiotics in examination-indicated cerclage: a randomized controlled trial. Obstet Gynecol. 2014;123(6):1311.
8. Wierzchowska-Opoka M, Kimber-Trojnar Ż, Leszczyńska-Gorzelak B. Emergency Cervical Cerclage. J Clin Med. 2021 Mar 18;10 (6):1270.
9. Shennan A, Chandiramani M, Bennett P, David AL, Girling J, Ridout A, Seed PT, Simpson N, Thornton S, Tydeman G, Quenby S, Carter J. MAVRIC: a multicenter randomized controlled trial of transabdominal vs transvaginal cervical cerclage. Am J Obstet Gynecol. 2020 Mar;222(3):261.e1-261.e9.
10. Demirel C, Goksever Celik H, Tulek F, Kucukdemir B, Gokalp D, Ergin T, Lembet A. Fertility outcomes after preconceptional laparoscopic abdominal cerclage for second-trimester pregnancy losses. Eur J Obstet Gynecol Reprod Biol. 2021 Feb;257:59-63.
11. Huang X, Ma N, Li TC, Guo Y, Song D, Zhao Y, Xia E. Simplified laparoscopic cervical cerclage after failure of vaginal suture: technique and results of a consecutive series of 100 cases. Eur J Obstet Gynecol Reprod Biol. 2016 Jun;201:146-50.
12. Kavallaris A, Gkoutzioulis A, Zygouris D. Laparoscopic emergency cervicoisthmic cerclage in second trimester of pregnancy: A case series report. Eur J Obstet Gynecol Reprod Biol. 2021 Jan;256:184-188.
13. Chatzakis C, Efthymiou A, Sotiriadis A, Makrydimas G. Emergency cerclage in singleton pregnancies with painless cervical dilatation: A meta-analysis. Acta Obstet Gynecol Scand. 2020 Nov;99(11):1444-1457.
14. Gulersen M, Bornstein E, Domney A, Blitz MJ, Rafael TJ, Li X, Krantz D, Rochelson B. Cerclage in singleton gestations with an extremely short cervix (≤10 mm) and no history of spontaneous preterm birth. Am J Obstet Gynecol MFM. 2021 Sep;3 (5):100430.13.
15. Akar B, Ceylan Y, Karadağ C, Çalışkan E. Cervical cerclage application algorithm in continued cervical shortening cases despite vaginal progesterone. J Gynecol Obstet Hum Reprod. 2021 Mar;50(3):101989.
16. Szmulewicz C, Neveu ME, Vigoureux S, Fernandez H, Capmas P. Emergency vaginal cervico-isthmic cerclage. J Gynecol Obstet Hum Reprod. 2019 Jun;48(6):391-394.
17. Story L, Shennan A. An assessment of mode of delivery in history indicated versus ultrasound indicated vaginally placed cervical cerclage. Eur J Obstet Gynecol Reprod Biol. 2017 Mar;210:123-125.
18. Capmas P, Letendre I, Leray C, Deffieux X, Duminil L, Subtil D, Fernandez H. Vaginal cervico-isthmic cerclage versus McDonald cerclage in women with a previous failure of prophylactic cerclage: A retrospective study. Eur J Obstet Gynecol Reprod Biol. 2017 Sep;216:27-32.
19. Karakus R, Akalin M, Dizdarogulları GE, Demirci O, Kılıccı C. A new technique for emergency cerclage: Guard suture method. J Gynecol Obstet Hum Reprod. 2021 Oct 9;51(1):102250.
20. Bloomfield J, Pénager C, Mandelbrot L. Shirodkar cerclage: Obstetrical and neonatal outcomes in a single-center cohort of 55 cases. J Gynecol Obstet Hum Reprod. 2021 Nov;50(9):102152.
21. Bader G, Capmas P, Guyot B, Fauconnier A, Ville Y. Severe case of infection following cervicoisthmic cerclage by vaginal approach with a thermally bonded, silicone coated polypropylene tape. Eur J Obstet Gynecol Reprod Biol. 2007 Aug;133(2):252-3.