



Transabdominal cerclage (TAC) as a new tool for the treatment of cervical incompetence (CI)

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In their study, Li *et al.* reported the usefulness of hysteroscopic adhesiolysis (HA) and following transabdominal laparoscopic cervical cerclage (TAC) for patients with cervical incompetence (CI) and concomitant cervical or lower uterine segment intrauterine adhesions (IUA).

CI is defined as the inability of the uterine cervix to retain a pregnancy in the second trimester in the absence of clinical contractions, labor, or both (1). Therefore, CI can be a main cause of recurrent abortions, which usually need intrauterine curettage. Such repeated curettage can be a cause of IUA, and also of severe Asherman syndrome (2). Li *et al.* focused on the operative treatment of patients with coexisting CI and IUA. They described the necessity of separating the adhesion prior to evaluating cervical competency with a No. 7 Hegar dilator, to confirm the diagnosis, and the following laparoscopic TAC. However, when the cervix was too loose, laparoscopic TAC was exceptionally carried out first and then the IUA was treated. They concluded that such pre-pregnancy laparoscopic TAC had a good obstetrical prognosis in patients with CI complicated by moderate-to-severe IUA. This study is interesting in terms of a new direction for the indication of TAC.

TAC is both a new and old operative procedure. TAC was first described by Benson and Durfee in 1965, almost 55 years ago (3). This operative method has been mainly performed for a select group of patients for whom the vaginal approach failed due to an extremely “short” cervix after large conization or an anatomically deformed cervix. The mainstream of cervical cerclage has been transvaginal

till now. However, the recent development of artificial reproductive technologies, and uterine-preserving operations such as radical trachelectomy (RT) reaffirmed the necessity and usefulness of TAC. Although no guidelines regarding the indication for TAC exist, it is usually performed for patients who cannot undergo the transvaginal approach. For example, as we reported before, patients after RT who have troubles with a cerclage tend to have second trimester miscarriage (4,5). Unfortunately, they usually have no remaining space to make a transvaginal cerclage. We believe such patients are good candidates for TAC.

Interestingly, Li *et al.* performed HA and following TAC for patients who had CI with concomitant IUA and repeated miscarriages in the second trimester. These patients usually have enough uterine cervical length in their early pregnancies. Therefore, prophylactic transvaginal cerclage in the first trimester seems to be the first choice for surgical treatment. Why do they choose TAC for these patients? They say that a higher cerclage site close to the inner orifice of the cervix by TAC might reduce the possibility of cerclage failure caused by a low cerclage position. The authors’ main purpose is to reduce abortion that can be a cause of IUA again. It actually seems to be a new approach for patients with CI with moderate-to-severe IUA. However, TAC is a more radical procedure than transvaginal cerclage. We therefore need to assess the eligibility of these patients for TAC. We believe there are three major points to consider when performing TAC: (I) the timing of the operation, (II) the approach to the uterus,

and (III) the threads used for the cerclage. Li *et al.* chose (I) before pregnancy, (II) the laparoscopic approach, and (III) Mersilene tape™ in their study.

First of all, when is the best time to perform TAC: before pregnancy or early in the pregnancy? Li *et al.* reported that they performed TAC before pregnancy, and we also usually perform TAC before pregnancy (5). However, some investigators prefer to perform TAC during pregnancy (6,7). In cases of CI and concomitant cervical or lower uterine segment IUA, it might also be possible to perform TAC after pregnancy, except in the case of a loose uterine cervix.

In cases of cerclage before pregnancy, as the cerclage thread is a foreign body for the patient, it can be a cause of intra-abdominal foreign body reaction. Therefore, if TAC is performed before pregnancy, conception must occur quickly in order to prevent various intra-abdominal problems induced by foreign body reactions. We believe patients should conceive within 2–3 years after TAC. Fortunately, patients in their study became pregnant in shorter periods without such troubles. On the other hand, if we perform TAC early in the pregnancy, there is a risk of abortion (8). One of the most important procedures of TAC is to identify avascular space between uterine vessels and the uterus, and to place the cerclage correctly in this avascular area. The procedure itself can be a cause of uterine contraction. Moreover, as uterine vessels during pregnancy are usually expanded to support fetal growth, there is a risk of damage to these vessels during the operation, which can be a cause of massive bleeding and abortion. Thus, TAC before pregnancy is less stressful for surgeons.

TAC is usually performed via laparotomy. Recently, however, more than a few institutes choose the laparoscopic approach for TAC (9). Li *et al.* also adopted the laparoscopic approach. This was better for patients from the standpoint of invasiveness. It is well known that the greatest disadvantage of TAC via laparotomy is that it requires at least two extra laparotomies (cerclage and removal). This is a burden for patients who wish to undergo the procedure. To prevent multiple laparotomies, a laparoscopic procedure or a robot-assisted procedure might be an alternative option for patients (10,11). Laparoscopic procedures seem to be more complicated and take more time, but will not be a big problem for skilled laparoscopic surgeons, and we believe the laparoscopic approach might be the main one for TAC in the near future.

As for sutures for TAC, Li *et al.* used Mersilene™. Although there is no consensus as to what type of thread or tape is better for TAC, non-absorbable thick braided

synthetic polyester fiber sutures, such as Mersilene™ or Teflon™ with a 3–5 mm width, are used in many institutes. However, some institutes prefer to use thinner monofilament threads such as nylon thread for the cerclage. Thick braided synthetic polyester fiber sutures have higher tensile strength than thinner monofilament threads when cerclage is done in thicker parts of the uterine cervix, but thinner monofilament threads might be better from the standpoint of preventing problems due to foreign body reactions. Also, in cases of CI, we believe non-absorbable thick braided synthetic polyester fiber sutures like Mersilene™ are better than thinner monofilaments because higher tensile strength is an important factor to support cervical function.

Thus there are many factors that need to be taken in account when performing TAC for patients with CI. In addition, we need to keep in the mind the problem of abortion after TAC and the prevention of uterine infection if we perform TAC for patients with CI and concomitant IUA.

When abortion is detected, it is usually possible to dilate the cervical canal up to the size of a number 5 Hegar dilator. With this size of dilatation, it is possible to insert a suction tube for removing the embryo in the first trimester. However, as Novy suggested, in cases of fetal death in the late first trimester and early second trimester, it is almost impossible to deliver a fetus vaginally (12). Then a laparotomy to remove the cerclage before removal of the fetus is needed.

Furthermore, when we consider the management of CI with concomitant IUA, we have to take the possibility of the existence of chronic intrauterine infection into account. CI itself can be a cause of intrauterine infection, and repeated curettage also can be a cause of infection. It is reported that 25–50% of preterm births are attributable to maternal infection (13). Therefore, the prevention of intrauterine infection is a key to preventing second trimester fetal loss. Bacterial vaginosis (BV) is known to be a risk factor for preterm birth (14). However, chorioamnionitis (CAM) caused by intrauterine infection can occur even in patients with normal BV scores. Silent intrauterine infection might also exist under normal BV scores. The uterine cavity was believed to be in a sterile condition for long time. However, recent analysis using next-generation sequencing of the 16 s ribosomal RNA gene revealed the existence of various bacteria there. Kyono *et al.* recently reported that a considerable percentage of the non-Lactobacillus dominated microbiota, which is undetectable by routine bacterial culture, affects the occurrence of infertility and abortion (15). We believe TAC in a condition of subclinical intrauterine cavity infection can be a cause of first to early

second trimester fetal loss. In cases of CI with concomitant IUA, such infections might exist even after HA. Therefore, a detailed examination of bacteria in the uterine cavity is essential for these patients before TAC.

TAC is certainly one of the promising treatment modalities for the treatment of CI with concomitant IUA. However, as we mentioned above, it is still an invasive treatment compared with transvaginal cerclage. We look forward to more reports on the safety, usefulness, and risks of TAC for patients who have CI with concomitant IUA.

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Footnote

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