

# Transabdominal cerclage in early pregnancy for cervical shortening after radical trachelectomy: A case report

Yoshino Kinjyo <sup>\*</sup>, Yara Nana, Yukiko Chinen, Tadatsugu Kinjo, Keiko Mekaru, Yoichi Aoki

Department of Obstetrics and Gynecology, Graduate School of Medicine, University of the Ryukyus, 207 Uehara Nishihara, Okinawa 903-0215, Japan

## ARTICLE INFO

### Article history:

Received 8 April 2021

Received in revised form 30 April 2021

Accepted 4 May 2021

### Keywords:

Radical trachelectomy

Transabdominal cerclage (TAC)

## ABSTRACT

Radical trachelectomy (RT) is a method of fertility preservation for patients with early invasive uterine cervical cancer stage IA2 or IB1 with a tumor diameter of  $\leq 2$  cm. However, women who have undergone RT have high risks of abortion and premature birth. To prevent premature birth, cervical cerclage is performed in patients with an ultra-short cervix, but the portio vaginalis is not visible in these patients, and transvaginal uterine cervical cerclage is almost impossible. In such cases, transabdominal cerclage (TAC) is considered. The patient reported here was a 39-year-old Japanese woman, gravida 2, para 0. At 37 years, she was diagnosed with cervical cancer, stage IB1 (according to the International Federation of Gynecology and Obstetrics [FIGO] classification), so abdominal modified RT was performed. One year after the operation, she became pregnant through in vitro fertilization and embryo transfer. The cervical length was 17 mm at 13 weeks of gestation but was shortened to 5 mm at 16 weeks of gestation, so TAC was performed. An emergency cesarean section was performed because of increased genital bleeding at 34 weeks of gestation and a live baby was delivered.

© 2021 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

In recent years, radical trachelectomy (RT) has become increasingly popular as a means of preserving fertility for patients with early-stage cervical cancer, and reports of pregnancy after such surgery have been increasing [1–3]. During pregnancy after RT, evaluation for risk factors such as abortion, premature membrane rupture, chorioamnionitis, preterm birth (<34 weeks of gestation) and abnormal vaginal bleeding from varices around the cervix is important. A short residual cervix after RT appears to increase the risk of late abortion and preterm birth [4–6]. Observation of the cervix after RT is very important. Transvaginal cerclage is often difficult to perform in cases where the remaining cervix is shortened. In cases where transvaginal cerclage is not anatomically feasible owing to previous cervical surgery, transabdominal cerclage (TAC) is an option to reduce the risk of spontaneous preterm delivery [7].

We report the case of a patient who underwent a modified abdominal RT for stage IB1 cervical cancer and then TAC at 16 weeks of the subsequent gestation for a markedly shortened cervical canal, of 5 mm.

## 2. Case Presentation

A 39-year-old Japanese woman, gravida 2, para 0, with a strong desire for fertility preservation was diagnosed with cervical cancer, stage

IB1 according to the International Federation of Gynecology and Obstetrics (FIGO) classification. She underwent a modified abdominal RT with pelvic lymphadenectomy because the cervical tumor was 10 mm in diameter. The preoperative cervical length was 40 mm, and the cervical length removed by trachelectomy was 20 mm. The cervix was ligated with a polyester suture (Echibond Excel 1–0). The postoperative pathological diagnosis was squamous cell carcinoma, non-keratinizing type, pT1b1, N0 M0. Postoperative adjuvant therapy was not performed. Fertility treatment was started 1 year after the surgery, and pregnancy was achieved by intracytoplasmic sperm injection and frozen-thawed embryo transfer.

The cervical length was 17 mm at 13 weeks of gestation but was shortened to 5 mm at 16 weeks of gestation (Fig. 1). Transvaginal cervical cerclage would be difficult owing to the cervical deformity and defect, so TAC was performed at 16 weeks 6 days of gestation under general and epidural anesthesia. A lower midline vertical incision was made. The peritoneum of the vesicouterine fold was difficult to dissect, but the anterior wall of the cervix could be developed to the level of the external uterine os. No adhesions in the Douglas pouch were found. Transuterine ultrasonography during the surgery was used to confirm the position of the fetal membranes and cervix. The suture position was marked with electrocautery, and bilateral uterine arteries in the parametrial tissue were confirmed by palpation. A polyester suture tape was passed below the left uterine artery from front to back of the broad ligament while palpating the avascular part and below the right uterine artery from back to front of the broad ligament, and was ligated on the anterior surface of the uterus. The operation time was 2 h 39 min,

<sup>\*</sup> Corresponding author.

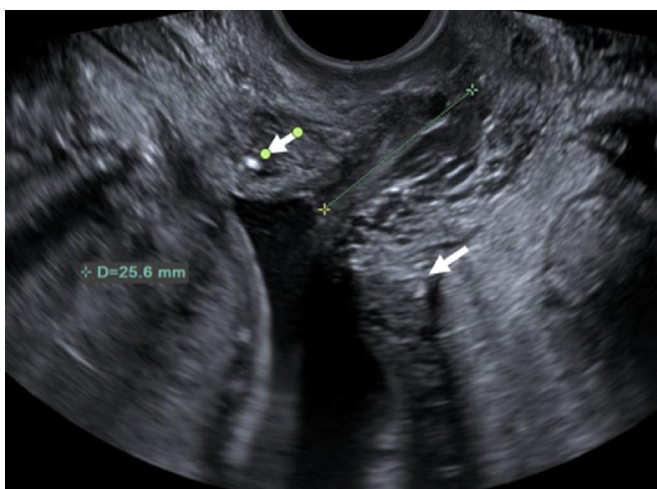
E-mail address: [k198705@eve.u-ryukyuu.ac.jp](mailto:k198705@eve.u-ryukyuu.ac.jp) (Y. Kinjyo).



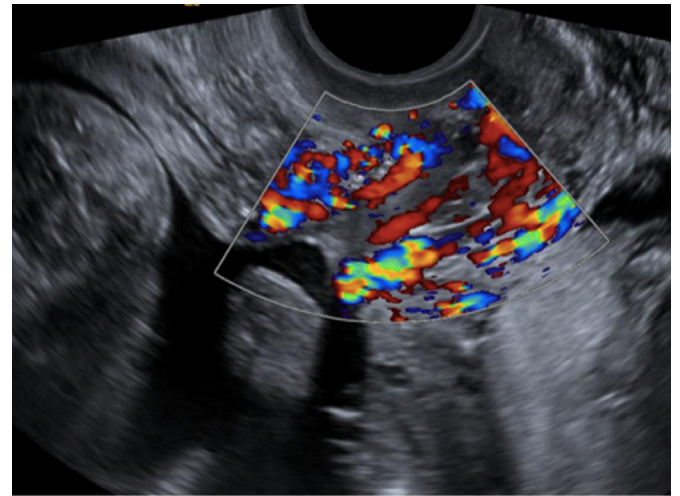
**Fig. 1.** Ultrasonography image at 16 weeks of gestation. The cervical length was shortened to 5 mm.

and the total blood loss was 387 ml. The intraoperative and postoperative fetal heart rates were normal.

Postoperatively, intravenous ritodrine hydrochloride was administered for 10 days, and the patient was managed in hospital until 25 weeks of gestation. Intramuscular hydroxyprogesterone caproate 250 mg was given weekly until 34 weeks of gestation. Vaginal cultures were assessed every 4 weeks, and no signs of infection were observed. The postoperative cervical length was 25 mm (Fig. 2), but varices around the cervix developed and gradually expanded (Fig. 3). Eventually, vaginal bleeding was observed from 33 weeks of gestation and had increased at 34 weeks 3 days. Accordingly, emergency cesarean section was performed with a lower abdominal transverse incision. The uterine cerclage tape was covered with the peritoneum and could not be confirmed by visual inspection, but could by palpation. The uterine cerclage tape on the anterior and posterior walls was held at the same position as in TAC. A 2160-g boy was delivered through a transverse incision of the uterine wall, with an Apgar score of 8/9 and umbilical artery pH of 7.329. The uterine cerclage tape was not removed for the next pregnancy. The total blood loss was 1590 ml, and the operative



**Fig. 2.** The cervical length was 25 mm after transabdominal cerclage. The white arrows indicate the polyester tape.



**Fig. 3.** Varices around the cervix developed at 33 weeks of gestation.

time was 1 h 24 min. The postoperative course was uneventful, and the patient was discharged on the seventh postoperative day.

### 3. Discussion

RT has been proposed as a surgical method for patients with invasive cervical cancer who wish to preserve their fertility [1,2]. The pregnancy rate for patients who try to conceive after surgery is reported to be 30–50% [1–3,5,6]. Moreover, the risks of abortion and preterm delivery are high for those who do conceive. Nine abortions (14%) in the first trimester, 9 abortions (14%) in the second trimester, and 47 preterm deliveries (72%) in the third trimester were reported in 65 cases of pregnancy following RT [5]. It has been reported that the preterm birth rate is higher in patients with shortened residual cervical length [4,6] and that the residual cervical canal becomes necrotic and shortened in a mean of 10% of cases [8]. Postoperative follow-up of the cervical changes is important.

In cases where anatomical conditions make transvaginal cerclage difficult, such as previous cervical surgery, TAC is a procedure of choice to reduce the risk of late abortion and preterm labor. The technique was first reported by Benson and Dufree in 1965 [7]. TAC during pregnancy has the advantage of avoiding the risk of abortion in the first trimester, but first the absence of fetal abnormalities should be confirmed by ultrasonography. TAC is most appropriate at 10–16 weeks of gestation, when the uterine vessels are less distended [7,9]. A cervical length of <13 mm at mid-trimester has also been reported to increase the risk of preterm birth in post-RT pregnancy [4,5]. In the present case, the cervix was shortened to 5 mm in length, and TAC was performed at 16 weeks of gestation. TAC is indicated for patients who have undergone transvaginal cervical suture in a previous pregnancy that resulted in late abortion or early preterm delivery (<24 weeks), or when the cervix is significantly shortened owing to cervical surgery such as conization. Previously, we had a patient who attained pregnancy after RT in whom the cervical os was dilated at 18 weeks of gestation, and a subsequent intrauterine infection resulted in intrauterine fetal death. In the present case, the patient had no history of preterm birth; however, we decided to perform TAC because we judged that the risk of preterm birth was high and transvaginal cerclage would be difficult.

Tulandi et al. conducted a systematic review of 678 cases from 14 studies that reported the clinical outcomes of TAC, and concluded that the perinatal outcomes did not differ by the technique or timing of the procedure, and all the studies had high live birth rates [10]. In the MAVRIC study [11], however, the preterm birth rate at <32 weeks

was significantly lower in the TAC group than in the transvaginal group. Complications of TAC occurred in 3.7% of cases, with lower uterine tears in 1.3%, uterine rupture in 0.3%, and fetal death <20 weeks in 4.1%. Other reported complications include fetal growth restriction due to uterine artery ligation, deviated suture, bladder or rectal injury, infection, preterm labor, premature rupture of membranes, bleeding from the cervical varices, and rectovaginal fistula [12]. In the present case, the varices around the cervix developed from around 28 weeks of gestation, as shown in Fig. 3. Vaginal bleeding increased at 34 weeks of gestation; finally, we decided to perform a cesarean section. Okugawa et al. reported that vaginal bleeding requiring blood transfusion was observed in three cases of pregnancies after RT [13]. Kasuga et al. also observed massive vaginal bleeding during pregnancy after RT and speculated that it may be due to increased vascular distribution or varices in the cervix during pregnancy [1].

Pregnancy after RT carries a high risk of various complications, and TAC may be a procedure of choice to reduce the risk of late abortion and preterm labor. Further studies are needed to confirm the safety and efficacy of TAC in this group of patients.

### Contributors

Yoshino Kinjo drafted the manuscript.

Yara Nana contributed to the review and editing of the manuscript.

Yukiko Chinen contributed to the review and editing of the manuscript.

Tadatsugu Kinjo contributed to the review and editing of the manuscript. Keiko Mekaru contributed to the review and editing of the manuscript.

Yoichi Aoki drafted the manuscript.

All authors contributed equally to the creation of this case report.

### Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this case report.

### Funding

No funding from an external source supported the publication of this case report.

### Patient Consent

Obtained.

### Provenance and Peer Review

This case report was peer reviewed.

### Acknowledgement

The authors would like to thank Enago ([www.enago.jp](http://www.enago.jp)) for the English language review of this article.

### References

- [1] Y. Kasuga, H. Nishio, K. Miyakoshi, S. Sato, J. Sugiyama, T. Matsumoto, K. Tanaka, D. Ochiai, K. Minegishi, T. Hamatani, T. Iwata, T. Morisada, M. Nakamura, T. Fujii, N. Kuji, D. Aoki, M. Tanaka, Pregnancy outcomes after abdominal radical trachelectomy for early-stage cervical cancer: a 13-year experience in a single tertiary-care center, *Int. J. Gynecol. Cancer* 26 (1) (2016 Jan) 163–168, <https://doi.org/10.1097/IGC.000000000000057126512787>.
- [2] M.E. Căpîlna, N. Ioanid, V. Scripcariu, M.M. Gavrilescu, B. Szabo, Abdominal radical trachelectomy: a Romanian series, *Int. J. Gynecol. Cancer* 24 (3) (2014 Mar) 615–619, <https://doi.org/10.1097/IGC.0000000000000076> (PMID: 24445820; PMID: PMC4047319).
- [3] M. Plante, J. Gregoire, M.C. Renaud, M. Roy, The vaginal radical trachelectomy: an update of a series of 125 cases and 106 pregnancies, *Gynecol. Oncol.* 121 (2) (2011 May 1) 290–297, <https://doi.org/10.1016/j.ygyno.2010.12.345> (Epub 2011 Jan 20. PMID: 21255824).
- [4] Y. Kasuga, K. Miyakoshi, H. Nishio, Y. Akiba, T. Otani, M. Fukutake, S. Ikenoue, D. Ochiai, T. Matsumoto, K. Tanaka, K. Minegishi, N. Kuji, R. Roberts, D. Aoki, M. Tanaka, Mid-trimester residual cervical length and the risk of preterm birth in pregnancies after abdominal radical trachelectomy: a retrospective analysis, *BJOG* 124 (11) (2017 Oct) 1729–1735, <https://doi.org/10.1111/1471-0528.14688> (Epub 2017 May 22. PMID: 28418597).
- [5] R. Pareja, G.J. Rendón, C.M. Sanz-Lomana, O. Monzón, P.T. Ramirez, Surgical, oncological, and obstetrical outcomes after abdominal radical trachelectomy - a systematic literature review, *Gynecol. Oncol.* 131 (1) (2013 Oct) 77–82, <https://doi.org/10.1016/j.ygyno.2013.06.010>, Epub 2013 Jun 14 23769758.
- [6] R.M. Alvarez, I. Biliatis, A. Rockall, E. Papadakou, S.A. Sohaib, N.M. de Souza, J. Butler, M. Nobbhuhuis, D. Barton, J.H. Shepherd, T. Ind, MRI measurement of residual cervical length after radical trachelectomy for cervical cancer and the risk of adverse pregnancy outcomes: a blinded imaging analysis, *BJOG* 125 (13) (2018 Dec) 1726–1733, <https://doi.org/10.1111/1471-0528.15429> (Epub 2018 Sep 17. PMID: 30099822).
- [7] R.C. Benson, R.B. Durfee, Transabdominal cervico uterine cerclage during pregnancy for the treatment of cervical incompetency, *Obstet. Gynecol.* 25 (1965 Feb) 145–155 (PMID: 14268594).
- [8] X. Li, J. Li, X. Wu, Incidence, risk factors and treatment of cervical stenosis after radical trachelectomy: a systematic review, *Eur. J. Cancer* 51 (13) (2015 Sep) 1751–1759, <https://doi.org/10.1016/j.ejca.2015.05.012> (Epub 2015 Jun 3. PMID: 26049687).
- [9] D.M. Gibb, E. Saridogan, The role of transabdominal cervical cerclage techniques in maternity care, *Obstet. Gynecol.* 18 (2) (2016 Apr) 117–125, <https://doi.org/10.1111/tog.12254>.
- [10] T. Tulandi, N. Alghanaim, G. Hakeem, X. Tan, Pre and post-conceptual abdominal cerclage by laparoscopy or laparotomy, *J. Minim. Invasive Gynecol.* 21 (6) (2014 Nov-Dec) 987–993, <https://doi.org/10.1016/j.jmig.2014.05.015> (Epub 2014 Jun 4. PMID: 24907551).
- [11] A. Shennan, M. Chandiramani, P. Bennett, A.L. David, J. Girling, A. Ridout, P.T. Seed, N. Simpson, S. Thornton, G. Tydeman, S. Quenby, J. Carter, MAVRIC: a multicenter randomized controlled trial of transabdominal vs transvaginal cervical cerclage, *Am. J. Obstet. Gynecol.* 222 (3) (2020 Mar) 261.e1–261.e9, <https://doi.org/10.1016/j.ajog.2019.09.040> (Epub 2019 Oct 1. PMID: 31585096).
- [12] R.H. Debbs, G.A. DeLa Vega, S. Pearson, H. Sehdev, D. Marchiano, J. Ludmir, Transabdominal cerclage after comprehensive evaluation of women with previous unsuccessful transvaginal cerclage, *Am. J. Obstet. Gynecol.* 197 (3) (2007 Sep) 317, e1–4 <https://doi.org/10.1016/j.ajog.2007.06.060> (PMID: 17826436).
- [13] K. Okugawa, H. Kobayashi, K. Sonoda, E. Kaneki, Y. Kawano, N. Hidaka, K. Egashira, Y. Fujita, H. Yahata, K. Kato, Oncologic and obstetric outcomes and complications during pregnancy after fertility-sparing abdominal trachelectomy for cervical cancer: a retrospective review, *Int. J. Clin. Oncol.* 22 (2) (2017 Apr) 340–346, <https://doi.org/10.1007/s10147-016-1059-9> (Epub 2016 Nov 1. PMID: 27804040).