

Removal of laparoscopic cerclage stitches *via* laparotomy and rivanol-induced labour: A case report and literature review

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Abstract

BACKGROUND

Laparoscopic cervical cerclage is performed for patients with abnormal cervical anatomy and/or transvaginal cervical cerclage failure. However, the method of removing the stitches to allow labour induction remains controversial. According to published literature, stitches are removed through laparoscopic or transvaginal methods. Herein, we report, for the first time, a case of a patient who had undergone laparoscopic cerclage, and then underwent removal of stitches by laparotomy and labour induction in the third trimester of pregnancy.

CASE SUMMARY

A patient who underwent laparoscopic cervical cerclage due to cervical insufficiency became pregnant naturally following the operation. At 31 wk of pregnancy, severe foetal malformations were found. To successfully induce labour, cerclage stitches were removed *via* laparotomy, and rivanol was injected directly into the uterus. Following successful induction of labour, the patient delivered a dead foetus.

CONCLUSION

This report provides a reliable scheme of removing cerclage stitches for patients who have undergone laparoscopic cerclage but experience severe foetal malformations.

Key Words: Laparoscopic cerclage; Pregnancy; Induced labour; Stitch removal; Case report

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Core Tip: To the best of our knowledge, this is the first report of a case in which a patient, who had undergone laparoscopic cerclage, underwent removal of cerclage stitches *via* laparotomy and labour induction in the third trimester of pregnancy. This report highlights the advantages of this technique over other available methods. Moreover, this report presents the rarity of foetal abnormality or death in the third trimester in a woman who had laparoscopic cervical cerclage.

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INTRODUCTION

Cervical incompetence is the main cause of late-term abortion and premature delivery, for which cervical cerclage is the primary treatment[1,2]. Cervical cerclage is a surgical intervention involving the placement of stitches around the uterine cervix to prevent the shortening and opening of the cervix. Transvaginal and laparoscopic cerclage are the main methods. Transvaginal cerclage is the most widely used[3], while laparoscopic cerclage is used for patients with abnormal cervical anatomy and/or transvaginal cerclage failure. Laparoscopic cerclage is primarily used before or during the early stages of pregnancy, and the stitches are usually removed during caesarean section[4]. However, for patients with foetal abnormalities or second- or third-trimester foetal death, the method of removing the stitches to allow for labour induction remains controversial. In all previous cases of laparoscopic cerclage, labour induction was implemented in the second trimester, and cerclage stitches were removed either laparoscopically or transvaginally[5-10].

Herein, we report, for the first time, a case in which the patient, who had undergone laparoscopic cerclage, underwent removal of stitches by laparotomy and labour induction in the third trimester of pregnancy.

CASE PRESENTATION

Imaging examinations

Foetal three-dimensional ultrasonography showed 'tulip'-like external genitalia, external penis and scrotum transposition, single umbilical artery, disappearance of umbilical blood flow in the diastolic period, and foetal intrauterine growth restriction.

Laboratory examinations

No abnormal laboratory examinations.

Physical examination

No abnormal physical examination.

Personal and family history

No special personal and family history.

History of past illness

The patient experienced two miscarriages in the second trimester of pregnancy, one of which was caused by transvaginal cervical cerclage failure. Before the present pregnancy, laparoscopic cervical cerclage was performed under general anaesthesia, and the isthmus of the cervix was ligated with Mersilene tapes (RS22, Ethicon, NJ, United States).

History of present illness

During the routine obstetric examination, severe foetal malformations were identified through three-dimensional ultrasonography; thus, the patient requested for induced

labour.

Chief complaints

A 31-year-old woman (gravida 4, abortus 3) was admitted for labour induction at 31 wk of gestation because of severe foetal malformations.

FINAL DIAGNOSIS

The final diagnosis was foetal malformations.

TREATMENT

After relevant examinations, cerclage stitches were removed, and rivanol amniocentesis was performed for labour induction *via* laparotomy under combined spinal-epidural anaesthesia. A mini horizontal incision was made in the middle of the abdomen, and the cerclage stitches were separated carefully from the cervix and surrounding tissue to which they were closely adhered (Figure 1). The stitches were clipped and removed. Amniocentesis was then performed, and 0.2 g rivanol was injected into the uterine cavity. Finally, the abdominal incision was sutured routinely.

OUTCOME AND FOLLOW-UP

Two days following labour induction, the patient delivered a dead foetus and was discharged 2 days later.

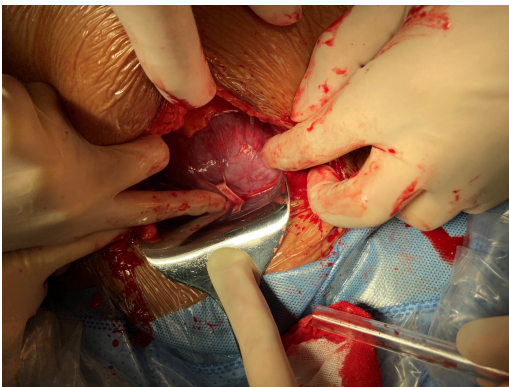
DISCUSSION

Laparoscopic cerclage is a type of trans-abdominal cervical cerclage. The isthmus of the cervix is sutured under laparoscopic guidance before or during early pregnancy. Compared with transvaginal cerclage, laparoscopic cerclage causes less trauma and has a lower risk of infection[11]. In addition, laparoscopic cerclage stitches are placed closer to the internal cervix, which more closely conforms to the normal physiological anatomy. Laparoscopic cerclage is effective not only in reducing the risk of cervical tear and infection but also in maintaining the expansion of the amniotic cavity[12,13]. In clinical practice, several obstetricians have performed this technique in women with cervical defects to extend the gestational age of the foetus, as well as in cases where transvaginal cerclage was not possible and in cases with repeated transvaginal cerclage failure.

Laparoscopic cerclage stitches can be removed by laparotomic, laparoscopic, and transvaginal approaches. For pregnant women with normal foetuses at full term or near term, caesarean section is commonly performed for delivery, and cerclage stitches were removed during the procedure[14]. For pregnancies that should be terminated because of foetal abnormalities or third-trimester foetal death, the methods of removing cerclage stitches and inducing labour remain controversial. Burger *et al*[6] reported three cases of removing transvaginal cerclage stitches in the second trimester. Carter *et al*[7-10] and other authors have reported laparoscopic removal of cerclage stitches in pregnancies terminated due to premature rupture of membranes or foetal abnormalities in the second trimester (Table 1). However, in the present study, the patient was already at 31 wk of pregnancy. She was informed of the risks of labour induction and caesarean delivery. Subsequently, she requested for induction of labour, but not caesarean section, to maintain the integrity of the uterus for future pregnancy. Therefore, we considered removing the stitches for a vaginal delivery. The enlarged uterus limited the surgical space in the abdominal cavity; therefore, laparoscopic removal of the stitches was not feasible. In addition, given the abundant pelvic blood supply during pregnancy, the stitches may be adhered to the surrounding tissue, and transvaginal stitch removal may cause injury to the surrounding tissue or intra-abdominal bleeding. Therefore, stitches were removed by laparotomy and rivanol was injected directly into the uterus to induce labour.

Table 1 Cases of inducing labour in the second trimester after laparoscopic cerclage

Author	Gestational age (wk)	Reason of removal	Method of removal
Nicole B. Burger[6]	16 + 5	Rupture of membranes	Posterior colpotomy
	19	Intrauterine infection	Posterior colpotomy
	23 + 3	Intrauterine infection	Anterior colpotomy
James F. Carter[7,8]	17	Foetal death	Laparoscope
	19	Rupture of membranes	Laparoscope
S E Scarantino[9]	16	Rupture of membranes	Laparoscope
Mohammed Agdi[10]	19	Oligohydramnios	Laparoscope

**Figure 1** A mini horizontal incision was made and the cerclage stitches were exposed.

To the best of our knowledge, no study has reported the removal of laparoscopic cerclage stitches *via* laparotomy simultaneously with labour induction in the third trimester. The method of terminating a pregnancy is usually restricted by trans-abdominal stitches, especially in cases with premature rupture of the membrane or foetal abnormality in the second or third trimester. Obstetricians should comprehensively assess the methods of removing cerclage stitches to reduce the risk of injury to the patients; this indicates the need to develop new laparoscopic cerclage techniques. Sukur and Saridogan[15] sutured cerclage stitches behind the cervical isthmus, allowing the removal of these stitches through the vagina. Shaltout *et al*[16] designed an improved laparoscopic cerclage, which involved opening the peritoneum folding between the uterus and the bladder, puncturing the needle through the posterior fornix of the vagina, and placing the suture knot in the posterior fornix. Among the 15 patients who underwent this new surgical method, 12 underwent induced vaginal delivery after the stitches were removed through the vagina. Wang *et al*[17] performed 'vaginal removal' of laparoscopic cervical cerclage without opening the peritoneum folding, through which the cerclage stitches can be sutured to the posterior fornix of the vagina. Procedures were performed on 13 patients, of which four underwent vaginal delivery after 36 wk of pregnancy. The improved laparoscopic cerclage enabled the removal of the stitches through the vagina and avoided potential traumas caused by transabdominal surgery.

CONCLUSION

Foetal abnormality or death in the third trimester of pregnancy in patients who have undergone laparoscopic cerclage is extremely rare. In the present case, cerclage stitches were removed by laparotomy and vaginal delivery was possible following successful induction of labour, which maintained the integrity of the patient's uterus. This is an alternative method for patients undergoing induced labour in the third trimester. In addition, obstetricians should improve prenatal examinations of patients who have undergone laparoscopic cervical cerclage during pregnancy to detect pregnancy-related complications as early as possible and thereby avoid adverse events. More

laparoscopic cerclage techniques should be developed, and existing techniques should be improved to increase the number of options available for removal of stitches.

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