

Successful myomectomy using barbed sutures at 15 weeks of gestation: A case report

Yui Negoro^a, Michihisa Shiro^{a,*}, Jota Maki^b, Tsubasa Kokehara^a, Hisashi Masuyama^b, Shigeki Yoshida^a

^a Department of Obstetrics and Gynecology, Chibune General Hospital, Japan

^b Department of Obstetrics and Gynecology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Japan

ARTICLE INFO

Keywords:
Barbed sutures
Myomectomy
Pregnancy

ABSTRACT

To date, there are no reports on the use of barbed sutures in myomectomy during pregnancy. Herein, successful laparotomic myomectomy at 15 weeks of gestation using barbed sutures is described. A 38-year-old pregnant woman with a large myoma (16 × 11 cm) underwent myomectomy at 15 weeks and 4 days of gestation because of strong pain at the myoma site, a high level of inflammatory markers with degeneration of uterine fibroids, and severe anemia caused by denaturation of myoma. The uterine wall was reconstructed using monofilament absorbable 0 barbed sutures. Unlike conventional sutures, barbed sutures do not retract, so an assistant does not need to hold onto it during reconstruction of the uterine wall, resulting in less pressure and damage to the gravid uterus while maintaining resistance and the ability to hold the tissue under tension. The pregnancy continued with no evidence of myometrial thinning or symptoms of preterm labor. The patient delivered a healthy baby via cesarean section due to partial placenta previa at 36 weeks. The case shows the satisfactory outcome of perinatal myomectomy using barbed sutures during pregnancy.

1. Introduction

The estimated prevalence of uterine myomas during pregnancy is 0.2–2.6% [1]. Most are asymptomatic during pregnancy but approximately 10% of patients develop complications, including bleeding in the first trimester, pain, preterm labor, premature rupture of membranes, malpresentation, and postpartum hemorrhage. Moreover, compression of the uterine myoma may cause various symptoms, such as gastrointestinal and urinary tract pain and leg edema [2,3].

Conservative treatment is the mainstay for uterine myomas during pregnancy because myomectomy carries the risk of miscarriage or preterm labor. However, myomectomy during pregnancy is performed in situations such as torsion of a pedunculated myoma, persistent pain that is poorly controlled after 72 h of pharmacological therapy, and large uterine myomas, which may pose a risk for the duration of the pregnancy [2,4].

In previous reports on myomectomy during pregnancy, monofilament or multifilament sutures were used to reconstruct the uterine wall [4–6]. However, there have been no case reports on the use of

barbed sutures. Additionally, the perinatal outcomes of this type of suture have not been clarified.

Herein, a novel case of successful laparotomic myomectomy at 15 weeks of gestation in which barbed sutures were used to reconstruct the uterine wall is reported.

2. Case Presentation

A 38-year-old primigravida was referred to hospital for perinatal management of a large myoma at 12 weeks of gestation. She was unaware of her uterine fibroids until she became pregnant.

Transabdominal ultrasonography revealed a right-sided intramural large myoma and a viable fetus with normal growth. Magnetic resonance imaging (MRI) indicated that the uterine cavity containing the fetus was retroverted. Additionally, the myoma, measuring 16 × 11 cm, was superior to the uterine cavity (Fig. 1a, b). MRI also showed that a normal muscle layer was interposed between the large fibroid and the uterine cavity. Ultrasound examination revealed no findings of fetal anomaly.

* Corresponding author at: Department of Obstetrics and Gynecology, Chibune General Hospital, 3-2-39 Fuku-machi, Nishiyodogawa-ku, Osaka-city 555-0034, Japan.

E-mail address: shiro.michihisa@ajjinkai-group.com (M. Shiro).

<https://doi.org/10.1016/j.crwh.2023.e00550>

Received 27 August 2023; Received in revised form 25 September 2023; Accepted 25 September 2023

Available online 26 September 2023

2214-9112/© 2023 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/>).

On presentation, the patient complained of strong abdominal pain. Her laboratory data showed increased white blood cell count (17,300/ μ L) and C-reactive protein (3.64 mg/dL), indicating an inflammatory reaction in the degenerative fibroids. Additionally, the hemoglobin level was low (7.8 g/dL). The cause of high levels of inflammatory markers and severe anemia was considered extensive denaturation of an enlarged myoma.

The possibility of worsening symptoms that could not be managed with conservative treatment due to bloating and abdominal distension from the large myoma, severe pain and anemia, and fever caused by degenerative fibroids were considered. The advantages and disadvantages both of watchful waiting and of surgery were explained to the patient and her husband, and the patient elected to undergo an operation. After obtaining informed consent, a myomectomy under general anesthesia was performed at 15 weeks and 4 days of gestation.

After laparotomy with a longitudinal skin incision, careful ablation between the myoma pseudo-capsule and fibroid was performed, and the myoma was completely excised. During the myomectomy, the uterine cavity was not breached. No endometrial tissue was palpable and none could not be confirmed visually. Reconstruction of the uterine wall was executed in three layers with monofilament absorbable 0 barbed sutures (STRATAFIX® Spiral PDS® PLUS; ETHICON, Tokyo, Japan). With barbed sutures, applying extra force that would otherwise apply pressure on the uterus was not required (Fig. 1c, d). The uterine serosa was closed with a continuous baseball suture using monofilament absorbable 3.0 sutures (PDS® II; ETHICON, Tokyo, Japan) (Fig. 1e). An anti-adhesion agent (INTERCEED®, ETHICON, Tokyo, Japan) was applied to the surface of the uterus. The myoma weighed 1173 g (Fig. 1f), the estimated blood loss was 195 mL, and the operation time was 122 min. A viable fetal heartbeat and adequate cervical canal length (> 40 mm) were confirmed before and after the operation.

Prophylactic tocolysis (ritodrine hydrochloride) was performed during and after surgery, and continued until postoperative day 6. Indomethacin was not used before or during surgery because indomethacin during pregnancy is contraindicated in Japan. No significant contraction was observed on cardiotocography, and the patient did not

consistently experience uterine contractions after surgery. The patient was discharged on postoperative day 8. After discharge, the patient exhibited no signs of preterm labor.

The patient was closely followed every 1–2 weeks, and the remaining barbed suture was confirmed using ultrasonography until delivery (Fig. 2a-c). The patient was diagnosed with partial placenta previa later during pregnancy, and an emergency cesarean section was performed at 36 weeks and 0 days, owing to frequent repetitive genital bleeding. The patient delivered a female baby weighing 1970 g with Apgar scores of 8 and 9 at 1 and 5 min, respectively. The right superior uterine wall, from where the myoma was removed, did not show adhesions or myometrial thinning (Fig. 2d). The postoperative course was uneventful.

3. Discussion

The present case has two novel clinical features. First, the use of barbed sutures to reconstruct the uterine wall during myomectomy in pregnancy resulted in no symptoms of abortion or spontaneous preterm delivery. Second, the myometrium reconstructed with barbed sutures during myomectomy revealed no thinning on ultrasound examination, and the patient did not show any signs of uterine rupture until delivery.

The first-line treatment for uterine myomas during pregnancy is conservative, and surgery is reserved for carefully selected cases. In previous reports on myomectomy during pregnancy, monofilament or multifilament sutures were used to reconstruct the uterine wall [4–6]. In this case, barbed sutures were used to reconstruct the uterine wall; this is the first report of the use of barbed sutures for myomectomy in pregnancy.

When using conventional monofilament or multifilament sutures, pressure must be applied to the uterus and the suture pulled by both a surgeon and an assistant. Of course, even using a barbed suture, a surgeon still exerts some pull on the suture. However, because the barb is spirally attached to the sutures, it does not require as much traction as in conventional methods. Additionally, this helical barb design ensures even traction on the muscle layer (preventing suture retraction), eliminating the need for an assistant to maintain continuous tension. The

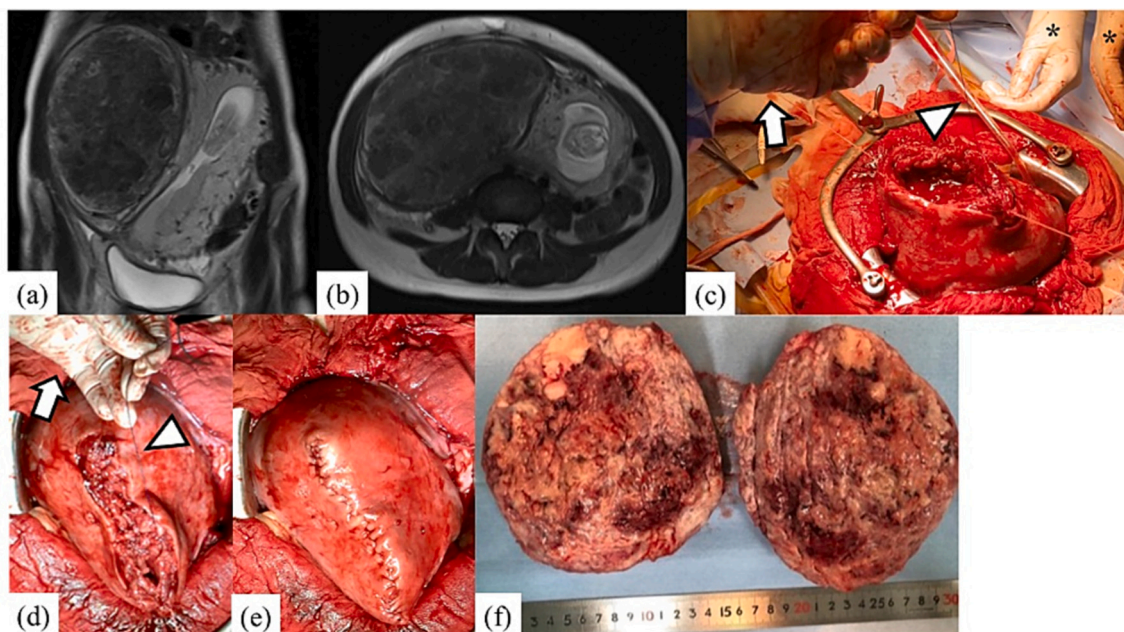


Fig. 1. (a) Coronal and (b) horizontal magnetic resonance images at 14 weeks of gestation showed a giant myoma measuring 16 × 11 cm superior to the uterine cavity. (c, d) During myomectomy, reconstruction of the uterine wall is performed by an assistant surgeon using monofilament absorbable 0 barbed sutures (STRATAFIX® Spiral PDS® PLUS; ETHICON, Tokyo, Japan) without applying extra force that would otherwise apply pressure to the uterus (asterisk). The left hand of the operator (white arrow) is able to pull the barbed suture alone (white triangle). (e) The uterine serosa is closed with a continuous baseball suture using monofilament absorbable 3.0 sutures (PDS® II; ETHICON, Tokyo, Japan). (f) The removed myoma weighs 1173 g.

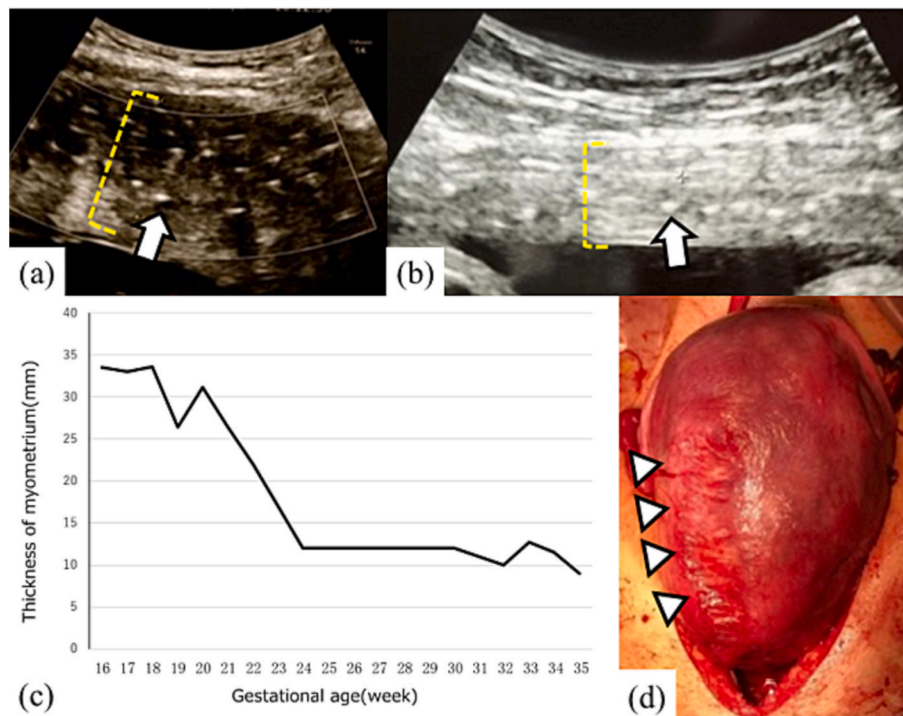


Fig. 2. Follow-up ultrasonography at (a) 16 weeks and 4 days, and (b) 32 weeks and 4 days shows the remains of the barbed sutures (white arrow) in the myometrium and the thickness of the myometrium (yellow dotted line) up to the delivery. (c) The graph indicates the changes in myometrium thickness over time. (d) The gravid uterus at 36 weeks and 0 days when emergency cesarean section was performed. The right superior uterine wall (white triangles) where the myoma was removed did not exhibit findings of adhesion or myometrium thinning. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

result is less pressure and damage to the gravid uterus, which in turn makes this technique less likely to cause symptoms of abortion and spontaneous preterm delivery after myomectomy.

In this case, the myometrium was reconstructed using monofilament absorbable 0 barbed sutures which have spirally positioned barbs. These barbs allow the suture to maintain resistance and hold onto tissue under tension. The absorption time of these sutures is 182–238 days, and they remain strong for 6 weeks [7]. On the other hand, absorption time of Coated VICRYL™ (polyglacin 910) is 56–70 days [8]. Therefore, they provide greater long-term tissue support than conventionally used sutures. Similarly, in this case, the sutures were not completely absorbed for 20 weeks postoperatively, as revealed by ultrasound examination.

The duration of full adhesion for the incised portion of the uterine myometrium remains undetermined. Consequently, an extended absorption period may aid in preserving the myometrial layer at the enucleation suture site throughout pregnancy. Additionally, the gravid uterus is an organ subject to expansion with smooth muscle; since PDS® II is devoid of barbs, a need arises to securely ligate and apply traction to the suture surface to avert detachment. Conversely, as barbed sutures necessitate no excessive traction for repair, it may avoid undue ischemia and effectively secure the incision surface for a prolonged period, thereby proving potentially beneficial for repair. Moreover, the patient showed no signs of uterine rupture or myometrial thinning until delivery.

A retrospective cohort study reported no uterine ruptures in 110 pregnancies, following laparoscopic myomectomy using barbed sutures before pregnancy [9]. Perinatal outcomes in myomectomy during pregnancy using barbed sutures are unclear, as there are no other reported cases using the same sutures.

In conclusion, in the case presented the use of barbed sutures in myomectomy during pregnancy caused no symptoms of preterm delivery. Furthermore, the myometrium reconstructed with barbed sutures revealed no thinning on ultrasound examination or no signs of uterine

rupture until delivery. Hence, barbed sutures may be clinically useful for myomectomies during pregnancy. Due to the small number of such cases, future studies are needed to demonstrate further safety and efficacy.

Contributors

Yui Negoro, Michihisa Shiro, Jota Maki, and Tsubasa Kokehara drafted, reviewed, edited the manuscript and provided patient care.

Hisashi Masuyama and Shigeki Yoshida drafted, reviewed, and edited the manuscript.

All authors approved the final submitted manuscript.

Funding

This work did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Patient consent

Written informed consent for publication was obtained from the patient.

Provenance and peer review

This article was not commissioned and was peer reviewed.

Acknowledgments

The authors thank the Department of Obstetrics and Gynecology at Chibune General Hospital. The authors also thank Editage (www.editage.jp) for English language editing.

Conflicts of interest statement

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

References

- [1] P. Jhalta, S.G. Negi, V. Sharma, Successful myomectomy in early pregnancy for a large asymptomatic uterine myoma: case report, *Pan. Afr. Med. J.* 24 (2016) 228, <https://doi.org/10.11604/pamj.2016.24.228.9890>.
- [2] G.D. Coronado, L.M. Marshall, S.M. Schwartz, Complications in pregnancy, labor, and delivery with uterine leiomyomas: a population-based study, *Obstet. Gynecol.* 95 (2000) 764–769, [https://doi.org/10.1016/s0029-7844\(99\)00605-5](https://doi.org/10.1016/s0029-7844(99)00605-5).
- [3] E.S. Shin, H.S. Kang, Case of suspected torsion and amputation of myoma during pregnancy, *Ann. Med. Surg. (Lond.)* 71 (2021) 103007, <https://doi.org/10.1016/j.amsu.2021.103007>.
- [4] L. Domenici, V. Di Donato, M.L. Gasparri, F. Lecce, J. Caccetta, P.B. Panici, Laparotomic myomectomy in the 16th week of pregnancy: a case report, *Case Rep. Obstet. Gynecol.* 2014 (2014) 154347, <https://doi.org/10.1155/2014/154347>.
- [5] A. Basso, M.R. Catalano, G. Loverro, S. Nocera, E. Di Naro, M. Loverro, M. Natrella, S.A. Mastrolia, Uterine fibroid torsion during pregnancy: a case of laparotomic myomectomy at 18 weeks' gestation with systematic review of the literature, *Case Rep. Obstet. Gynecol.* 2017 (2017) 4970802, <https://doi.org/10.1155/2017/4970802>.
- [6] C. Umezurike, P. Feyi-Waboso, Successful myomectomy during pregnancy: a case report, *Reprod. Health* 2 (2005) 6, <https://doi.org/10.1186/1742-4755-2-6>.
- [7] Ethicon, Anatomy of a barbed suture: A comprehensive guide, 2023. https://www.jnjmedtech.com/libraries/pdf.js/web/viewer.html?file=/sites/default/files/user_uploaded_assets/pdf_assets/2020-11/STRATAFIX%20Anatomy%20of%20a%20Barbed%20Suture%20Brochure%20081792-171005.pdf#pagemode=none (Accessed 13 Jun 2023).
- [8] Ethicon, Coated VICRYL™ (polyglactin 910) Suture, 2023. <https://www.jnjmedtech.com/en-US/product/coated-vicryl-polyglactin-910-suture> (Accessed 22 Sep 2023).
- [9] K. Pepin, M. Dmello, E. Sandberg, C. Hill-Verrochi, P. Maghsoudlou, M. Ajao, S. L. Cohen, J.I. Einarsson, Reproductive outcomes following use of barbed suture during laparoscopic myomectomy, *J. Minim. Invasive Gynecol.* 27 (2020) 1566–1572, <https://doi.org/10.1016/j.jmig.2020.02.005>.