Study on the Method of Enucleation of Anterior Uterine Fibroids by Transverse Incision of Lower Uterine Segment During Cesarean Section

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Research Article

Keywords: cesarean section, uterine myomectomy, uterine large fibroids, prognosis

Posted Date: August 2nd, 2021

DOI: https://doi.org/10.21203/rs.3.rs-692369/v1

Abstract

Introduction:

A retrospective study was conducted to investigate the effectiveness and feasibility of enucleation fibroids of the anterior wall of the uterus by transverse incision of the uterus at the same time during cesarean section.

Methods

The medical history, surgical data, preoperative and postoperative blood system changes and complications of 90 pregnant women who underwent myomectomy of the anterior uterine wall during cesarean section in the second Department of Maternal and Child Health Hospital of Fujian Province were analyzed retrospectively.

Results

There was no significant difference in the number of leiomyoma, pathological type, preoperative and postoperative hemoglobin, incidence of perioperative bleeding, frequency of blood transfusion, incidence of postoperative fever, uterine involution and lochia between the study group and the control group. The proportion of large fibroids in the study group was slightly higher than that in the control group ($p < 0.05$), and the operation time and average hospitalization time in the study group were slightly longer than that in the control group ($p < 0.05$).The distribution of type III-V fibroids in the study group was slightly more than that in the control group ($p < 0.05$), and the distribution of type VI fibroids in the study group was less than that in the control group ($p < 0.05$).

Conclusion

It is safe and effective to enucleate the fibroids of the anterior wall of the uterus through the lower uterine transverse incision in cesarean section. Potential to reduce the risk of pelvic adhesion and intrauterine adhesion in the future, so that some patients avoid the risk of reoperation.

1. Introduction

Uterine fibroids are common benign tumors in women of childbearing age, which may have increased menstrual volume, pelvic pain, fibroid degeneration, infertility and so on. Most cases may have no obvious clinical symptoms, and even many women are found by obstetric ultrasound after pregnancy [1]. According to statistics, the incidence of pregnancy with uterine fibroids is between 1.6% and 10.7%, which may result in miscarriage, premature birth, abnormal fetal position, placental abruption, obstructed birth

passage, postpartum hemorrhage and other obstetric complications [1].Pregnancy combined with large fibroids of the uterus is more prone to the above obstetric complications than small fibroids, often requiring cesarean section to terminate the pregnancy. It is still controversial whether to remove uterine fibroids at the same time during cesarean section. Some scholars believe that uterine blood flow is rich during pregnancy, and enucleation of fibroids at this time is likely to cause uncontrollable bleeding. In addition to pedicled uterine fibroids, it is not recommended to enucleate fibroids at the same time during cesarean section. However, with the progress of surgical hemostasis technology, on the premise of preventing postpartum hemorrhage, many clinical studies have shown that cesarean section while eviscerating uterine fibroids can avoid the pain caused by reoperation. In this study, 90 pregnant women who underwent myomectomy of the anterior wall of the uterus during cesarean section were analyzed retrospectively. Compared with the traditional group of fibroids enucleation of the anterior wall of the uterus through the serous layer, there was no statistical significance in the number of myoma, pathological type, preoperative and postoperative hemoglobin, incidence of perioperative bleeding, frequency of blood transfusion, incidence of postoperative fever and uterine involution and lochia in the group of fibroids enucleation of the anterior wall of the uterus through the incision margin of lower uterine cesarean section. The latter can not increase the uterine wound, potentially reduce the risk of pelvic adhesion in the future, so that some patients avoid the risk of reoperation. The report is as follows.

2. Method

2.1 Case inclusion criteria and grouping:

A retrospective analysis was performed on pregnant women diagnosed with anterior uterine fibroids admitted to the Second Department of Obstetrics, Fujian Maternal and Child Health Hospital from January 2015 to December 2019. Inclusion criteria: Hysteromyoma enucleation was performed at the same time during cesarean section, which was performed by the corresponding author of this paper. The intraoperative examination showed that the myoma was located in the anterior wall of the uterus (excluding type VII and type II), the diameter of the myoma was ≥ 3cm, and the postoperative pathology confirmed that the myoma was uterine leiomyoma. Finally, 90 cases were included. According to the method of enucleation of uterine fibroids, the patients were divided into two groups: 50 cases with anterior uterine fibroids enucleated by incision through the serous layer (control group) and 40 cases with anterior uterine fibroids enucleated by incision through the lower segment of the uterus (study group).The following data were obtained from the medical records: maternal age, number of pregnancies, number of births, gestational weeks, weight, height, body mass index (BMI), pregnancy complications, indications for cesarean section, neonatal weight, Apgar score, type of cesarean section (emergency or elective), myoma type (using the International Federation of Obstetrics and Gynecology (FIGO) uterine leiomyoma type 9 classification method: divided into three groups: type 0-II submucous type, III-V type intermuscular type. VI-VII is subserous type, type VIII is other special types or sites of leiomyoma, cervical leiomyoma), maximum diameter of leiomyoma (measured by pathologist, divided into 3-5cm and ≥ 5cm), location of leiomyoma (recording the distance from the lower edge of leiomyoma to uterine incision, divided into ≤

2cm, 2-5cm, ≥5cm), number of leiomyoma (single or multiple), operation time (in minutes, from skin incision to skin closure), intraoperative blood loss (data from surgical and anesthetic surgery reports), blood transfusion, methods of myoma enucleation (myoma enucleation through incision margin or serosa of uterus), emostatic measures used in the process of myoma enucleation (strong oxytocin, para-uterine vascular ligation, uterine compression suture, etc.), peoperative and postoperative hemoglobin and hematocrit levels, the main complications, postoperative hospital stay, lochia 42 days after delivery, uterine involution and reexamination of pelvic color ultrasound. This study was approved by the Ethics Committee of Fujian Maternal and Child Health Hospital, and all patients signed written informed consent and filed it.

2.2 Methods of enucleation of uterine leiomyoma:

in the study group, uterine leiomyoma was enucleated through the incision margin of the lower segment of the uterus: the fetus and placenta were delivered by cesarean section in the lower segment of the uterus, and the uterus was lifted out of the abdominal wall incision, clamping both ends of the incision and the upper and lower margin of the incision. The two ends of the incision could be intermittently sutured with "0" absorbable thread if there was active bleeding. For leiomyomas ≥ 5cm, we usually perform para-uterine vascular ligation and/or intrauterine injection of powerful uterine contractile agents before uterine leiomyoma enucleation. Check the position of the uterine leiomyoma and measure the distance from the lower edge of the myoma to the edge of the incision. For the leiomyoma above the incision, the left hand holds the bottom of the uterus to squeeze the leiomyoma downward, so that the leiomyoma moves toward the incision to the edge of the incision. According to the depth of the myoma, cut to the tumor wall at the most protruding part of the cutting edge, clamp the tumor with cloth forceps, pull outward until the tumor nucleus is completely exposed. The root of the tumor was clamped with curved forceps and sutured with "0" absorbable thread and "8" shape suture. Then the myoma was removed while tightening the root, and the tumor cavity was closed continuously until the edge of the incision. After checking that there was no bleeding, the uterine incision of cesarean section was routinely sutured. In the control group, the uterine incision was sutured first, and then the myoma was eviscerated by traditional subserous incision. The tumor cavity was sutured with "0" absorbable thread and "8" shape discontinuous suture. Finally, the uterine sarcomuscular layer was sutured with continuous hemming. See Figs. 1 and 2.

2.3 Statistical Analysis.

SPSS 21.0 sofware was used for the statistical analysis. Continuous variables were expressed as mean ± standard deviation or median (minimum-maximum) while categorical variables were denoted as numbers or percentages where appropriate. One-way ANOVA, Kruskal Wallis test and Pearson chi square test were used for the comparisons. Two-tailed p values < 0.05 were accepted to be statistically significant.

3. Results

3.1. The clinical characteristics of the subjects.

90 pregnant women were included in this study, with an average age of 34.7 ± 4.58 years old. The patients were divided into two groups according to the method of enucleation of the largest leiomyoma, 40 cases (44%) were enucleated through the incision margin of the lower segment of the uterus, and 50 cases (56%) were removed by subserous incision. There was no significant difference in age, BMI, weight, height, gestational weeks, gravidity, parity, previous history of cesarean section or myomectomy, primipara, emergency cesarean section, abnormal fetal position and neonatal weight between the two groups. Among the 90 cases, there was no significant difference in the distribution of obstetrical complications (such as gestational diabetes mellitus, hypertension disorders of pregnancy, premature rupture of membranes, placenta previa and placental abruption, etc.) between the two groups (all $p > 0.05$). Among them, there were 5 cases of fetal growth restriction (6%), 6 cases of fetal distress (7%), 1 case of fetal death at 22 weeks of pregnancy, and no neonatal asphyxia. The clinical and sociological data of the two groups are shown in Table 1.

3.2 Comparison of the characteristics of uterine leiomyoma between the two groups.

There was a statistically significant difference in the size of the largest fibroids between the two groups. The number of cases with the largest fibroids diameter ≥ 5cm in the study group was more than that in the control group (73% vs42% $p = 0.00$). In the distance between the largest fibroids and the incision edge of the lower segment of the uterus, the number of cases in the study group was more than that in the control group in ≤ 2cm (53% vs 6% $p = 0.00$), while in the distance ≥ 5cm, the number of cases in the study group was less than that in the control group (0% vs 46% $p = 0.00$). There was no significant difference between the study group and the control group in the distance of 2-5cm (48% vs 48% $p = 0.96$). According to the comparison of the distribution of fibroids between the two groups according to FIGO classification, there was no significant difference in type II between the two groups (3% vs 2% $p = 0.58$), while the III-V type study group was slightly more than the control group (80% vs 60% $p = 0.04$), and the VI type study group was less than the control group (18% vs 38% $p = 0.03$). There was no significant difference in the number of fibroids (single or multiple) and the type of pathological diagnosis between the other two groups (all $p > 0.05$). The characteristics of uterine fibroids in the two groups are compared in Table 2.

3.3 Comparison of the changes of operation and blood related indexes.

Among the 90 cases, except for the indication of obstetrical cesarean section, 14 cases (16%) underwent cesarean section simply because of uterine fibroids, and there was no significant difference in distribution between the two groups ($p = 0.10$). The total duration of operation in the study group was 40–162 minutes (median 83.3 minutes), slightly longer than that in the control group (42–137 minutes) (median 72.5 minutes), and the difference was statistically significant ($p = 0.04$). The postoperative hospital stay in the study group was slightly longer than that in the control group (median 3.6 vs 3.2, $p = 0.01$). There was no significant difference in the levels of hemoglobin, hematocrit and the changes of hemoglobin and hematocrit between the two groups before and after operation (all $p > 0.05$). Of the 90

cases, 1 case had postpartum hemorrhage (1%), 3 cases had requests for blood transfusion (3%), and 5 cases had fever after operation (6%). There was no significant difference between the two groups (all $p > 0.05$). There were no operative complications in both groups. All cases were followed up for more than half a year, and there was no difference in the time of uterine involution and lochia cleaning between the two groups. The comparison of the operation and blood related indexes between the two groups is shown in Table 3.

Table 1
Patients' clinical and demographic data

Characteristics	Total	Control group	Study group	p-value
Patient (n)	90	40	50	
Age(years)	34.7 ± 4.58	34.58 ± 4.25	34.80 ± 4.87	0.82
BMI on admission(Kg/m2)	26.76 ± 3.25	26.66 ± 3.59	26.84 ± 2.99	0.79
Body weight (Kg)	67.72 ± 7.89	67.20 ± 7.77	68.15 ± 8.04	0.57
Height(cm)	159.21 ± 4.87	159.01 ± 4.30	159.38 ± 5.31	0.72
Term(weeks of gestation)	37.9(22.5–41)	37.74(22.5–41)	38.03(29.5–41)	0.93
Number of pregnancies (times)	2.4(1–7)	2.4(1–5)	2.5(1–7)	0.81
Parity (times)	0.7(0–3)	0.6(0–3)	0.8(0–2)	0.13
Previous cesarean section (n [%])	33[37]	12[30]	21[42]	0.24
Previous myoma evisceration (n [%])	3[3]	2[5]	1[2]	0.43
Number of first-born women (n[%])	38[42]	21[53]	17[34]	0.08
Emergency cesarean section (n [%])	21[23]	11[27]	10[20]	0.40
Incorrect fetal position (n[%])	12[13]	8[20]	4[8]	0.10
Neonatal weight (g)	3160.5(550–4570)	3108.98(550–4570)	3201.70(1030–4535)	0.54
Gestational diabetes mellitus (n [%])	22[24]	9[23]	13[26]	0.70
Hypertension complicating pregnancy (n [%])	9[10]	5[13]	4[8]	0.48
Premature rupture of membranes (n[%])	11[12]	5[13]	6[12]	0.94
Placenta previa (n[%])	5[6]	2[5]	3[6]	0.78
Placenta abruption (n[%])	1[1]	1[3]	0[0]	0.91
Fetal distress (n[%])	6[7]	1[3]	5[10]	0.16
Stillbirth (n[%])	1[1]	1[3]	0[0]	0.44
Fetal growth restriction (n[%])	5[6]	1[3]	4[8]	0.26
Neonatal asphyxia (n[%])	0	0	0	

Table 2
Characteristics of uterine fibroids data

Characteristics	Total	Control group	Study group	p-value
Patient (n)	90	40	50	
Number of leiomyoma				
Solitary myoma(n[%])	44[49]	18[45]	26[52]	0.51
Multiple myoma (≥ 2)(n[%])	46[51]	22[55]	24[48]	0.51
The size of the largest myoma	6.2(3–20)	7.2(3–20)	5.3(3–14)	0.01
Size of leiomyoma < 5cm (n[%])	40[44]	11[28]	29[58]	0.0038
Size of leiomyoma ≥ 5cm (n[%])	50[56]	29[73]	21[42]	0.0038
FIGO classification of leiomyoma				
Type II(n[%])	2[2]	1[3]	1[2]	0.58
Type III-V(n[%])	62[69]	32[80]	30[60]	0.04
Type VI(n[%])	26[29]	7[18]	19[38]	0.03
The distance between the myoma and the incisal margin				
≤ 2cm(n[%])	24[27]	21[53]	3[6]	0.000
2-5cm(n[%])	43[48]	19[48]	24[48]	0.96
≥ 5cm(n[%])	23[26]	0[0]	23[46]	0.000
Pathological diagnosis of leiomyoma				
No denaturation (n[%])	42[47]	21[53]	21[42]	0.32
Red degeneration (n[%])	39[43]	16[40]	23[46]	0.57
Cystic degeneration (n[%])	0	0	0	0
Glass transformation (n[%])	9[10]	3[8]	6[12]	0.72

Table 3
Data about surgical procedures and hematological analysis

Characteristics	Total	Control group	Study group	p-value
Patient (n)	90	40	50	
Uterine leiomyoma(n[%])	14[16]	9[23]	5[10]	0.10
Total duration of operation(min)	77.3(40–162)	83.3(40–162)	72.5(42–137)	0.04
Preoperative hemoglobin(g/L)	118.8 ± 12.1	118.9 ± 10.9	118.7 ± 13.2	0.94
Postoperative hemoglobin(g/L)	102.9 ± 15.1	100.9 ± 14.9	104.5 ± 15.1	0.17
Hemoglobin change	16.0(-1-59)	18.05(-1-56)	14.28(0–59)	0.06
Preoperative hematocrit(%)	35.2 ± 3.1	35.17 ± 2.75	35.15 ± 3.42	0.97
Postoperative hematocrit(%)	30.7 ± 4.1	30.12 ± 3.96	31.2 ± 4.3	0.12
Hematocrit changes	4.7(-8.6-17.2)	5.1(-8.6-16)	3.9(-2.4-17.2)	0.07
Intraoperative bleeding(ml)	486.7(300–1500)	477.5(300–800)	494(300–1500)	0.80
Postpartum hemorrhage(n[%])	1[1]	0[0]	1[2]	0.91
Blood transfusion(n[%])	3[3]	1[3]	2[4]	0.70
Postoperative fever(n[%])	5[6]	2[5]	3[6]	0.84
Postoperative hospital stay (days)	3.4(3-6.5)	3.6(3-6.5)	3.2(3–5)	0.01
Operative complications(n[%])	0	0	0	

4 Discussion

Uterine leiomyoma is a common benign tumor in women of childbearing age. The incidence increases with age, especially between 30 and 40 years old [2]. With the increase of childbearing age, the incidence of uterine leiomyoma in pregnancy increases accordingly, and complications such as early abortion, early pregnancy bleeding, premature delivery, premature rupture of membranes and placental abruption may occur, but in most cases, patients do not have any clinical symptoms, and even many women are found to suffer from uterine leiomyoma during obstetrical ultrasound examination after pregnancy [3]. Pregnancy with uterine leiomyoma, if there is no obstruction of the birth canal, trial delivery without contraindications, most pregnant women can still be encouraged to try vaginal delivery. However, if it is a myoma located in the lower segment of the uterus, it will often lead to obstruction of the birth canal and abnormal fetal position, which will become one of the indications of cesarean section.

Whether to remove uterine fibroids at the same time during cesarean section is still controversial. According to the traditional view, uterine hyperemia during pregnancy is obvious [4], and myoma is generally enlarged under the influence of progesterone. Uterine myomectomy may have perioperative complications such as massive bleeding, prolonged operation time, postoperative infection and so on. In severe cases, there is even the risk of hysterectomy. Therefore, except for subserous myoma with pedicle, hysteromyomectomy at the same time after cesarean section is not recommended [4–9]. However, in recent years, with the development of hemostatic technology of cesarean section, more and more studies have shown that hysteromyoma enucleation at the same time of cesarean section is safe and feasible[5, 10]. In this study, the innovative application of the method of removing myoma from the anterior wall of the uterus through the edge of the uterine incision is a safe and feasible method compared with the traditional method. There was no significant difference in preoperative and postoperative hemoglobin, incidence of perioperative bleeding, frequency of blood transfusion, incidence of postoperative fever and complications between the study group and the control group.

Uterine myoma evisceration is performed at the same time during cesarean section, especially for large fibroids, according to the traditional subserous myomectomy method, it often increases the wound on the surface of the uterus, thus increasing the risk of pelvic adhesion in the future. In order to solve this problem, Hatirnaz et al proposed a method to remove uterine leiomyoma from the endometrium [4, 11]. They believed that the endometrium, myometrium and serosal layer can be healed smoothly through endometrium incision to enucleate uterine fibroids, and directly merge to reduce the risk of pelvic adhesion in the future [11]. Although endometrial myomectomy helps to avoid the formation of adhesions between the serosa and the surrounding organs, adhesions may occur in the uterine cavity [4]. To solve this problem, our team innovatively adopted the method of enucleation of uterine fibroids from the edge of the uterine incision. This method is suitable for the myoma of the anterior wall of the middle and lower segment of the uterus. Without adding a new uterine incision, the myoma of the uterus can be removed, which can preserve the integrity of the uterine tissue as much as possible and reduce the possibility of uterine and pelvic adhesion in the future. In this study, 90 cases of cesarean section with myomectomy of anterior uterine wall were selected, 40 cases of uterine myoma were eviscerated through the edge of uterine incision as the study group, and the other 50 cases were treated with traditional serous layer enucleation of uterine leiomyoma as the control group. The results showed that the operation time and average hospitalization time of the study group were slightly longer, which may be related to the higher proportion of major myoma (diameter ≥ 5cm) in the study group than that in the control group. Compared with small leiomyoma, large myoma takes more time to eviscerate and repair, and it takes more time to recover after operation.

The method of cutting into the edge of the uterine incision and enucleating the uterine leiomyoma is more suitable for the myoma of the anterior wall of the middle and lower segment of the uterus, especially the large leiomyoma, and the intermuscular leiomyoma has an advantage. For obstetricians, there is one more option to remove uterine fibroids at the same time during cesarean section, especially for young patients with reproductive requirements, reducing the incision on the uterine surface and uterine cavity,

which is conducive to postoperative recovery. In this study, the proportion of III-V type in FIGO classification of leiomyoma in the study group was high, and the proportion of lower edge of leiomyoma to uterine incision edge ≤ 2cm was high, which reflected the applicability of this method.

Make good use of the uterine incision of the lower uterine segment of cesarean section, successfully remove the myoma of the anterior wall of the middle and lower segment of the uterus, and minimize uterine injury, so as to facilitate the recovery of the uterus after operation and reduce the risk of long-term pelvic adhesion. Myomectomy at the same time after cesarean section has its own advantages and disadvantages [4, 8, 12, 13]. It is very important to make a good evaluation and countermeasures before operation. All the operations in this study were performed by the same medical team, and the chief surgeon had 15–25 years of surgical experience, and the patient's tolerance and willingness were fully evaluated before operation. In this study, there were 3 cases of blood transfusion, of which 1 case in the study group was postpartum hemorrhage caused by multiple myoma evisceration, and 2 cases in the control group were complicated with severe anemia before operation, so they were treated with blood transfusion before operation.

In short, pregnancy with uterine leiomyoma will increase the difficulty of obstetrical management. Pregnancy with large myoma in the lower segment of the uterus often has to choose cesarean section to terminate pregnancy because the myoma blocks the birth canal. It is the aspiration of many pregnant women to eviscerate the myoma of the lower part of the uterus at the same time during cesarean section, which can reduce the possibility of postpartum hemorrhage and secondary operation caused by uterine weakness caused by myoma. In this study, we make full use of the transverse incision of the lower segment of the uterus to remove the myoma of the intermuscular type of the anterior wall of the middle and lower segment of the uterus, which can not increase the wound surface of the uterus and reduce the risk of pelvic adhesion and uterine adhesion in the future. This method is easy to master and is a choice for hysteromyoma evisceration during cesarean section. Because the number of cases in this study is limited, and the follow-up time is not long enough, the long-term impact on the long-term needs to be further prospective case-control studies.

Declarations

Ethics approval and consent to participate: This study was approved by the Ethics Committee of Fujian Maternal and Child Health Hospital, and all patients signed written informed consent and filed it. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication: The manuscript is approved by all authors for publication.

Availability of data and material: The results/data/figures in this manuscript have not been published elsewhere, nor are they under consideration (from you or one of your Contributing Authors) by another publisher.

Competing interests: No conflict of interest exits in the submission of this manuscript.

Funding: This work was supported by the Fujian Provincial Maternity and Children's Hospital Science Foundation (FJSYCXB-18-08).

Authors' contributions: Conceptualization: Yan Dai and Jinxiao Lin. Methodology: Yan Dai. Project administration: Rongli Xu. Software: Wenqiang You. Writing – original draft: Li Xia, Yan Dai. Writing – review & editing: Li Xia, Yan Dai. All authors reviewed the manuscript.

Acknowledgements: We acknowledge and appreciate our colleagues for their valuable efforts and comments on this paper.

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Figures

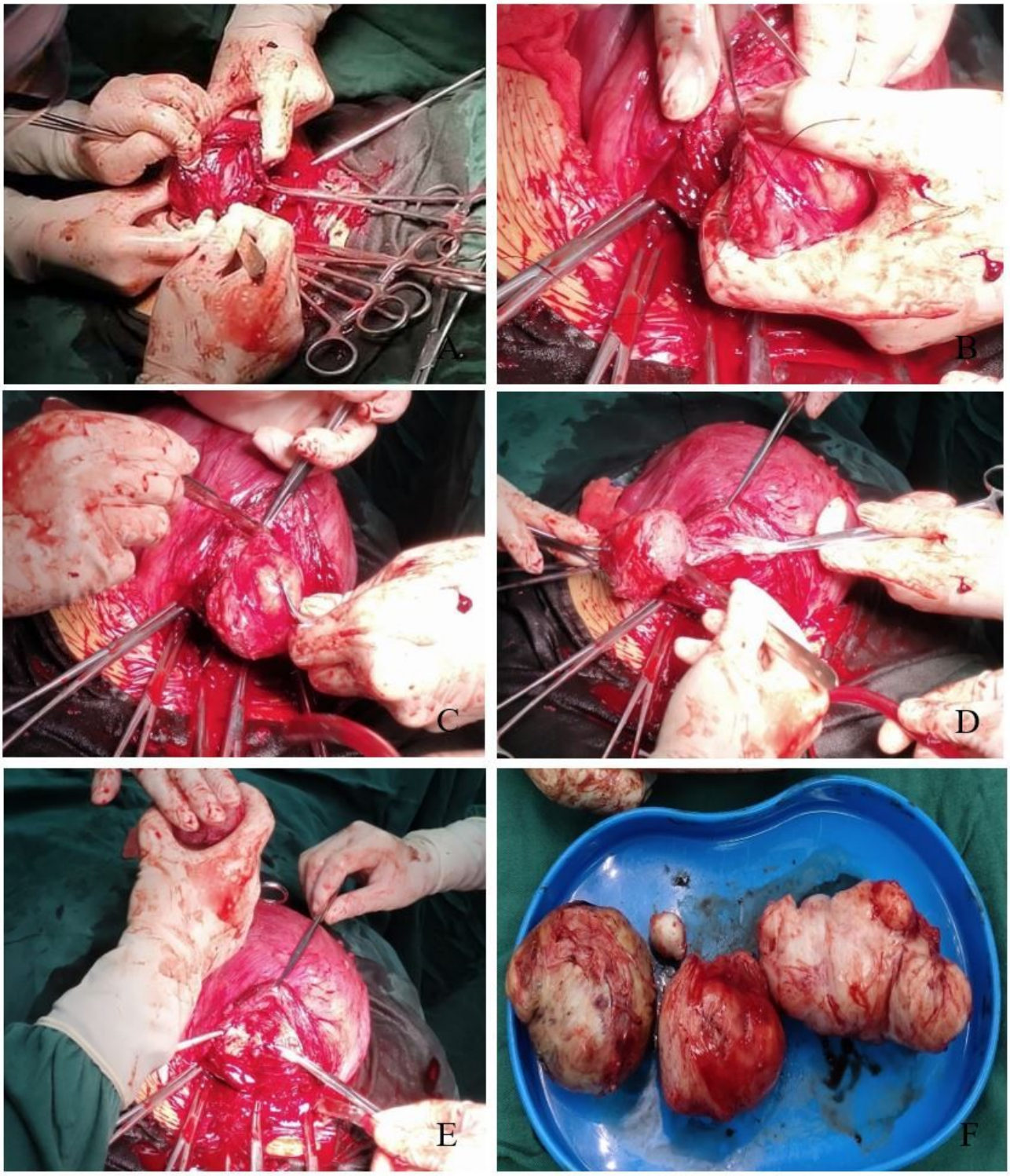

Figure 1

Enucleation of hysteromyoma through the upper edge of cesarean section incision. A. Cut to the tumor wall at the most protruding part of the incisal margin; B. Suture the tumor root tissue with "0" absorbable thread and "8" suture; C-E. Enucleation of hysteromyoma; F. All myomas of the anterior wall of uterus were enucleated.

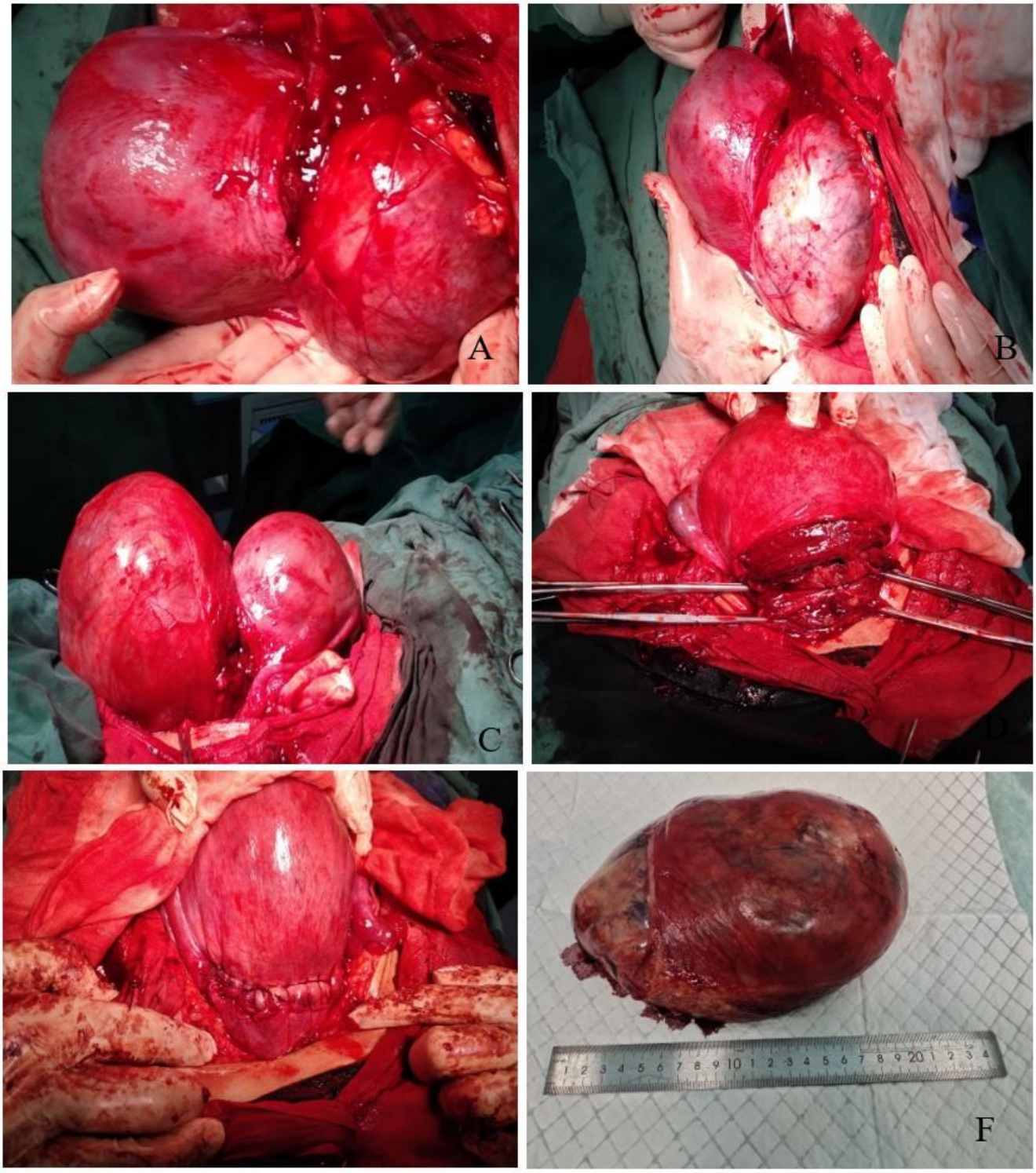

Figure 2

Enucleation of hysteromyoma through the lower edge of cesarean section incision. A-C. Large fibroid of anterior wall of lower margin of cesarean section；D. Enucleation of large fibroid in the anterior wall of the lower uterine segment through the lower edge of cesarean section incision；E. Suture the caesarean section of the uterine incision；F. Enucleated large fibroid of uterus.