Feasibility Study And Surgical Technique Sharing Of Myomectomy For Intramural Myoma Greater Than 8cm During Cesarean Section

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Abstract

Objective: To explore the feasibility and safety of cesarean myomectomy in large interstitial myoma.

Methods: A total of 124 cases of pregnancy who underwent cesarean section in Ningbo Women's and Children's Hospital were selected. 79 patients were complicated with intramural uterine leiomyoma, and 43 patients underwent cesarean myomectomy (Study group), and 36 patients did not undergo myomectomy during cesarean section (regular group). No uterine leiomyoma was found in the other 45 patients during cesarean section (control group). The intraoperative conditions were compared, including operation time, intraoperative blood loss and uterine balloon packing rate. The short-term recovery after operation was compared, including the time of use of antibiotics, postoperative hospital stay, postoperative fever rate and anal exhaust time. Long-term recovery after discharge was followed up by telephone.

Results: Compared with the operation time of the three groups, the operation time of the study group was significantly longer than that of the regular group and the control group[75(60, 150) min vs 69.5(40, 100) min vs 58(41, 70) min, P<0.001]. In the control group, the study group and the regular group, the intraoperative blood loss was 400□350□600□ml vs 600□400,2500□ml vs 550□400,1300□ml, P <0.001], antibiotic use time [2(1,3) days vs 3(2,5) days vs 3 (2,12) days, P <0.001], postoperative hospital stay [4(3,5) days vs 5(4,6) days vs 5(4,14) days, P <0.001], anal exhaust time [1(1,1) day vs 1(1,5) day vs 1(1,3) day, P <0.05], but there was no significant difference between the study group and the regular group (P > 0.05). Compared with the study group and the control group, the balloon implantation rate of the regular group was the highes (33.3% vs 11.65% vs 0%, P < 0.05). There was no significant difference in the incidence of postoperative fever (>38℃) among the three groups.

Conclusions: For pregnancy complicated with large uterine leiomyoma, it is safe and feasible to be resected by experienced obstetricians and gynaecologists at the same time of cesarean section.

Background

Uterine fibroids are the most common benign tumors in the female reproductive organs, with an incidence of 20 to 40 percent in women of reproductive age [1]. The incidence of uterine fibroids during pregnancy is 0.1–3.9% [2], and with the liberalization of China's fertility policy, it is estimated that the incidence of uterine fibroids during pregnancy will further increase. Large uterine fibroids interfere with uterine contractions, leading to prolonged labor, retained placenta, postpartum hemorrhage, infection, and possibly hysterectomy for uncontrolled postpartum hemorrhage or puerperal infection [3–4]. In recent years, Chinese scholars have proposed that for patients with pregnancy complicated by uterine fibroids, the indications for cesarean section should be relaxed [5, 6, 9]. There is still debate about whether to perform myomectomy during cesarean section. In recent years, although more and more studies have confirmed the safety and feasibility of myomectomy by cesarean section [7–8]. However, for intramural fibroids larger than 8 cm in diameter, the feasibility of myomectomy at the same time as cesarean section

is less, and there are only a few case reports. This study explores the safety and feasibility of cesarean myomectomy for intramural fibroids larger than 8 cm in diameter.

Methods

This was a retrospective cohort study. A total of 124 pregnant patients preparing for cesarean section were admitted to the hospital. Seventy-nine women with large interstitial myoma measured > 8 in diameter, and 43 women underwent cesarean myomectomy (study group), and 36 women had cesarean section without myomectomy(regular group), and the remaining 45 women found no uterine fibroid during cesarean section (control group). Exclusion criteria: 1. Patients with high blood risk factors, such as twin pregnancy, placenta praevia, placental implantation, placental abruption, etc; 2. Patients with pregnancy complications, such as preeclampsia, pregnancy with thrombocytopenia (PLT < $50*10^9$/L), etc. The data were from the electronic database of Ningbo Women and Children's Hospital. This study was approved by Ningbo Medical Ethics Committee with patient informed consent. Maternal clinical and obstetric characteristics were compared, including age, number of pregnancies, number of deliveries, gestational age at termination of pregnancy, neonatal weight, and diameter of uterine fibroids.

Intraoperative status was assessed by 3 indicators including operative time, intraoperative blood loss, and intrauterine balloon placement rate (Bakri Balloon). Postoperative recovery was assessed by duration of postoperative antibiotics, postoperative hospital stay time, postoperative fever rate, time to anal flatus, and incidence of late postpartum hemorrhage. Long-term post-operative recovery were followed-up by telephone after discharge from hospital. In this study, All patients received combined spinal-epidural anesthesia, and the midline abdominal incision was made, and a transverse incision in the lower uterine segment was performed for cesarean section. After delivery of the fetus, antibiotics were administrated to prevent infection and 20U of oxytocin were injected. Intravenous carbetocin 0.1mg was injected in the patient with large interstitial myoma. Uterine incisions were sutured in two continuous layers with absorbable 1 – 0 Vicryl. If a large intramural myomas was found during cesarean section and needed to be removed, the uterus was delivered out of the abdominal cavity immediately after delivery and lower uterine was tied with a tourniquet. For type IV and VI large intramural myomas, the uterine incision was sutured firstly and then the uterine serosa was cut longitudinally to remove the myoma. For type III and V large interstitial myomas, an arc incision was made on the endometrium to remove the myoma, and then the uterine incision was sutured. The wound of uterine leiomyoma was sutured in 2 layers. Firstly, we sutured the tumor cavity with absorbable 1 Polysorb CL-905, and then continuously sutured the seromuscular layer with absorbable 2 – 0 Vicryl .For type III and V interstitial myomas, if the uterine fibroid was close to the fundus uteri and the apical exposure was difficult, we can place a Bakri balloon in the uterine cavity, which can not only compress the wound to stop bleeding, but also prevent uterine adhesions. If there was a lot of bleeding during the operation, we can also choose to ligate the upper branch of the uterine artery.

Statistical analyses were performed with SPSS 23.0 (International Business Machines Corporation, USA). The measurement data of normal distribution were expressed by x ± s, using LSD-t test, and the

measurement data of non-normal distribution were expressed by M (min, max), using Kruskal-Wallis H test. The counting variables were tested by χ^2 test. There was significant difference between the two groups ($P < 0.05$).

Results

Table 1 showed the comparison of maternal characteristics between three groups. In this study, there was no statistically significant difference between the three groups in terms of maternal age, gravidity, parity, gestational age at delivery, neonate weight and myoma size ($p > 0.05$). Table 2 showed the comparison of intraoperative conditions of the three groups. There were significant differences in operation time among the three groups ($p < 0.001$). The operation time of the study group was the longest, followed by the regular group, and the operation time of the control group was the shortest. The amount of intraoperative blood loss in the control group was significantly less than that in the study group and the regular group ($P < 0.001$). There was no significant difference between the study group and the regular group ($P < 0.05$). Intraoperative uterine cavity packing rate (Bakri balloon placement rate): regular group > study group > control group, and the difference was statistically significant ($P < 0.05$). The recent post-operative recovery were summarized in Table 3. The duration of antibiotic use and postoperative hospitalization stay in the three groups were significantly less in the control group than in the study and regular groups ($P < 0.001$), and there was no significant difference between the study and regular groups ($P > 0.05$). The time of anal exsufflation in the study group was significantly longer than that in the control group ($P < 0.05$), but there was no significant difference between the study and regular group ($P > 0.05$). The incidence of postoperative fever (> 38°) had no significant difference among the three groups ($P > 0.05$).Of the 43 patients who underwent myomectomy after cesarean section, 20 patients showed myoma degeneration after operation. We followed up 40 patients by telephone (3 cases did not answer the phone). There was no uterine rupture in 1 case of full-term cesarean section. The other 39 cases had no more planned pregnancy and 3 cases had induced abortion. There was no recurrence of uterine leiomyoma, uterine adhesion or chronic pelvic inflammation. In 36 patients whose uterine leiomyoma was not removed during cesarean section, the diameter of myoma decreased by 2–4 cm one year after operation. Thirty women chose a second operation (laparoscopic myomectomy). Three women with significantly reduced postpartum leiomyoma chose conservative drug treatment. Three women are still breastfeeding and have no plans to treat leiomyoma.

Table 1
Comparsion of general characteristics of three groups of patients

	Study group(n = 43)	Regular group (n = 36)	Control group (n = 45)	F/t value	P
Maternal age (yrs)	34.33 ± 4.98	32.89 ± 4.52	32.04 ± 4.20	2.78	0.06
Gestational age at delivery (wks)	38.05 ± 0.69	38.08 ± 0.91	38.41 ± 1.01	2.40	0.95
Gravidity	2.07 ± 1.42	2.06 ± 0.92	2.44 ± 1.27	1.30	0.28
Parity	0.23 ± 0.43	0.39 ± 0.49	0.40 ± 0.50	1.67	0.19
Neonate weight (g)	3201 ± 435	3114 ± 508	3221 ± 434	0.67	0.52
Myoma size (cm)	9.66 ± 2.80	9.10 ± 2.00		1.01	0.31

Table 2
Comparison of intraoperative conditions among the 3 groups of patients

	Study group(n = 43)	Regular group (n = 36)	Control group (n = 45)	$H(\chi^2)$	P
Intraoperative bleeding(ml)	600(400,2500)	550(400,1300)	400(350, 600)	45.84	< 0.001
bakri balloon placed (n,%)	5(11.6%)	12(33.3%)	0.0	19.03	< 0.001
Operative time(min)	75(60,150)	69.5(40,100)	58(41,70)	58.82	< 0.001

Table 3
The comparison of the post-operative recovery of the 3 groups

	Study group (n = 43)	Regulargroup (n = 36)	Controlgroup (n = 45)	$H(\chi^2)$	P
antibiotic use(d)	3.0(2,5)	3(2,12)	2(1,3)	43.1	< 0.001
Postoperative hospital stay (d)	5(4,6)	5(4,14)	4(3,5)	45.23	< 0.001
anal venting (d)	1(1,5)	1(1,3)	1(1,1)	6.80	< 0.05
Postoperative fever (n,%)	4(9.3%)	3(8.3%)	1(2.2%)	2.12	> 0.05

Discussion

At present, there is no consensus on whether to perform cesarean section myomectomy, especially large intermural myoma, for women with uterine leiomyoma during pregnancy [9]. Considering the increased risk of postpartum hemorrhage and perinatal hysterectomy, most of the literature strongly opposes myomectomy after cesarean section and believes that it is safer to leave the myoma in situ for a second operation [10]. However, there were still many scholars who hold a different view [11]. In view of the fact that huge uterine fibroids may lead to poor involution of the uterus and will not fade by itself, it is recommended that hysteromyomectomy should be performed at the same time of cesarean section in order to reduce puerperal complications and psychological and economic burden caused by uterine fibroids and avoid further surgical intervention [12]. Rong, Zhao, Dedes I et al [13, 14] reported that myomectomy can be considered during caesarean section for uterine fibroids ≤ 5 cm in diameter, whereas for uterine fibroids > 5 cm in diameter, intraoperative haemostasis is difficult and bleeding is significantly increased, so caesarean myomectomy should be careful. Dam Hye Kwon [15] et al. concluded that there was no significant difference in intraoperative bleeding, operative time and length of hospital stay when myomas > 5cm in diameter were removed during caesarean section compared to those ≤ 5cm in diameter, and concluded that large myomas > 5cm in diameter were safe to remove during caesarean section. A study by Shi Xinwei et al [16] found that cesarean myomectomy was safe and feasible, but for uterine fibroids > 8 cm in size, the operative time and intraoperative bleeding increased significantly and caution was needed [9]. So, if the uterine fibroid > 8cm in diameter, is it necessary to remove it during caesarean section? Is the procedure safe? Does it increase the risk of postpartum haemorrhage and hysterectomy? This is the purpose of this study.

Is it necessary to remove large intermural myoma during cesarean section? Some studies suggests[17, 18] that giant myomas may affect uterine contraction, increase the risk of postpartum hemorrhage and infection, and are forced to remove the uterus due to refractory postpartum hemorrhage or severe infection. Hysteromyomectomy by caesarean section can avoid a second operation in 90% of patients with large myoma and reduce the need for hysterectomy due to excessive growth of myoma in the future. In the current study, comparing the intraoperative blood loss between the regular group and the control group, we found that the amount of intraoperative blood loss in patients unresected uterine leiomyoma was significantly higher than that in patients without uterine leiomyoma ($P < 0.001$). We also found an interesting phenomenon that the rate of Bakri balloon implantation in patients with unresectable uterine fibroids during cesarean section was the highest among the three groups ($P < 0.001$). What is the reason for this? In the study group, after myomectomy, the wound was quickly sutured to restore muscle fiber integrity, resulting in better contraction and less subsequent bleeding. However, in patients who do not undergo myomectomy during cesarean section, uterine fibroids cause uterine weakness, leading to persistent uterine bleeding. In addition, we found a patient in the regular group who developed persistent abdominal pain and fever for 13 days, which was thought to be caused by secondary infection caused by myoma degeneration. In the study, we also found that 90.9% of patients without cesarean section underwent laparoscopic myomectomy at a later stage. In short, under the premise of ensuring the safety of the operation, myomectomy for cesarean section is advocated.

Is myomectomy safe and feasible for large intramural myomas larger than 8cm in cesarean section? Tjokroprawiro B An et al. [19] reported that myomectomy was successfully performed in two cases of large myoma larger than 15cm in diameter. Ma et al. [20] also reported that hysteromyomectomy for 40 cm-sized uterine leiomyomas was successful during cesarean section after bilateral uterine artery ligation. However, due to the small sample size, these researchers did not conduct group studies to assess the safety of surgery. This is the significance of this study. Our study compared the surgical results of myomectomy in cesarean section with that without myomectomy in cesarean section. In addition to the operation time, the hysteromyomectomy group was significantly longer in cesarean section, and there was no statistical difference in intraoperative blood loss, antibiotic use time, postoperative hospital stay and anal exhaust time. And there were no long-term complications. Therefore, we believe that cesarean section of large interstitial fibroids larger than 8cm is safe and feasible for experienced obstetricians and gynaecologists.

Operational experience of cesarean myomectomy in patients with large interstitial myoma. Firstly, the surgeon must be able to perform uterine artery ligation and hysterectomy. All the cesarean myomectomy in our current study were performed by the same Chief Obstetrician. Secondly, the improvement of surgical skills. Before myomectomy, we bind the lower segment of the uterus with a compression band to block the blood supply and reduce intraoperative bleeding. The choice of incision for myomectomy of intramural uterine leiomyoma, we choose the incision according to the classification of leiomyoma to avoid all myomas cut from the serous layer of uterus, type III and V uterine leiomyoma, we choose to cut open from the endometrial layer, which can reduce intraoperative bleeding, shorten operation time, and avoid intestinal adhesion and intestinal obstruction after operation. However, type IV and VI uterine leiomyomas are still cut from the serous layer. With regard to the suture of the myoma wound, considering that the tumor cavity is deep after large intermural myomectomy, we give up the traditional continuous double suture with 1 – 0 micro-Joe thread, and use No. 1 polysorb CL-905 absorbable thread to close the tumor cavity, and then use 2 – 0 micro-Joe thread continuous mattress suture to compress and embed the wound. This can not only avoid dead space, but also reduce muscle layer tear and needle eye bleeding in the process of suture.

Conclusions

In conclusion, it is necessary, safe and feasible to remove large intramural uterine leiomyoma during cesarean section. If medical conditions permit, we suggest that myomectomy should be performed at the same time of cesarean section, which can not only avoid postpartum hemorrhage caused by uterine involution and pain caused by reoperation, but also reduce the economic burden of patients and prevent myoma from further enlargement and degeneration.

Declarations

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Not applicable.

Authors' contributions

CS: data collection and analysis; primary author of manuscript. AC: Surgeon of cesarean section; leads all aspects of this study including study concept and design; obtaining funding and ethics approval; supervision of data collection and implementation; and manuscript supervision and revision for critical intellectual input. JC: data analysis and interpretation; manuscript preparation and review. All authors have read and approved the manuscript.

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Availability of data and materials

The research data used to support the fndings of this study were supplied by Ms. Shi under license and so cannot be made freely available. Requests for access to these data should be made to Ms. Shi (Email:15824506880@ 163.com).

Ethics approval and consent to participate

The Institutional Review Board of Ningbo Women and Children’s approved this study. The need for informed consent was waived by the Institutional Review Board of Ningbo Women and Children’s because of retrospective nature of this study. (EC2019–043). Research was conducted according to the ethical stand ard of Helsinki declaration and that data of patients were stored anonymized in a dedicated database. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable for this publication.

Competing interests

We declare that we don’t have competing interests with publication of this article.

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