When it is opportune to avoid cesarean myomectomy? An analysis of possible factors influencing duration of treatment in the intensive care unit

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Background: Cesarean myomectomy (CM) is a controversial issue, even relatively contraindicated in obstetric practice. Recent reports showed that CM is not associated with increased morbidity, but those are lacking the data about risks of intensive care unit (ICU) treatment. Aim: The authors evaluated the factors affecting the duration of ICU treatment in patients after CM. Material and Methods: The study included 57 women who underwent CM and were postoperatively admitted and treated in ICU. Correlation analysis was used to estimate the effect of various parameters on the duration of ICU treatment. Results: There was a highly significant correlation between duration of ICU treatment and number of postoperative transfusions (p=0.001), duration of surgery (p=0.007), intraoperative hemorrhage (p=0.008) and myoma diameter (p=0.009). Duration of ICU treatment was also correlated with gestational age, hypertensive syndrome in pregnancy, preoperative hematocrit and hemoglobin values, number of intraoperative transfusions, postoperative hemorrhage and repeated myomectomy. Conclusions: In our report, longer ICU treatment was required in cases of perioperative hemorrhage, prolonged surgeries and those requiring perioperative transfusion. Patients who have had previous myomectomy, with lower preoperative hemoglobin and hematocrit values and bigger myomas are at risk of prolonged ICU treatment.

Key words: Cesarean myomectomy; myomectomy; cesarean section; complications; intensive care unit.

INTRODUCTION

A high percentage of cesarean section (CS) in women with myomas is well documented; however, the cesarean myomectomy (CM) is still a controversial issue, even relatively contraindicated in obstetric experience. Conversely, many reports showed that CM was not associated with increased morbidity. Nowadays, CM is considered to be an intervention with more favorable outcomes than interval myomectomy, including avoiding the risks of re-laparotomy and repeated anesthesia; thereby, reducing direct costs of re-hospitalizations and re-operations, and expenses for later myoma treatment. The studies have researched insufficiently the risks of intensive care unit (ICU) admission and treatment after CM, as objective indicators of surgical morbidity. In fact, factors that might influence the duration of ICU treatment following CM have not been previously evaluated in obstetric and surgical literature. In the authors’ opinion, the CM option during CS should be evaluated in terms of risk factors, both for the high economic costs of ICU treatment and for further complications associated with it. Thus, the aim of this study was to determine the factors influencing the duration of treatment in ICU following CM.

MATERIAL AND METHODS

The authors performed a retrospective study including patients who had undergone CM during a five-year period in a university referral hospital. The local Institutional Review Board and Ethic Committee approved the study. The criteria excluding the patients from this study were the following: presence of placenta previa or placental abruption, existence of congenital or acquired coagulopathy, multiple pregnancies, additional surgical procedure during CS (except myomectomy) and no need for ICU admission. ICU treatment duration was determined by the number of days patients spent in the ICU after CM. Indications for ICU treatment were defined because of the primary indications. The ICU admission indications were based on clinical judgment of the surgeons or anesthesiologists in the operative team. They used the following criteria: patients at risk of their conditions deteriorating, requiring acute care and support from critical care team; patients requiring more detailed observation or intervention after the surgery; patients requiring invasive or non-invasive hemodynamics monitoring and patients who may require respiratory support. The following variables were recorded: age, parity, hypertension...
or diabetes, gestational age at delivery, the indications, type and duration of CS, surgeon’s experience, previous myo- mectomy and/or laparotomy, type, localization, diameter and number of myomas, number of uterine incisions, duration of ICU treatment, hematological parameters before and after CM. In addition, authors recorded the following perioperative complications: 1) surgery expansion; 2) intraoperative and/or postoperative hemorrhage; 3) packed red blood cell (RBC) transfusion during and/or after surgery; 4) postoperative intestinal sub-occlusion; 5) the occurrence of uterine or abdominal wall hematoma; 5) wound dehiscence; 6) febrile morbidity and bacteremia; 7) re-operation; 8) hysterectomy and/or ligature of the hypogastric arteries; 9) intraoperative injury of the digestive and urinary organs.

A descriptive analysis was carried out for all the variables. For continuous variables, mean values and standard deviations were calculated, and these values were compared using paired samples t test. Bivariate correlations (both parametric and nonparametric according to the nature of the variables) were used to assess the relationship between ICU treatment duration and various factors. All tests were two-tailed; a p value < 0.05 was considered statistically significant. All analyses were performed using the SPSS software package (version 17.0; Chicago, IL, USA).

RESULTS

Fifty-seven patients were selected for the study. The ICU treatment lasted, on average, for 1.39 ± 1.33 days (range 1-7). Nine patients that underwent CS for hypertensive syndrome in pregnancy were treated in the ICU for 1.44 ± 1.59 days, on average. None of the patients was readmitted to ICU. The most common indication for treatment in ICU was the intraoperative hemorrhage in 35 (61.40%) women. The second most common indication was the need for intensive surveillance after surgery in 16 (28.07%), and followed by postoperative hemorrhage in four (7.02%) patients; febrile morbidity and bacteremia after surgery were indication in one patient (1.75%), who previously had had a myomectomy. Intestinal sub-occlusion after surgery was the indication in one woman (1.75%). Other perioperative complications were not recorded.

The patient mean age was 36.48±4.72 years and most of the patients, 49 (85.96%), were primiparas with an average of 1.16±0.41. The mean gestational age at delivery was 38.75±2.11 weeks (range 32-42). Average neonatal weight was 3091.23±562.37 (range 1400-40). As the potential co-morbidity factors influencing the duration of ICU treatment, we found the presence of hypertension in 17 (29.82%), diabetes in four (7.02%), previous myomectomy in seven (12.28%) and previous laparotomy in 11 (19.30%) patients.

CS indications are listed in Table 1. The most common indication was myoma previa in 10 patients (17.54%).

Surgery characteristics are shown in Table 2. Average duration of surgery was 73.68±21.22 min (range 40-125). Average number of uterine incisions was 2.09±0.66 (CS + myomectomy), with the range 1-4. Out of 57 babies, 56 were delivered by low transverse incision. In the one case, myomectomy followed by inverted T incision and fetal version were necessary. All the CMs were performed by experienced surgeons, with 16.58±6.55 mean years of practice (range 5-31). Out of 57 CS, 25 of them (43.86%) were emergencies. Intraoperatively, 25 (43.86%) patients received a single unit of packed RBC, and three (5.26%) received two units; while 29 (50.88%) were not transfused. Intraoperative hemorrhage was present in 35 (61.40%) patients.
Postoperative transfusion was not necessary for 41 (71.93%) patients. A single unit of packed RBC postoperatively was given in 10 (17.54%) cases, while six (10.53%) patients received more than one unit (up to 8 units). Both intraoperative and postoperative packed RBC transfusions were given in nine cases (15.79%). Postoperative hemorrhage was recorded in four (7.02%) patients, and one of them required re-laparotomy for surgical hemostasis.

Regarding preoperative and postoperative blood test values, there was a statistically significant drop of hemoglobin, hematocrit and RBC in all patients (p=0.000 in all cases). The data are shown in Table 3.

The mean number of myomas was 1.95±1.44 (range 1-8). The average myoma diameter was 67.33±36.54 mm (range 15-210). Out of 57 patients, 34 (59.65%) had intramural or multiple myomas. Anterior wall myomas were the most frequent, present in 32 (56.14%) women, followed by posterior wall myomas in 13 (22.81%) patients, fundal in five (8.77%), isthmic cervical in four (7.02%) and cornual in three (5.26%).

Correlation analysis was used to estimate the effect of various parameters on the duration of ICU treatment. Gestational age at delivery significantly influenced the duration of ICU treatment (r=-0.241; p=0.034). Patients who delivered at a smaller gestational age were treated longer in the ICU. There was a highly significant correlation between ICU treatment duration and the number of postoperative RBC transfusions (r=0.601; p=0.001), intraoperative hemorrhage (r=0.481; p=0.008), duration of CM (r=0.311; p=0.007) and myoma diameter (r=0.288; p=0.009). The patient who stayed longer in the ICU had intraoperative hemorrhage and bigger myomas; her operation lasted longer and she received postoperatively a greater number of packed RBC.

There was a significant correlation between the duration of ICU treatment and hypertensive syndrome in pregnancy (r=0.231; p=0.037), because the hypertension as an indication for CS increased the number of days of ICU treatment.

Preoperative hematocrit (r=-0.239; p=0.032) and hemoglobin (r=-0.227; p=0.041) values significantly influenced duration of ICU treatment, while RBC values and postoperative results had no influence. Women with lower preoperative hematocrit and hemoglobin required a longer stay in the ICU.

Other factors influencing ICU treatment duration were the number of intraoperative RBC transfusions (r=0.225; p=0.042) and postoperative hemorrhage (r=0.211; p=0.039). Significantly longer treatment in ICU was required in patients with previous myomectomy (r=0.195; p=0.035).

There was no significant relationship between ICU treatment duration and patient age and parity, presence of diabetes, number of previous laparotomies, indication and type of CS, surgeons experience, type, number and myoma localization, number of uterine incisions, and the volume of intraoperative transfusions.

**DISCUSSION**

Authors investigating safety of CM do not specify neither the incidence, nor the duration of ICU treatment, when describing complications of CM. Massive obstetric hemorrhage requiring postpartum hysterectomy and ligation of hypogastric arteries are rarely described following CM, and the number of cases published is probably less than what is realistic in practice.

Serious maternal diseases, such as hypertension, may lead to preterm delivery, which could explain the correlation between the number of days of ICU treatment and gestational age at delivery. Therefore, the existence of undefined factors other than CM might contribute to longer ICU treatment in patients who delivered before their term. Furthermore, the risk of hemorrhage during CS is also higher in preterm than in term deliveries. The overall incidence of CS complications is much higher in...
preterm deliveries, which could also affect the duration of ICU treatment.  

Regardless of CM, pre-eclampsia, eclampsia and HELLP syndrome are the most common indications for peripartum treatment in ICU. Patients with hypertensive syndrome required a slightly longer ICU treatment than average. Based on the aforementioned, the correlation between ICU treatment duration and hypertension and gestational age can be explained, but further research is necessary to assert that CM additionally influences ICU treatment duration in cases of hypertensive syndrome and/or preterm deliveries, as it was shown in our study.

Intraoperative hemorrhage, duration of surgery and myoma diameter influenced significantly ICU treatment duration, because they are interrelated. Enucleation of bigger myomas causes larger uterine defects, which causes intraoperative bleeding. Suturing larger defects also requires longer surgery. Intraoperative hemorrhage is pronounced in longer surgeries, regardless of myoma diameter. The significance of myoma diameter on the amount of intraoperative bleeding was also confirmed in cases of minimally invasive surgery. The influence of perioperative transfusions can also be explained by intraoperative and postoperative hemorrhage.

Park and Kim, in their study of CM complications, described postoperative hemorrhage as the most common complication, occurring in 90% of their cases. Obstetric hemorrhage requiring postpartum hysterectomy in order to achieve hemostasis is a common indication for ICU treatment. Postoperative hemorrhage and consequent postoperative polytransfusions influenced ICU treatment duration in our study. Loverro et al., evaluating a general population after CS, found that 39% of mothers treated in the ICU received intrapartum or postpartum transfusion. This finding is consistent with our results documenting a correlation between the duration of ICU treatment and perioperative hemorrhage, and the number of packed RBC given during or after CM. The same significant association between hematocrit and hemoglobin preoperative values and length of stay in ICU could be explained as the patients with lower hemoglobin and hematocrit preoperative levels often require perioperative transfusion.

Previous myomectomy is a known risk factor for both the complications of classical abdominal myomectomy and CM. That a previous myomectomy could influence the duration of ICU treatment is supported by the fact that only the patient for whom it was necessary to perform inverted T incision, had myomectomy twice before CS. Although in literature there are reports of successful repeated CM, numerous findings suggest a higher incidence of complications in repeated myomectomy, but none of those studies provides any data regarding ICU treatment of patients. Also, in some of the reports on CM safety, women with history of previous myomectomy are excluded.

We could not provide a satisfactory explanation why age did not influence ICU treatment duration in our study. The absence of significant correlations between parity and duration of ICU treatment may be due to a relatively small number of multiparous women in our sample. Lack of influence of diabetes and relaparotomies on ICU treatment duration may be due to a small number of patients. Average neonatal weight in our study could have masked any influence of this factor on the duration of the ICU treatment following CM, if it exists. The absence of interference of type and indications for CS on the duration of ICU treatment can be explained by a sample size that is insufficient to demonstrate the possible existence of this influence.

Although surgical skill determined by experience is important for achieving intraoperative hemostasis, in cases of CM, the time required for this is influenced predominantly by the characteristics of the removed myoma, primarily by myoma diameter. Thereby, we can explain why surgical experience did not significantly affect the duration of treatment.

To eliminate the influence of surgical experience, it is necessary to conduct research that is more extensive. Given that research was conducted in a teaching hospital, many CMs were performed by younger doctors and assisted by experienced surgeons. It is customary that in cases where hemorrhage is encountered, the experienced surgeons take over the procedure. Moreover, they frequently perform CMs, while younger surgeons performing CS were recorded as the leading surgeons. These are the reasons why surgical experience is not found to be a significant influence for ICU treatment duration. These conclusions can be supported by the results published by Bergholt et al., who did not find a significant association between surgeon experience and intraoperative blood loss during CS, in a teaching hospital. Most patients had myomas on the anterior wall, so the CM is already considered as relatively safe for women with myomas on the anterior wall. This anatomical location could explain the absent influence of myoma localization on the duration of ICU treatment. The lack of significant association between localization, type and number of myomas and number of hysterotomies on the duration of ICU treatment can be explained by an insufficient sample size. It cannot be stated that a larger sample size would not show the existence of such an association. Most authors agree that pedunculated and subserous myomas can be safely removed during CS. Other types of myomas (intramural and multiple) frequently cause perioperative hemorrhage, and thus, possibly the need for ICU admission. Such myomas were present in 59.65% of patients.

The predominant finding of two hysterotomies was the consequence of the fact that most women had one myoma. This may explain the absent influence of the number of myomas and uterine incisions on the ICU treatment duration.
Not all retrospective studies are without bias, and neither is ours. In addition, our study consisted of a small number of patients. The final drawback in our study concerns the organization and admission policy of the obstetric ICU, which is a 5-bed facility, approximately the Delivery Ward and CS Operating Room. Therefore, this allows the surgical team to easily indicate the ICU admission after CS, characteristic of the institution where the study was conducted.

CONCLUSION

In our report, longer ICU treatment was required in cases requiring perioperative transfusion and after prolonged surgeries. Bigger myomas, smaller gestational age, lower preoperative hemoglobin and hematocrit values and repeated myomectomy are also associated with longer ICU treatment. It is our hope that the data we have provided will prove helpful to the clinicians in deciding when to avoid a CM.

SAŽETAK

Uvod: Miomektomija tokom carskog reza je predmet rasprava, a ova procedura se smatra čak i relativno kontraindikovana u akušerskoj praksi. Nedavne publikacije su pokazale da miomektomija tokom carskog reza nije povezana sa povećanim morbiditetom, mada u njima nedostaju podaci o rizicima lečenja u jedinici intenzivne nege.

Cilj: Autori su ispitali faktore koji utiču na dužinu trajanja lečenja u jedinici intenzivne nege bolesnica kojima je urađena miomektomija tokom carskog reza.

Materijal i metode: Studijom je obuhvaćeno 57 bolesnica kojima je urađena miomektomija tokom carskog reza, koje su postoperativno primljene i lečene u jedinici intenzivne nege. Za procenu efekata različitih parametara na trajanje lečenja u jedinici intenzivne nege korišćena je korelaciona analiza.

Rezultati: Utvrđena je statistički visoko značajna korelacija između dužine trajanja lečenja u jedinici intenzivne nege i broja postoperativnih transfuzija (p=0,001), dužine trajanja operacije (p=0,007), intraoperativnog krvarenja (p=0,008) i veličine mioma (p=0,009). Trajanje lečenja u jedinici intenzivne nege je takođe koreliralo sa gestacionom starošću, postojanjem hipertenzivnog sindroma u trudnoći, preoperativnim vrednostima hemoglobina i hematokrit, brojem intraoperativnih transfuzija, postoperativnim krvarenjem i postojanjem prethodne miomektomije.

Zaključak: Prema našim rezultatima, duže lečenje u jedinici intenzivne nege bilo je potrebno kod bolesnicama sa preoperativnim krvarenjem, dugotrajnim operacijama i kod onih kod kojih je bila neophodna preoperativna transfuzija. Kod žena koje su prethodno podvrgnute miomektomiji, onih sa nižim preoperativnim vrednostima hemoglobina i hematokrit, kao i onih sa većim miomima postoji rizik od dugotrajnijeg lečenja u jedinici intenzivne nege.

REFERENCES


