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Case Report

Multidisciplinary planning with prophylactic REBOA in cesarean delivery for a giant uterine leiomyoma: a case report

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ABSTRACT

Large uterine leiomyomas during pregnancy may significantly influence the mode of delivery, hinder access to the uterine cavity and increase the risk of hemorrhage during cesarean delivery. Evidence regarding prophylactic aortic balloon occlusion (REBOA) in this context is limited. A 25-year-old primigravid woman with gestational diabetes, preeclampsia and early-onset fetal growth restriction was found to have a previously undiagnosed giant uterine leiomyoma measuring 17×14×13 cm on magnetic resonance imaging. Due to its size and location, a cesarean delivery was planned at 34+2 weeks with prophylactic REBOA placement. Blood loss was within the expected range and balloon inflation was not required. Maternal and neonatal outcomes were favourable. Prophylactic REBOA may be considered in selected high-risk cesarean deliveries.

Keywords: Uterine leiomyoma, Pregnancy, Cesarean delivery, REBOA, Obstetric hemorrhage

INTRODUCTION

Uterine leiomyomas are the most common benign tumors in women of reproductive age and are identified in up to 10% of pregnancies.¹ Giant leiomyomas, usually defined as lesions larger than 10 cm, are uncommon but may significantly affect pregnancy by distorting uterine anatomy, increasing the risk of malpresentation, cesarean delivery, postpartum hemorrhage, preterm birth and adverse neonatal outcomes.^{2,3} Large fibroids can also complicate surgical access to the uterine cavity and increase intraoperative hemorrhagic risk during cesarean delivery.⁴ The use of REBOA has emerged as a strategy for hemorrhage control in selected obstetric settings, particularly placenta accreta spectrum, although evidence for pregnancies complicated by giant leiomyomas remains scarce.^{5,6} The objective of this report is to describe the multidisciplinary management of a pregnant woman with

a giant uterine leiomyoma undergoing cesarean delivery with prophylactic REBOA placement and to discuss the potential role of this approach in reducing surgical risk.⁷

CASE REPORT

We present the case of a 25-year-old primigravid woman with no relevant prior medical or surgical history, referred to our center for specialized obstetric follow-up. During pregnancy, she was diagnosed with gestational diabetes and preeclampsia. In addition, fetal assessment revealed early-onset intrauterine growth restriction (IUGR), with an estimated fetal weight below the 1st percentile, associated with microcephaly and fetal cardiomegaly. During routine obstetric ultrasound, a previously unknown uterine leiomyoma measuring up to 17 cm in maximum diameter was identified. Due to the coexistence of these risk factors, the patient was followed in the high-risk obstetrics clinic

at our hospital. At 32 weeks of gestation, she was admitted for threatened preterm labor, presenting with regular uterine contractions but no associated cervical changes. During hospitalization, she required continuous intravenous tocolytic therapy due to persistent painful contractions predominantly localized to the region corresponding to the myoma. A complete course of antenatal corticosteroids was administered, consisting of two doses of betamethasone for fetal lung maturation.

Given the size and location of the myoma, it was considered likely to significantly interfere with fetal descent; therefore, an elective cesarean section was scheduled. Due to the anticipated surgical complexity and potential hemorrhagic risk, magnetic resonance imaging was performed for preoperative planning (Figure 1), confirming the presence of a uterine leiomyoma measuring approximately 17×14×13 cm.



Figure 1: Magnetic resonance imaging showing a giant uterine leiomyoma measuring approximately 17×14×13 cm, distorting uterine anatomy and occupying a large portion of the uterine cavity.

The cesarean section was performed at 34+2 weeks of gestation. Following multidisciplinary evaluation in collaboration with interventional vascular radiology, prophylactic placement of a COBRA-OS aortic occlusion balloon (REBOA) was performed via ultrasound-guided access through the right femoral artery prior to the start of surgery. Abdominal entry was achieved by layers according to the Misgav-Ladach technique. A right longitudinal corporal hysterotomy measuring approximately 10-12 cm was performed, avoiding the region occupied by the myoma. Fetal extraction was carried out by traction of the lower extremities, with intraoperative breech presentation observed despite the previously documented cephalic presentation.

Estimated blood loss did not exceed that expected for an uncomplicated elective cesarean section and balloon inflation was not required during the procedure. In the immediate postoperative period, the patient was admitted to the intensive care unit for close monitoring. No local vascular or hemorrhagic complications were observed at the femoral access site. Preoperative hemoglobin was 11.8

g/dl and decreased to 8.5 g/dl postoperatively, consistent with moderate postoperative anemia. One unit of packed red blood cells was transfused, after which laboratory values remained stable without the need for further transfusions.

Elevated blood pressure levels persisted in the context of preeclampsia and were initially managed with labetalol and subsequently with enalapril, achieving adequate clinical response. The surgical wound evolved favorably, with no signs of infection or secondary bleeding. The patient was discharged on postoperative day seven in good general condition and hemodynamically stable.

The male newborn had a birth weight of 1,390 g and initial neonatal adaptation with Apgar scores of 7/8/9, requiring non-invasive respiratory support with Continuous positive airway pressure (CPAP). He was admitted to the neonatal unit due to prematurity and low birth weight. During the first days of life, he remained hemodynamically stable, without signs of infection or significant respiratory compromise, allowing early discontinuation of ventilatory

support. He initially received parenteral nutrition, with progression to full enteral feeding with good tolerance. Neonatal hyperbilirubinemia developed, requiring continuous phototherapy for 86 hours, with favorable evolution. Trans fontanelle ultrasound was normal, and urine CMV testing was negative. Clinical course was notable for sustained cardiorespiratory stability, appropriate progressive weight gain and neurological examinations consistent with gestational age, with preserved tone and reflexes. He was discharged without respiratory support or additional therapeutic requirements.

DISCUSSION

This case illustrates the successful management of a high-complexity cesarean section in a patient with a giant uterine leiomyoma through multidisciplinary planning and the prophylactic availability of resuscitative endovascular balloon occlusion of the aorta (REBOA). Giant uterine leiomyomas (>10 cm) during pregnancy represent a significant clinical challenge and are associated with substantially increased rates of maternal and perinatal complications. In this regard, Dayanan et al, in a cohort study of 651 pregnancies, demonstrated that such fibroids were associated with cesarean delivery rates of 92.1%, postpartum hemorrhage rates of 30.6%, and malpresentation in 47.2% of cases.¹ These findings are consistent with meta-analyses identifying fibroid size as an independent predictor of malpresentation (OR:2.65), cesarean delivery (OR:2.60), and postpartum hemorrhage (OR:2.95).^{2,3} In our case, the 17 cm leiomyoma was associated with an unanticipated intraoperative breech presentation and additional obstetric comorbidities, including early-onset fetal growth restriction, preeclampsia, and preterm delivery at 34+2 weeks, reflecting the pattern of complications described in the literature.

The decision to perform a lateral corporal hysterotomy avoiding the fibroid was appropriate given the location and dimensions of the mass. Cesarean myomectomy remains a controversial issue. Recent studies suggest that it may be safe in selected cases when performed by experienced surgeons.^{4,5} Conversely, a meta-analysis of 23 studies including 8,016 patients demonstrated that cesarean myomectomy was associated with increased blood loss (mean difference 45.54 ml) and longer operative time (mean difference 10.40 minutes).⁴ For this reason, current guidelines recommend avoiding cesarean myomectomy whenever possible, particularly in cases involving large intramural fibroids, multiple fibroids or lesions located near major vessels.² In our case, the conservative strategy was prudent, minimizing hemorrhagic risk in an already high-risk context.

The prophylactic use of REBOA in this case represents a novel application of this technology beyond its most established indication: the placenta accreta spectrum. In this setting, multiple meta-analyses have demonstrated significant reductions in intraoperative blood loss

(weighted mean difference -1,384.66 ml) and transfusion requirements (mean difference -2.42 units).^{6,7} Furthermore, a recent study comparing distal versus proximal aortic occlusion reported a 45.9% reduction in estimated blood loss with distal placement, without access-related vascular complications.⁸ However, specific evidence supporting the use of REBOA in cesarean deliveries complicated by giant leiomyomas remains extremely limited, largely restricted to case series and institutional experience. A national observational study in Japan identified 143 patients with postpartum hemorrhage requiring REBOA, with an in-hospital mortality rate of 7%; however, most cases were secondary to uterine atony (52.4%) or disseminated intravascular coagulation (29.4%), rather than fibroids.⁹ The most recent systematic review on REBOA in obstetrics emphasizes its role as an adjunct to prevent hysterectomy in selected patients with postpartum hemorrhage or placenta accreta spectrum, while underscoring the need for further research in other indications.¹⁰

An important theoretical concern relates to the impact of aortic occlusion on uteroplacental perfusion. A review of 825 cases of aortic occlusion for obstetric hemorrhage reported that 13.5% involved balloon inflation prior to delivery, without differences in Apgar scores between patients managed with and without REBOA.¹¹ In our case, the balloon was placed prophylactically but was not inflated, representing the most conservative strategy, minimizing potential risks while maintaining the capacity for immediate hemorrhage control if required. A fundamental aspect of the successful outcome in this case was meticulous preoperative multidisciplinary planning, including magnetic resonance imaging for precise anatomical mapping and close collaboration with interventional vascular radiology. This approach is consistent with current recommendations for the management of high-risk pregnancies complicated by large fibroids (>10 cm), which should be considered high-risk gestations requiring intensified antenatal surveillance and individualized delivery planning.¹

CONCLUSION

Multidisciplinary planning with prophylactic availability of REBOA may be considered as an adjunctive strategy in selected pregnancies complicated by giant uterine leiomyomas with complex uterine access and increased hemorrhagic risk. Preparation for rapid aortic flow control may provide an additional margin of surgical safety, even when balloon inflation is ultimately not required.

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