

HELLP syndrome complicated by placenta accreta spectrum: Impact of uterine-sparing surgery and obstetric critical care

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Summary

The placenta accreta spectrum is a major cause of obstetric hemorrhage, frequently associated with massive transfusion and admission to the intensive care unit (ICU). Although cesarean hysterectomy is the standard, conservative strategies have emerged in selected patients. We present a case managed with segmental uterine resection and selective vascular control, achieving hemorrhagic control with-

out hysterectomy. The patient required admission to the ICU for hemodynamic monitoring and transfusion support. Evidence suggests that these approaches may reduce blood loss in selected cases, although limitations and risk of conversion remain. Uterine preservation is feasible, but high-risk, and requires multidisciplinary management and intensive care support.

Keywords: Placenta accreta spectrum, postpartum hemorrhage, uterine preservation, intensive care units, obstetric surgical procedures.

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Introduction

Placenta accreta spectrum (PAS) represents one of the main causes of severe obstetric hemorrhage and maternal morbidity, with a direct impact on the need for massive transfusion, admission to intensive care units (ICU), and maternal mortality. Its incidence has increased in parallel with cesarean section rates, becoming a relevant challenge for multidisciplinary teams in highly complex centers. (1–3)

Traditionally, cesarean hysterectomy has been considered the standard of management, as it allows definitive control of bleeding. However, this approach is associated with high blood loss, urological complications, and irreversible loss of fertility. In this context, conservative strategies have emerged, particularly segmental or local uterine resection, which seek to preserve the uterus without compromising maternal safety. (4,5)

In recent years, multiple studies have evaluated the effectiveness and safety of these approaches, along with advances in vascular control techniques and more precise selection criteria. However, the evi-

dence remains heterogeneous and, in many cases, of limited quality. This report analyzed the current evidence and discussed the role of conservative surgery in the context of the critically ill patient. (6–8)

Case presentation

A 22-year-old woman, gravida 3, para 0, abortus 2 (G3P0A2), at 26.1 weeks of gestation, was admitted with clinical and laboratory findings compatible with severe hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome. Her medical history was significant for insulin resistance treated with metformin. She had not had previous uterine surgery. Initial laboratory evaluation showed hemoglobin 11.4 g/dl, platelet count 78,000/ μ l, aspartate aminotransferase (AST) 747 U/l, alanine aminotransferase (ALT) 587 U/l, and significant proteinuria. Given the seriousness of her condition, an emergency cesarean section was indicated.

Under regional anesthesia, an infraumbilical midline laparotomy was performed. After hysterotomy and delivery of a live newborn (700 g, Apgar 2/2), placental delivery was attempted. The placenta was found to be firmly attached to the right uterine horn without an identifiable cleavage plane, compatible with focal placenta accreta.

Bilateral uterine artery ligation (O'Leary technique) was performed to reduce bleeding. Due to the failure of placental separation, segmental resection of the right uterine horn, including the placental implantation site, was performed. Uterine reconstruction was achieved in two layers with absorbable sutures, followed by standard hysterotomy closure and abdominal wall (**Figure 1**). The procedure was complicated by moderate hemorrhage, which required transfusion of packed red blood cells and plasma, thus achieving hemodynamic stabilization. After the operation, the patient was admitted to the obstetric ICU for 3 days. On the first day, he had persistent thrombocytopenia (67,000/ μ l) and elevated liver enzymes, without active bleeding. On the second day, the platelet count reached a low of 48,000/ μ l, followed by a progressive recovery. Liver enzymes decreased significantly, and coagulation parameters remained stable.

On the third day, the platelet count improved to >100,000/ μ l, with continued biochemical recovery and preserved renal function throughout hospitalization. No vasopressor support or mechanical ventilation was required. Despite persistently elevated D-dimer levels, no thrombotic or infectious complications occurred.

The patient was transferred to the general ward with a stable clinical condition. Subsequent laboratory tests demonstrated normalization of liver enzymes

and platelet count, with persistent mild anemia (hemoglobin 8–9 g/dl) that did not require additional transfusion. She was discharged in stable condition. At one month, diagnosis was confirmed with a result of pathology, which was reported, in its macroscopic description, the fragment of placental tissue that together measured 16x10x4 cm and the right uterine horn of 6x5x3cm, with a fragment of firmly attached placenta that measured 4.5x3 cm, the largest fragment on the maternal side, presented fragmented cotyledons, reddish brown in color with a spongy appearance. For each fetus, the umbilical cord was fragmented, measuring 12 cm in length and 1.5 cm in diameter with 3 permeable blood vessels. The fetal membranes were smooth, opaque, and grayish-brown. Diagnosis: right uterine horn and placental fragment; placenta accreta of partial extension affecting the right uterine horn, myometrium with edema, dilation, and vascular congestion; fragmented placenta with chorionic villi corresponding to the third trimester of gestation with acute necrotic hemorrhagic deciduitis.

Discussion

The present case fell within a complex clinical scenario in which the balance between bleeding control and uterine preservation was critical. Contemporary evidence suggests that segmental uterine resection may offer significant advantages over cesarean hysterectomy in carefully selected patients. (6–8)

Recent meta-analyses have consistently shown that conservative-resective surgery is associated with less blood loss, lower transfusion requirements, and reduced perioperative complications. Matsuzaki et al. reported significant reductions in blood loss, transfusions, and ICU admissions. At the same time, Hessami et al. confirmed these findings in a larger cohort, including a significant reduction in genitourinary lesions. Similarly, Pinto et al. showed that myometrial resection was the predominant conservative approach, with acceptable success rates and acceptable complication rates. (7,8)

However, these benefits must be interpreted in the context of significant limitations. The quality of the evidence was generally low, with substantial methodological heterogeneity and a high risk of bias. In addition, the conversion rate to hysterectomy is not negligible. Data from the International Society for Placenta Accreta Spectrum (IS-PAS) registry indicated that up to 46% of cases initially managed with focal resection might require hysterectomy, underscoring the importance of adequate patient selection and surgical experience. (8)

The selection of cases is probably the most determining factor of success. The best results are ob-

served in patients with focal placental adhesion, without extensive cervical or parametrial invasion, and with reparable myometrial defects. (9) In contrast, extensive placenta percreta is associated with significantly higher rates of complications and failure of conservative management. In this sense, advanced diagnostic tools, particularly ultrasonographic evaluation, have demonstrated high accuracy in predicting the need for hysterectomy, facilitating surgical planning. (5,10)

Intraoperative vascular control is another fundamental pillar. Recent studies suggest that selective pelvic vessel ligation offers better results than more extensive techniques such as internal iliac artery ligation. Likewise, combined strategies, such as intraoperative uterine artery embolization combined with tranexamic acid, have demonstrated significant reductions in blood loss and transfusion requirements. More advanced protocols, such as placenta accreta spectrum treatment with intraoperative multivessel embolization (PASTIME), have shown promising results, including reducing massive transfusion in small series. In deep invasion scenarios, infrarenal aortic occlusion may be a useful tool for controlling bleeding. (4,11–13)

From a technical point of view, the Triple P procedure offers a structured approach that emphasizes non-separation of the placenta, en bloc resection of the uterus-placental defect, and myometrial repair. This approach minimizes the risk of massive bleeding, one of the main determinants of ICU admission and adverse outcomes. (6)

Despite these advances, the implementation of conservative techniques remains limited. A significant number of centers do not offer uterine resection due to a lack of experience, underscoring the importance of centralizing these cases in specialized units with multidisciplinary teams. In addition, current guidelines still consider these strategies as alternatives in research, emphasizing the need for prospective

studies and controlled trials. (1,2,9)

In the context of critical care, reductions in blood loss, massive transfusion, and ICU admissions associated with conservative techniques could significantly impact resource utilization and maternal outcomes. However, these benefits must be balanced against the risk of therapeutic failure and the need for conversion to hysterectomy. (6,7,9)

Conclusion

Uterine preservation by segmental resection of the placenta accreta spectrum is a relevant surgical strategy in selected patients, not only because of its impact on future fertility but also because of its potential to reduce perioperative morbidity. In the present case, this approach allowed adequate control of the hemorrhagic focus, avoiding a radical hysterectomy, which is especially important in patients with reproductive desire and in scenarios where the anatomy allows it.

However, these procedures are not without risk. Despite the advantages observed, conservative surgery in hysterectomy-sparing procedures continues to be a highly complex intervention, with a significant risk of massive bleeding, coagulopathy, hemodynamic instability, and urological complications. Therefore, perioperative management frequently requires admission to intensive care units for close monitoring, advanced hemodynamic support, guided transfusion management, and timely detection of complications.

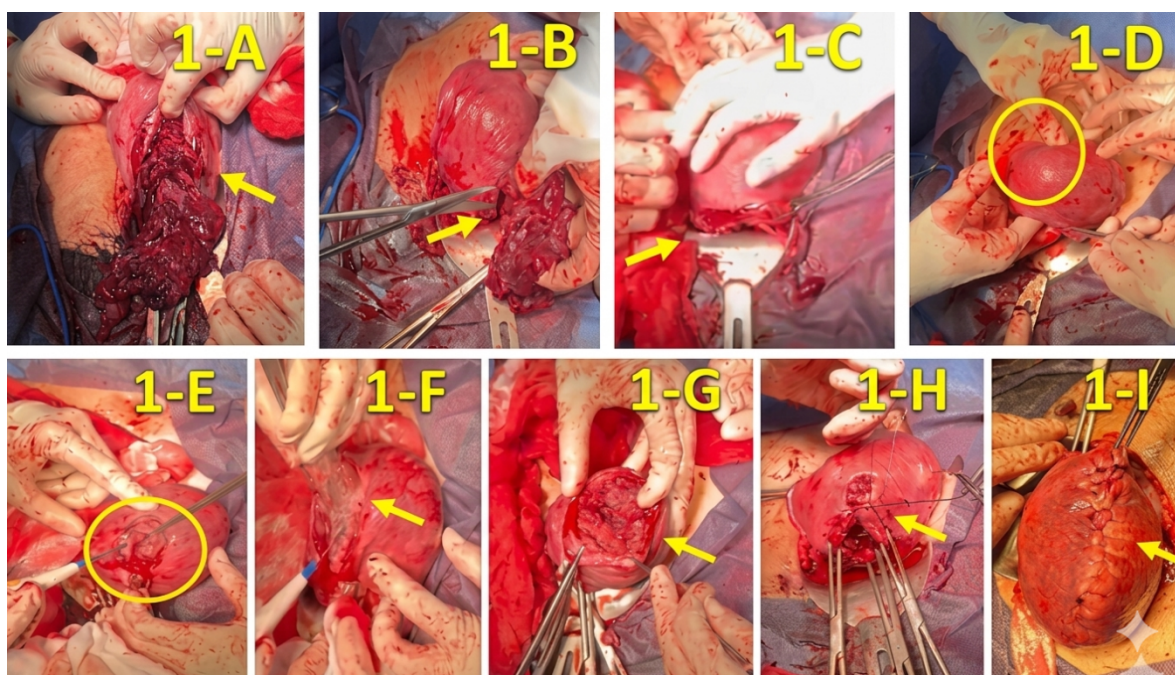
In this context, the participation of multidisciplinary teams and access to critical care resources were decisive for optimizing maternal outcomes. Uterine preservation should not be considered solely a surgical objective, but rather part of a comprehensive strategy that requires adequate patient selection, technical expertise, and specialized intensive support.

Table 1. Laboratory trends during hospitalization

Day	Hb (g/dl)	Platelets (x10 ⁹ /l)	AST (UI/l)	ALT (UI/l)	Creatinine (mg/dl)	Notes
0	11.4	78	747	587	—	HELLP diagnosis
1	11.1	67	410	449	1.0	Admission to the ICU
2	10.1	48	123	250	0.7	Platelet nadir
3	8.9	52	47	148	0.62	Upgrade
4	8.8	121	134	220	0.78	Recovery
5–8	7.6–8.8	147–269	↓	↓	Normal	Stabilization

Legend: Hb=hemoglobin; AST=aspartate aminotransferase; ALT=alanine aminotransferase; HELLP=hemolysis, elevated liver enzymes, and low platelet count; ICU=intensive care unit.

Figure 1 (A-I). Segmental hysterectomy procedure for focal placenta accreta spectrum in the anterior uterine wall and right salpingus



Procedure: 1-A) The yellow arrow indicates the moment of placental delivery which could not be performed normally; 1-B) The yellow arrow shows the moment when the placenta curve was cut with Metzenbaum scissors; 1-C) Hysterotomy was shown; 1-D) In the yellow circle, the infiltration of the placenta into the right uterine horn was observed; 1-E) Circle shows how circular incision of the portion with placenta accreta spectrum was made; 1-F) The yellow arrow shows the moment when the rest of the placenta was removed; 1-G) The uterine cavity was observed without placental remains; 1-H) The yellow arrow shows the omentum of segmental hysterotomy closure; 1-I) The yellow arrow shows the hysterorrhaphy with chromic 1-0 suture with continuous anchor point.

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