

Current Evidence on Conservative Versus Cesarean Hysterectomy in the Management of Placenta Accreta Spectrum: A Narrative Review

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Abstract

Placenta accreta spectrum (PAS) is a potentially life-threatening obstetric disorder characterized by abnormal placental adherence to, or invasion of, the myometrium and, in severe cases, adjacent pelvic organs. Rising cesarean delivery rates have contributed to a parallel increase in PAS incidence. Management remains complex because the principal strategies planned cesarean hysterectomy and uterine-preserving management differ substantially in immediate surgical risk, delayed morbidity, and reproductive consequences. This narrative review summarizes contemporary evidence on patient selection, multidisciplinary planning, cesarean hysterectomy, intentional placental retention, local or segmental resection, vascular control, tamponade, hemostatic sutures, postoperative surveillance, and maternal and neonatal outcomes. Cesarean hysterectomy with the placenta left in situ remains the most established definitive treatment for extensive PAS and when uterine preservation is not a priority. In carefully selected patients, conservative approaches may be associated with lower immediate blood loss, transfusion requirements, and urinary tract injury; however, the comparative evidence is predominantly observational and vulnerable to selection bias. Conservative management may also be followed by delayed hemorrhage, infection, readmission, reoperation, and secondary hysterectomy. No single uterine-preserving technique is appropriate for all patients. Management should therefore be individualized according to disease extent and location, hemodynamic stability, reproductive wishes, surgical expertise, and institutional resources. Delivery in an experienced multidisciplinary center and thorough counseling remain central to improving outcomes.

Keywords: placenta accreta spectrum; cesarean hysterectomy; conservative management; uterine preservation; maternal outcomes; neonatal outcomes

1. Introduction

Placenta accreta spectrum (PAS), historically described as morbidly adherent placenta, encompasses abnormal placental attachment and invasion caused by deficient decidualization at the uterine–placental interface. The spectrum includes placenta accreta, in which chorionic villi are abnormally adherent to the myometrium; placenta increta, in which villi invade the myometrium; and placenta percreta, in which placental tissue penetrates the uterine serosa and may involve adjacent structures, particularly the urinary bladder. Increasing depth and topographic extent of invasion are associated with greater hemorrhagic and surgical risk [1,2].

The incidence of PAS has increased in parallel with cesarean delivery rates. Previous cesarean delivery, particularly when combined with placenta previa, is the most important recognized risk factor. Other uterine procedures, including curettage, myomectomy, endometrial ablation, and other uterine surgery, may disrupt the endometrial–myometrial interface and predispose to abnormal implantation. Advanced maternal age,

multiparity, assisted reproductive technology, and short interpregnancy intervals have also been associated with PAS [3,4].

PAS is associated with major maternal morbidity, including massive hemorrhage, transfusion, coagulopathy, urinary tract injury, intensive care unit admission, reoperation, infection, thromboembolism, and, rarely, maternal death. Neonatal morbidity is driven mainly by planned or emergency preterm delivery. These risks make antenatal recognition, timely referral, multidisciplinary preparation, and individualized surgical planning essential components of care [5,6].

The central therapeutic controversy concerns the balance between definitive cesarean hysterectomy and uterine-preserving approaches. Cesarean hysterectomy provides immediate definitive treatment but permanently removes fertility and may require technically difficult pelvic dissection. Uterine-preserving management may reduce some immediate surgical risks, but it introduces the possibility of delayed hemorrhage, infection, prolonged surveillance, and secondary hysterectomy. This review evaluates the principal management options and their maternal and neonatal outcomes.

2. Pathophysiologic and Clinical Basis for Management

The prevailing pathophysiologic model attributes PAS to a defect in the endometrial–myometrial interface, most commonly at the site of a previous cesarean scar. Deficient decidualization permits abnormal anchoring of chorionic villi and access to deeper myometrial vascular structures. The resulting vascular remodeling, neovascularization, and distortion of pelvic anatomy explain why attempted placental separation can trigger sudden, uncontrolled hemorrhage[2,7].

Management decisions are influenced not only by the anticipated depth of invasion but also by the topographic extent of disease. A small focal area of anterior PAS may be amenable to local excision and uterine reconstruction, whereas diffuse lower-segment disease or percreta involving the bladder may favor hysterectomy. Imaging findings, clinical stability, intraoperative anatomy, and the availability of experienced pelvic surgeons are therefore more informative than a single diagnostic label.

Prenatal diagnosis improves preparation and allows planned delivery at an appropriate gestational age in a center with blood bank support, critical care, neonatal services, urology, interventional radiology, and experienced obstetric and pelvic surgeons. Ultrasound is the first-line diagnostic modality. Magnetic resonance imaging may complement ultrasound in selected cases, particularly when ultrasound findings are equivocal, placentation is posterior, or extrauterine invasion is suspected [6,8].

3. Principles of Multidisciplinary Management

Optimal PAS care depends on a coordinated multidisciplinary pathway. The core team generally includes maternal–fetal medicine specialists, obstetric surgeons, anesthesiologists, blood bank personnel, neonatologists, critical care specialists, and urologists, with gynecologic oncologists, vascular surgeons, or interventional radiologists involved when indicated. Delivery should occur in a facility capable of activating a massive transfusion protocol and providing rapid surgical and critical care support [9–11].

Preoperative counseling should address uncertainty in antenatal staging, the possibility of conversion from uterine-preserving surgery to hysterectomy, anticipated transfusion, urinary tract injury, intensive care admission, future fertility, and the need for prolonged follow-up when placental tissue is retained. Individual preferences are important, but fertility preservation should never compromise maternal safety [6,12].

Preoperative preparation commonly includes a complete blood count, coagulation profile, blood grouping and cross-matching, renal and liver function assessment, anesthesia evaluation, and multidisciplinary review of imaging. Operative planning should identify the upper placental margin and select a uterine incision that avoids transecting the placenta. A midline abdominal incision may improve exposure in extensive anterior disease, although the skin incision should be individualized[9,10].

4. Cesarean Hysterectomy

Planned cesarean hysterectomy with the placenta left in situ is the most established definitive strategy for extensive PAS. After fetal delivery through a uterine incision remote from the placenta, the umbilical cord is ligated and hysterectomy proceeds without attempted placental separation. Avoiding manual placental removal is critical because disruption of the placental bed can produce catastrophic hemorrhage [9–11].

Cesarean hysterectomy is generally favored for diffuse lower-segment involvement, extensive increta or percreta, suspected bladder or parametrial invasion, uncontrolled hemorrhage, hemodynamic instability, and patients who have completed childbearing. Its main advantage is definitive removal of the affected uterus and avoidance of the prolonged surveillance required when placental tissue is retained [2,6].

The principal disadvantages are major blood loss, transfusion, prolonged operative time, urinary tract injury, vascular injury, coagulopathy, and loss of fertility. Bladder injury is the most frequent visceral complication because the vesicouterine plane may be obliterated by placental invasion and neovascularization. Identification of the ureters and timely urologic support are particularly important in percreta or lateral parametrial extension [13,14].

Outcomes are improved when delivery is planned, the placenta is not disturbed, experienced surgeons are present, and a standardized institutional protocol is used. Even in specialist centers, however, cesarean hysterectomy remains a high-risk operation and should not be regarded as a routine extension of cesarean delivery [11,15].

5. Conservative and Uterine-Preserving Management

The terminology surrounding conservative management is heterogeneous. Expectant management generally refers to intentional retention of the placenta in situ, whereas conservative surgery refers to removal of the invaded placental–myometrial area with uterine reconstruction. Additional uterine-preserving measures include vascular ligation, tamponade, and hemostatic sutures. These techniques may be used alone or in combination, but they should not be considered interchangeable [12,16].

5.1 Placenta Left In Situ

Expectant management involves delivery of the fetus without attempting placental removal, closure of the uterus with the placenta intentionally retained, and prolonged clinical and imaging surveillance. The aim is gradual placental involution or resorption while avoiding immediate disruption of a highly vascular placental bed [17,18].

This approach may reduce immediate operative blood loss and avoid technically difficult pelvic dissection. It may be considered when the patient is hemodynamically stable, uterine preservation is strongly desired, reliable follow-up is feasible, and the multidisciplinary team judges that placental removal or hysterectomy would carry excessive immediate risk [16,19].

Delayed complications include secondary hemorrhage, endometritis, sepsis, fistula formation, readmission, unplanned embolization, reoperation, and delayed hysterectomy. Placental involution may take weeks or months, and no universally accepted surveillance schedule exists. Follow-up may include serial clinical assessment, hemoglobin measurement, ultrasound, and selective laboratory or cross-sectional imaging according to symptoms and institutional protocols [12,18].

Routine methotrexate is not supported because term placental trophoblast has low proliferative activity, whereas methotrexate can cause maternal toxicity. It should therefore not be considered a standard component of expectant management [2,6].

5.2 Local or Segmental Resection

Local or segmental resection involves en bloc removal of the invaded placental area and affected myometrium followed by uterine reconstruction. This approach is most applicable to focal, accessible disease

with clearly defined margins and sufficient residual myometrium. It provides immediate removal of placental tissue while preserving the uterus and avoiding months of retained-placenta surveillance [20,21].

Potential advantages reported in selected cohorts include lower transfusion requirements, shorter follow-up, and preservation of reproductive potential. The procedure nevertheless requires advanced pelvic surgical skills, planned vascular control, and the ability to convert promptly to hysterectomy. Diffuse posterior disease, broad parametrial extension, and extensive bladder invasion reduce its suitability [16,19].

Future pregnancy after uterine reconstruction requires counseling regarding scar integrity, recurrent PAS, placenta previa, and possible uterine rupture. Evidence on long-term uterine integrity and reproductive outcomes remains limited and is based mainly on observational series [22].

5.3 Vascular Control, Tamponade, and Hemostatic Sutures

Adjunctive techniques may include bilateral uterine artery ligation, internal iliac artery ligation, ovarian artery ligation, temporary vascular occlusion, uterine or cervical tamponade, and hemostatic compression sutures. Their purpose is to reduce uterine perfusion and control placental-bed bleeding while preserving the uterus [21,23].

Balloon tamponade and compression sutures are most useful when bleeding is localized and uterine anatomy permits effective compression. Vascular ligation may reduce pulse pressure but cannot reliably control bleeding arising from extensive collateral circulation in severe PAS. These techniques should therefore be viewed as components of a broader surgical strategy rather than guaranteed alternatives to hysterectomy [21,23].

Interventional radiology procedures, including prophylactic balloon occlusion and arterial embolization, remain controversial. Observational studies and meta-analyses suggest potential benefit in selected settings, but inconsistent effectiveness and risks such as thrombosis, vascular injury, technical complications, and radiation exposure have prevented universal adoption [6,23].

6. Comparative Maternal Outcomes

Comparative observational studies and recent meta-analyses suggest that carefully selected patients managed conservatively may experience lower immediate estimated blood loss and require fewer transfused red blood cell units than patients undergoing cesarean hysterectomy. Reduced pelvic dissection and avoidance of highly vascular vesicouterine planes may contribute to this difference. However, substantial heterogeneity and confounding by indication limit causal interpretation [16,19].

Urinary tract injury is more frequent during cesarean hysterectomy, especially in percreta with bladder involvement. Local resection may reduce this risk when disease is focal and surgical margins are accessible. Nevertheless, apparent benefits are strongly influenced by selection bias because less extensive disease is more likely to be managed conservatively [13,14].

Cesarean hysterectomy provides definitive treatment and avoids retained-placenta infection, prolonged surveillance, and some forms of delayed hemorrhage. Conservative management transfers part of the risk from the intraoperative period to the postoperative and follow-up periods. Comparative assessments should therefore include both immediate and delayed morbidity rather than blood loss alone [12,18].

Operative time, intensive care admission, and hospital stay vary considerably among studies. Institutional protocols, surgeon experience, disease severity, and whether intensive care admission is routine or clinically indicated all affect these outcomes. Mortality is uncommon in contemporary specialist centers but remains possible in undiagnosed PAS, emergency delivery, massive hemorrhage, and resource-limited settings [16,24].

Table 1. Comparison of Major Management Strategies

Strategy	Best suited for	Main advantages	Principal risks	Follow-up
Cesarean hysterectomy	Diffuse PAS, percreta, completed childbearing, uncontrolled	Definitive treatment; no retained placenta	Major blood loss, transfusion, bladder or	Standard postoperative

	hemorrhage, or hemodynamic instability		ureteric injury, loss of fertility	follow-up
Placenta left in situ	Stable patient, high immediate surgical risk, strong desire for uterine preservation, and reliable follow-up	Avoids immediate placental-bed disruption and difficult pelvic dissection	Delayed hemorrhage, infection, readmission, reoperation, or delayed hysterectomy	Prolonged clinical and imaging surveillance
Local or segmental resection	Focal, accessible disease with clearly defined margins and a reconstructable uterus	Immediate tissue removal with uterine preservation	Hemorrhage, reconstruction failure, or conversion to hysterectomy	Postoperative and reproductive follow-up
Vascular ligation, tamponade, or hemostatic sutures	Adjuncts for localized bleeding or uterine-preserving surgery	May reduce perfusion and assist hemostasis	Incomplete control, collateral bleeding, vascular or technical complications	Depends on the definitive strategy

Note: PAS, placenta accreta spectrum. Conservative management comprises heterogeneous techniques and requires individualized patient selection.

7. Neonatal Outcomes

Neonatal outcomes in PAS are determined primarily by gestational age at delivery rather than by the maternal surgical technique itself. Planned preterm cesarean delivery is often required to reduce the likelihood of labor, antepartum hemorrhage, or emergency surgery. Consequently, respiratory morbidity, low birth weight, and neonatal intensive care admission are common [4,6].

Available comparative studies generally report similar birth weight, Apgar scores, and neonatal intensive care admission between cesarean hysterectomy and conservative groups when gestational age is comparable, although the evidence is limited by observational design and differences in case selection. Maternal management should prioritize maternal safety while coordinating delivery timing with neonatal readiness [12,24].

Emergency delivery after bleeding or labor is associated with less complete maternal preparation and may increase neonatal morbidity through earlier gestational age. Antenatal diagnosis and planned delivery in a specialist center are therefore important for both maternal and neonatal outcomes [4,9].

8. Selecting the Appropriate Management Strategy

No single strategy is appropriate for every patient. The choice should integrate the extent and location of placental invasion, suspected bladder or parametrial involvement, hemodynamic stability, parity, desire for future fertility, prior surgical history, local expertise, blood bank capacity, and the ability to provide long-term surveillance [2,6].

Uterine-preserving treatment may be considered in carefully selected, stable patients with focal or surgically accessible disease who understand the risk of delayed complications and accept the possibility of secondary hysterectomy. Cesarean hysterectomy remains appropriate for extensive or diffuse PAS, major extrauterine invasion, uncontrolled hemorrhage, and patients who do not desire uterine preservation [12,16].

Planned flexibility is essential. A procedure begun with uterine preservation in mind must be converted to hysterectomy when bleeding cannot be controlled or reconstruction is unsafe. Conversely, routine hysterectomy in every suspected case may expose some patients with focal disease to avoidable morbidity and permanent loss of fertility.

9. Evidence Gaps and Future Directions

The evidence base is limited by retrospective designs, small samples, heterogeneous definitions, variable PAS severity, inconsistent reporting of delayed complications, and substantial selection bias. Randomized trials are unlikely in many clinical scenarios because of ethical and logistical constraints, making high-quality prospective registries and standardized comparative cohorts particularly important [18,19].

Future studies should use standardized clinical and histopathologic staging, distinguish intentional placental retention from local resection, report disease topography, and include both immediate and delayed outcomes. Long-term reproductive outcomes, recurrence of PAS, uterine integrity after reconstruction, psychological effects, and quality of life require further investigation [1,2].

Centralized PAS centers, simulation-based team training, standardized hemorrhage protocols, and improved imaging-based mapping may reduce morbidity. Emerging work on quantitative ultrasound, magnetic resonance imaging, vascular mapping, and artificial intelligence may improve risk stratification, but these technologies require robust external validation before routine adoption [11,15].

10. Conclusion

Cesarean hysterectomy and uterine-preserving management are complementary rather than mutually exclusive strategies for PAS. Cesarean hysterectomy remains the most established definitive treatment for extensive disease and when future uterine function is not desired. In selected patients, conservative approaches may preserve fertility and may be associated with lower immediate blood loss, transfusion requirements, and urinary tract injury; however, these apparent benefits arise mainly from observational evidence and must be balanced against delayed hemorrhage, infection, readmission, prolonged surveillance, and secondary hysterectomy. The safest approach is individualized, multidisciplinary, and adaptable to intraoperative findings. Delivery in an experienced center, avoidance of forcible placental removal, adequate blood product preparation, and thorough counseling are central to improving maternal and neonatal outcomes.

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