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An Overview on Cesarean Hysterectomy

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Abstract:

Caesarean hysterectomy is indicated when medical and conservative surgical measures are unsuccessful, and as first-line surgery for extensive uterine rupture and bleeding from morbidly adherent placentae. It has an incidence ranging from 1–4 per 1000 caesarean sections, significantly greater than that for vaginal delivery. Although it is a life-saving procedure, it is associated with significant morbidity, including massive blood transfusion and intensive care (10–48%), urological injury (8%) and the need for relook laparotomy (8–18%).

Keywords: Cesarean Hysterectomy, Cesarean section, PAS.

Introduction:

Cesarean hysterectomy is considered the gold standard for the treatment of invasive placentation. However, also this radical approach is associated with high rates (40–50%) of severe maternal morbidity, mostly related to hemorrhage and insult to surrounding organs during surgery, and mortality rates as high as 7% due to massive untreatable hemorrhage. However, a recent meta-analysis suggested that when prenatal diagnosis and multidisciplinary expert management are available, rates in the range of 0.05% are achievable. In a recent systematic review and meta-analysis almost 90% of antenatally suspected cases of PAS underwent cesarean hysterectomy **(1).**

1. Timing of delivery:

One challenge when dealing with PAS is to define the best time of delivery in order to optimize maternal and neonatal outcome. Earlier elective cesarean delivery may reduce the risk of bleeding or labor, leading to an emergency delivery, which has been associated with higher maternal complications; however, earlier delivery will also increase the risks to the neonate related with prematurity. Several management strategies have been proposed, suggesting planned elective delivery ranging from 34–38 weeks, further demonstrating that there is still insufficient evidence to recommend one gestational age over another. One reasonable approach could be to tailor the timing of delivery based on the individual woman's risk of emergent delivery **(1).**

Expectant management until after 36+0 weeks can be considered a safe option for women with no previous history of preterm delivery and who are stable with no vaginal bleeding, preterm premature rupture of the membranes (PPROM), or uterine contractions suggestive of preterm labour. On the contrary, planned delivery at around 34+0 weeks' gestation should be arranged for women with a history of previous preterm birth, multiple episodes of small amounts of vaginal bleeding, a single episode of a significant amount of vaginal bleeding, or PPROM. Antenatal steroids prophylaxis should be administered in accordance based to the current local guidelines for the specific gestation at delivery **(1).**

2. Preoperative preparation and requirement:

Referral of patients to a Placenta Accreta Center of Excellence or a tertiary or quaternary center for delivery is done as results have been improved greatly because of the accessibility of a large, interprofessional staff. It should involve perinatologists, pelvic surgeons, intensivists, general surgeons, urologists, and neonatologists. Patients suffering from hemorrhage, an immediate referral to be close to proper facility should be kept in regard. Moreover, the hemoglobin level must be obtained before delivery and there should be organization with the blood bank to guarantee sources once a heavy transfusion must be necessary **(2).**

For switching to hysterectomy easily. Cesarean deliveries are usually done by an approach includes dorsal lithotomy position and a vertical skin incision. Also, to avoid the placenta, the uterine incision should be done in a way preventing placental injury. Then, once delivery of the neonate and the placenta does not deliver spontaneously, it is recommended recently to keep the placenta, close the hysterotomy, and do a hysterectomy **(3).**

This approach reduces the risk of hemorrhage. Regularly, supracervical hysterectomies are difficult because of hemorrhage. The surgeon may also need to consider cystotomy to separate the placental tissue **(4).**

Making an accurate decision for requesting a blood transfusion, Observation of hemodynamic condition and blood deficit carefully should be achieved; ACOG recommends checking blood loss, hemoglobin, electrolytes, blood gases, and coagulation factors. Majority often, massive transfusion protocols include a 1 to 1 to 1 ratio of packed red blood cells, fresh frozen plasma, and platelets. Though, patients may believe autologous donation prior to the process too **(4).**

3. Type of incisions for access:

A low transverse skin opening which lets getting reach to the lower half of the uterus may be sufficient when the upper border of the placenta does not ascend to the upper uterine segment and hysterectomy is not intended. Though it may not offer sufficient exposure in cases of placenta percreta. When the placenta locates anteriorly and spreading to umbilical level, and/or a hysterectomy is arranged, a midline skin opening permits for a high upper-segment transverse uterine opening over the upper border of the placenta or extra usually a fundal transverse hysterotomy for infant delivery. So, a midline Incision is suggested by the majority of writers for PAS disorders diagnosed prenatally or at cesarean delivery time **(5).**

The Joel-Cohen incision (4-5 cm widths over the pubic symphysis) or a Cherney extended transverse incision (transection of the rectus muscles at their insertion on the pubic symphysis or a vertical incision of the fascia abdominalis) could be applied to prevent a vertical incision or permit improved the vision, but no accessible data on the application of these incisions in the treatment of PAS **(6).**

4. Blood conservation techniques:

A-Tranexamic acid:

Tranexamic acid is a commonly existing hemostatic antifibrinolytic agent which prevents the enzymatic breakdown of fibrinogen and fibrin by plasmin. Vital international attempts have ended in numerous studies examining tranexamic acid in obstetric trauma and postpartum hemorrhage **(6).**

Compared with placebo, tranexamic acid treatment significantly decreased mortality from obstetric bleeding in absence of increase incidence of adverse outcomes, involving thromboembolism. Which have been proved by a new meta-analysis, which explain that management with tranexamic acid prior to cesarean section reduces intra- and postoperative blood loss and blood transfusion without rise in thromboembolic incidents. Yet, no trials have tested tranexamic acid function exclusively in PAS surgical treatment. But value of support in postpartum bleeding explains its benefit in the treatment of PAS cases identified prenatally or at time of delivery **(6).**

B- Balloon occlusion catheters:

Numerous studies, mainly retrospective, have assessed the function of prophylactic fixation of balloon occlusion catheters to alleviate hemorrhage at cesarean hysterectomy time for PAS cases, with different outcomes **(7).**

C- Internal Iliac artery ligation:

Its benefits are like that of balloon occlusion devices. However, with the proper skillset, surgical internal iliac artery ligation has the added benefit of being available in low- and middle-income countries, where access to interventional radiology may be limited **(6).**

There are insufficient studies that assess safety and efficacy of internal iliac artery ligation in the setting of PAS cases. In a study by Grace Tan et al., before hysterectomy for PAS, 44% of cases have had bilateral internal iliac artery ligation; however, transfusion necessities were like those who did not undergo ligation **(8).**

D- Cell salvage:

Autologous cell salvage is a way reduce allogenic red blood cell transfusion in some cases, who are at high risk of heavy obstetric blood loss and preoperative decreased hemoglobin concentrations. Although, it is quite expensive, nowadays it is being accepted in several obstetric units treating PAS cases, with observational studies showing improved results and with no rise in harmful effects **(8).**

E- Placental removal:

A retrospective study of suspected PAS cases confirmed a considerably lowered short-lived morbidity when placenta is left in place and hysterectomy performed electively compared with attempting to remove the placenta first **(9).**

5. Stepwise procedures:

I. One step procedure:

It was first generated by Placios et al. and involves Pfannenstiel incision, ligation of new created vessels then dissection of posterior bladder wall, hysterotomy is made above placental border, the entire placenta and penetrated myometrium are separated in one bulk. Thus, uterine reconstruction is achieved by healthy tissues. For hematometra prevention, a Hegar's bougy dilator no.10 is put in the uterine cervix, which will move towards one of the sides. In this way, it is easy to do a square stitch, and accidental risk of the internal os closure is reduced **(10).**

II. **Two-step procedure:**

Include leaving placenta in situ plus methotrexate injection at the operative time and follow up by weekly β-HCG level and MRI. The second step is delayed hysterectomy (Interval hysterectomy) after 6 weeks conservation with minimal blood loss. It had the complications of both conservative treatment and hysterectomy, so it is not recommended. Afia et al. conducted a study to determine the outcome of interval hysterectomy compared to immediate caesarean hysterectomy. They found less blood loss, less visceral injuries, and better dissection in the group of delayed hysterectomy **(11)**

III. Shehata's simple procedures:

It includes three simple procedures without major vessels ligations, the first step was double ligation of uterine artery on both sides before and after placental removal, the second step was suturing the placental bed by two quadruple sutures and the third step was triple way Foley's catheter insertion through the cervix and inflation to 50 cc saline to compress lower segment and drain bleeding **(12).**

6 .Techniques for hysterectomy:

A- Total versus subtotal hysterectomy:

Total hysterectomy is the suggested surgical technique for emergent peripartum hysterectomy due to the possibility of malignant tumors development in the cervical stump, the necessity for regular cervical cytology, and other related problems like hemorrhage or discharge. Supporters of subtotal hysterectomy inform less bleeding, blood transfusions, perioperative complications, and decreased surgical time. But it may not be valuable in placenta increta or percreta treatment when the cervix is involved a total hysterectomy should be of choice. also, it does not protect from urinary tract injuries in comparison with total hysterectomy in PAS management **(13).**

B- Other novel surgical techniques:

Numerous centers have modified their surgical techniques to minimize hemorrhage and/or to reduce unintentional injury to the urinary tract **(14).**

C-Planned delayed hysterectomy:

It is a substitutional plan for treatment of placenta accreta cases when immediate cesarean hysterectomy is quite difficult in case of placenta percreta. It lets the placenta to be resorbed, reduce in its vascularity and postulate involution of the uterus to simplify the future surgery. But it may be combined with possibility of coagulopathy, bleeding, and sepsis in the interval time **(6).**

It is achieved postpartum between the 3rd to the 12th week and several cases need for uterine artery embolization or internal iliac artery ligation after labor, which may have associated complications **(15)**

The expected blood loss in this phased surgical strategy has been described to be similar to immediate surgery or fewer **(16)**

In complicated cases, it may decrease other surgical morbidity as urinary tract injuries rates but, when paralleled with immediate surgery, it looks statistically insignificant **(13).**

References:

1. Morlando, M., & Collins, S. (2020). Placenta Accreta Spectrum Disorders: Challenges, Risks, and Management Strategies. Int J Womens Health, 12, 1033-1045. doi:10.2147/ijwh.s224191
2. Shepherd, A. M., & Mahdy, H. (2020). Placenta accreta .
3. Hobson, S. R., Kingdom, J. C., Murji, A., Windrim, R. C., Carvalho, J. C., Singh, S. S., . . . Lim, K. (2019). No. 383-screening, diagnosis, and management of placenta accreta spectrum disorders. *Journal of Obstetrics and Gynaecology Canada, 41*(7), 1035-1049 .
4. Obstetric Care Consensus No. 7: Placenta Accreta Spectrum. (2018). *Obstet Gynecol, 132*(6), e259-e275. doi:10.1097/aog.0000000000002983
5. Walker, M. G., Pollard, L., Talati, C., Carvalho, J. C. A., Allen, L. M., Kachura, J . . . ,.Windrim, R. (2016). Obstetric and Anaesthesia Checklists for the Management of Morbidly Adherent Placenta. *Journal of Obstetrics and Gynaecology Canada, 38*(11), 1015-1023. doi:https://doi.org/10.1016/j.jogc.2016.08.015
6. Allen, L., Jauniaux, E., Hobson, S., Papillon-Smith, J., & Belfort, M. A. (2018). FIGO consensus guidelines on placenta accreta spectrum disorders: nonconservative surgical management. *International Journal of Gynecology and Obstetrics, 140*(3), 281-290 .
7. Chou, M. M., Kung, H. F., Hwang, J. I., Chen, W. C., & Tseng, J. J. (2015). Temporary prophylactic intravascular balloon occlusion of the common iliac arteries before cesarean hysterectomy for controlling operative blood loss in abnormal placentation. *Taiwanese Journal of Obstetrics and Gynecology, 54*(5), 493-498 .

8. Tan, S. G., Jobling, T. W., Wallace, E. M., Mcneilage, L. J., Manolitsas, T., & Hodges, R. J. (2013). Surgical management of placenta accreta: a 10-year experience. *Acta Obstetricia et Gynecologica Scandinavica, 92*(4), 445-450 .
9. Eller, A., Porter, T., Soisson, P., & Silver, R. (2009). Optimal management strategies for placenta accreta. *BJOG: An International Journal of Obstetrics & Gynaecology, 116*(5), 64 .654-8 doi:https://doi.org/10.1111/j.1471-0528.2008.02037.x
10. Palacios-Jaraquemada, J. (2012). One-step conservative surgery for abnormal invasive placenta (Placenta Accreta–Increta–Percreta). A Comprehensive Textbook of Postpartum Hemorrhage. An essential clinical reference for Effective Management 2nd Edition. London: Sapiens Publishing GLOWM, 263-271 .
11. Shehata ,A. (2016). Uterine sparing techniques in placenta accreta. *Obstet Gynecol Int J, 5*(1), 00143 .
12. Shehata, A., Hussein, N., El-Halwagy, A., & El Gergawy, A. (2015). Could simple procedures minimize hysterectomy in management of placenta accreta. *Indian Journal of Obstetrics and Gynaecology Research, 2*(4), 213-217 .
13. Tam Tam, K. B., Dozier, J., & Martin Jr, J. N. (2012). Approaches to reduce urinary tract injury during management of placenta accreta, increta, and percreta: a systematic review. *The Journal of Maternal-Fetal & Neonatal Medicine, 25*(4), 32 .334-9
14. Shamshirsaz, A. A., Fox, K. A., Salmanian, B., Diaz-Arrastia, C. R., Lee, W., Baker, B. W., . . . Javadian, P. (2015). Maternal morbidity in patients with morbidly adherent placenta treated with and without a standardized multidisciplinary approach. *Am J Obstet Gynecol, 212*(2), 218. e211-218. e219 .
15. Al-Khan, A., Gupta, V., Illsley, N .P., Mannion, C., Koenig, C., Bogomol, A., . . . Zamudio, S. (2014). Maternal and fetal outcomes in placenta accreta after institution of team-managed care. *Reprod Sci, 21*(6), 761-771. doi:10.1177/1933719113512528
16. Rupley, D. M., Tergas, A. I., Palmerola, K. L., & Burke, W. M. (2016). Robotically assisted delayed total laparoscopic hysterectomy for placenta percreta. *Gynecologic Oncology Reports, 17*, 53-55 .