

ANTEPARTUM HEMORRHAGE- ANESTHETIC MANAGEMENT FOR EMERGENCY LSCS

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Introduction:

Obstetric haemorrhage remains one of the major causes of maternal death in developing countries and is the cause for more than 50% of maternal death accounted globally. Haemorrhage from or into the vagina after the 24th week of gestation is classified as antepartum haemorrhage. The factors that cause antepartum haemorrhage may be present before 24 weeks, but the original distinction between a threatened miscarriage and an antepartum haemorrhage was based on the potential viability of the foetus. APH complicates 3–5% of pregnancies and is a leading cause of perinatal as well as maternal mortality. Seventy per cent of all cases of antepartum haemorrhage result from either placenta praevia or from abruptio placentae.

The major causes of uterine bleeding are:

- Placenta praevia
- Abruptio placentae or accidental haemorrhage
- Fetal bleeding from vasa praevia
- Uterine rupture
- Unknown aetiology.

Domestic violence:-

Domestic violence in pregnancy may result in APH. Women with repeated presentations that may include APH should be asked about this.

Placenta praevia occurs when the placenta implants on the lower uterine segment and overlies the cervical os. Placenta praevia is due to delay in implantation of blastocyst. It is assessed as being either anterior or posterior and the grade depends on the extent to which the placenta covers the os. In grade 1 placenta, the placenta extends to the os where as in grade 4 placenta praevia, the placenta completely covers the os, and significant bleeding may occur which may necessitate blood transfusion or urgent delivery. Painless vaginal bleeding, malpresentation of the fetus and uterine hypotonia are the cardinal signs of P.P. Since development of lower segment starts after 24-28 weeks of gestation, bleeding is likely to occur after 28 weeks. Bleeding is unpredictable and may vary from minor to massive life threatening hemorrhage.

Women who diagnosed having placenta praevia are usually delivered by elective caesarean section. As the condition may be associated with severe haemorrhage, which may be life-threatening, General anaesthesia is the technique of choice, but a consultant obstetric anaesthetist may consider regional anaesthesia in posterior grade 1 and 2 placenta praevia if no hypovolemia and in patients without much recurrent bleeding/anemia.

Abruptio placentae is defined as the premature separation of the placenta after the 24 weeks of gestation. It is associated with a perinatal mortality rate of up to 60%. Placental abruption may result in concealed or revealed haemorrhage. Typically the woman presents with abdominal pain, which may be severe, together with signs indicative of acute blood loss in proportion to the amount of blood lost. Sometimes placental abruption may be associated with pre-eclampsia; therefore, if the pre-abruption arterial pressure was markedly elevated, the post abruption BP may still appear normal, and so mask hypovolaemia. A large amount of blood loss is often associated with hemorrhagic shock, acute renal failure, a consumptive coagulopathy, fetal demise. Placenta accreta is the most common indication for cesarean hysterectomy.

Occasionally, fetal blood loss may occur, particularly where one of the placental vessels lies across the cervical os and below the presenting part— a condition known as **vasaprevia**. Blood volume of the fetus is 100ml/kg. Hence even with 30 to 50 ml of blood loss, foetal loss is inevitable.

Domestic violence or cephalo pelvic disproportion and obstructed labor may result in uterine rupture. This should be suspected from careful history, vaginal bleeding, hypotension, cessation of labor, fetal death, scar dehiscence in case of previous LSCS.

Risk factors :-

1. Previous placenta previa
2. Multiparity
3. Previous termination of pregnancy
4. Multiple pregnancy
5. Previous LSCS
6. Advanced maternal age(>40years)
7. Assisted conception
8. Smoking (Tobacco & Cocaine)
9. Presence or Previous history of endometritis, uterine scar, sub mucous fibroid, curettage, retained placenta

Confirmation of Diagnosis:-

USG:- used predominantly to localize the placenta and localization of placenta during early pregnancy may be inaccurate because as the uterus(Fundus) enlarges there may be apparent upward displacement of placenta.

MRI:- Most accurate but not yet widely used unless the USG is inconclusive.

Vasa Previa can be diagnosed by detecting the presence of fetal haemoglobin in the vaginal blood loss. Because of the advancement of USG both Trans abdominal and Trans vaginal, the double setup per vaginal examination is obsolete nowadays.

Anesthetic management:

The choice of Anesthesia for LSCS depends on the diagnosis, condition of the fetus & the urgency for fetal delivery, condition of the mother, degree of hypovolumic shock, and coagulation abnormality.

As per WHO guidelines, If there is a need for emergency LSCS, for example in cases of cord prolapse, massive APH, recurrent mild to moderate APH but foetal bradycardia, placenta

previa, hemodynamically unstable parturient where there is a need for knife from skin incision to delivery is within 10-15 minutes, Endotracheal intubation applying cricoid pressure to prevent gastric aspiration and GA with controlled ventilation is mandatory.

Preoperative assessment

Estimation of the degree of blood loss is notoriously unreliable in the obstetric setting, and hence clinical estimation of the following signs of hypovolaemia should be undertaken

- hypotension
- tachycardia > 120 beats/mt
- urinary output < 0.5ml/ kg
- capillary refill time > 5 s
- anxiety, agitation or confusion
- transient or minimal response to 1-2 L crystalloid or 500 ml colloid fluid challenge.

Challenges for Anaesthesiologists:-

1. Blood loss of 1.5 liters or more can occur without any change in cardiovascular parameters.
2. Acute blood loss super imposed on chronic anaemia due to recurrent APH in some cases result in maternal decompensation and foetal compromise.
3. Difficult obstetric airway due to airway changes during pregnancy
4. Full stomach & chances for acid aspiration syndrome
5. Enlarged gravid uterus and Aorto caval compression
6. Increased Tendency for hypoxemia due to reduction in FRC as well as increased oxygen consumption during apnoea.
7. In addition to enhanced neural susceptibility to local anaesthetics, a higher apical level of the thoracic kyphosis result in a 25% reduction in the dose requirement for spinal and epidural anaesthesia,
8. If regional – increased spread of local anaesthetic drug in the sub arachnoid space (IVC compression-> engorged epidural venous plexus, increased lumbar lordosis).

Anaesthetists should be involved early, in the management of such patients so that appropriate resuscitation, monitoring and planning for delivery may be developed.

Early resuscitation protocol.

1. Airway- head position 2. Breathing –oxygen by mask 3. Circulation –left lateral tilt to avoid aorto caval compression

- request baseline haemoglobin and haematocrit
- place two large-16gauge peripheral venous cannulae
- maintain circulating fluid volume
- administer group-compatible blood if possible or O-negative blood in a life-threatening situation
- consider insertion of invasive monitoring such as CVP or arterial monitoring
- involve the haematologist early for blood products and advice.

Fluid therapy and blood transfusion:

Crystalloids – up to 2lits of Ringer lactate

Colloids- up to 2lits of colloids until cross matched blood obtained

Blood or packed RBCs **4-6 units**

FFP -15-20ml/kg

Platelets – if count ,< than 50,000 - **give 2units**

Cryoprecipitates – if fibrinogen is < than 1gm/1lit – 30ml/kg

As per Yale-New Haven Hospital massive transfusion protocol, the blood bank immediately releases 6 units of O-negative RBCs and 4 units of AB FFP. Within 20 minutes, the blood bank releases an additional 10 units of O-negative RBCs, 10 units of AB FFP, 10 units of platelets, and 10 units of cryoprecipitate, and provides recombinant factor VIIa if requested.

The main therapeutic goal of management of massive blood loss is to maintain:

- hemoglobin > 8 g/dl
- platelet count > 75 x 10⁹/l
- prothrombin time < 1.5 x mean control
- activated partial prothromboplastin time < 1.5 x mean control
- fibrinogen > 1.0 g/l.

Acid aspiration prophylaxis should not be forgotten in the emergency preparation

- ✓ For all obstetric patients, antacid premedication should be considered.
- ✓ H₂-receptor blockers (Inj.Ranitidine) reduce gastric acid secretion.
- ✓ Proton pump inhibitors reduce gastric fluid volume to less than 25 ml.
- ✓ 0.3 Molar sodium citrate (which neutralizes the already secreted gastric acid) increases the mean pH > 2.5 and decreases the incidence of chemical pneumonitis.
- ✓ Prokinetic agents will shorten the gastric emptying time.

Equipments ForGA:-

Two Macintosh laryngoscopes (one standard, one long blade)

Short-handled Macintosh laryngoscope (or 'Polio-blade' laryngoscope)

McCoy laryngoscope

Gum elastic bougie

Wide selection of tracheal tubes(7,7.5id)

Selection of oral and nasal airways

Laryngeal mask airway size 3

Percutaneous cricothyroidotomy kit

Caesarean Section Preparation

1. Check the equipment again. Ensure that the suction equipment is working and that the table tilts head-down.
2. Perform a pre-anaesthetic check on the patient with particular attention to the airway and gastric contents.
3. Ensure that the assistant is ready.

4. Ensure that the patient is well positioned, paying particular attention to aortocaval compression, wedge should be kept under right hip and head should position for tracheal intubation.
5. Confirm the patency of both the i.v cannula and ensure that the infusion flows well.
6. Rapid infusion pumps and fluid warmer should be available for emergency.
7. Check that full routine monitoring is in use.
8. Preoxygenate the patient's lungs (with 100% O₂) for 3 minutes using a well applied face mask. Or four maximal deep breaths within 30 seconds in case of fetal distress
9. Check that the assistant knows how to apply cricoid pressure.
10. Commence the anaesthetic using a rapid-sequence induction.

Intraoperative management

Failed intubation 1:250 compared to 1:2500 in the general population. Anatomically, swelling and friability of the nasopharyngeal and oropharyngeal tissue occurs secondary to capillary engorgement. The parturients' airway can become compromised and tracheal intubation more difficult. Intubation prediction with Mallampati class is still commonly used but has been shown to have a low positive predictive value. It can be useful when used in conjunction with other difficult airway predictors. Pregnancy can change the Mallampati score, with the biggest increase in Mallampati 3 and 4 grades occurring between second and third trimester. This in conjunction with enlarged breasts and increasing obesity in the pregnant population can make laryngoscopy more difficult. The nasopharyngeal approach should be avoided because of the increased risk of epistaxis. Physiological changes in pregnancy decrease time to desaturation, and increase risk of aspiration.

One should be familiar with the Unanticipated Difficult Obstetric Airway Algorithm under Emergencies. For every case be prepared for a difficult airway, think through and communicate your plan and backup plan, pay meticulous attention to assessment of the airway, have appropriate assistance, check the equipment and know what other airway equipment is immediately available, position well, and preoxygenate fully. Suggested techniques for making intubation optimal at the first attempt include: attention to detail, a smaller ETT (e.g. 7.0mm), preloaded stylet or bougie, short-handled laryngoscope

The increase in oxygen consumption and decreased FRC mean that parturients become hypoxaemic very quickly during episodes of apnoea, despite careful preoxygenation. Increased minute ventilation and a reduced FRC facilitates gas exchange at the alveolar level resulting in increased rate of uptake of inhalation agents and more rapid changes in depth of anaesthesia

Rapid-sequence induction of GA is mandatory. Care should be taken with induction agents such as thiopental and propofol in hypovolumic patients, as profound hypotension may ensue, leading to cardiovascular collapse. Ketamine 0.5-1 mg/ kg stimulate the sympathetic nervous system and etomidate 0.3mg/kg helps to preserve blood pressure during induction of anaesthesia. Anaesthesia should be maintained with N₂O and O₂= 1:1 ratio along with inhalational agents like Sevoflurane or Isoflurane not more than 0.5 MAC. If it is more than 0.5 MAC chances for uterine atony and PPH will be there.

Sometimes unanticipated profuse bleeding while performing LSCS which may be due to

- ✓ Engorged veins on the anterior wall of the uterus in case of placenta previa.
- ✓ If the placenta is anterior then the surgical incision extends through the placenta, causing significant haemorrhage.
- ✓ If the placenta covers the os then a raw area is left after its delivery. This area of the os does not have the ability to contract that the normal myometrium has, and may thus continue to bleed.

After baby delivery, opioids like fentanyl 2-3 mics/kg and Oxytocics*to improve uterine tone, & muscle relaxant like Atracurium 3-4mg/kg should be administered. Anesthesia can be maintained with N₂O and O₂= 2:1 ratio. Inhalational agent can be administered ,but not more than 1MAC.At the end of surgery, neuro muscular block should be antagonized before tracheal extubation, with the patient in the lateral position and with a slight head-down tilt

Routine postoperative care in a fully equipped recovery area is essential. At this time, postoperative pain relief should be effective and the baby should be given to the mother whenever possible.

***Women with APH resulting from placental abruption or placenta praevia should be strongly recommended to receive active management of the third stage of labour. This is to take precautions against PPH (level A evidence). Hence consideration should therefore be given for the use of ergometrine-oxytocin for the third stage of labour in women with APH resulting from placental abruption or placenta praevia.**

Post operative care:

Paracetamol 1g IV QDS for 2 days, then PO for 3days
Diclofenac 50mg PO TDS or 75mg PR BDS for 5 days*
Inj.Tramadol 50mg-100mg iv/im 6th hrly**
Ondansetron 4mg PO / IV / IM 8th hrly

*NSAIDs should not be prescribed if there are any contraindications e.g. Asthma, Dyspepsia / Reflux, Renal Failure, Cardiovascular Disease.

**The manufacturer does not recommend the use of Tramadol in breast-feeding mothers.

Antepartum hemorrhage in women who refuse blood transfusion

What Jehovah's Witnesses Won't Accept

- 1) Transfusions of whole blood
- 2) Packed red cells
- 3) White cells
- 4) Plasma
- 5) Platelets

What Jehovah's Witnesses Will Accept

- 1) Ringer's Lactate
- 2) Normal Saline
- 3) Hypertonic Saline
- 4) Dextran
- 5) Gelatin (Gelofusine/Haemaccel)
- 6) Hetastarch

Conclusion:

Above discussion regarding the management of emergency LSCS in patients with antepartum bleeding is based on various guidelines given by RCOOG & OAA. But cases should still be treated on their individual merits and these guidelines will not rigidly prescribe an anaesthetic plan for all situations. In particular, high risk or complex cases should be discussed with an obstetric anaesthetist. These guidelines will provide a practical approach to , clinical problems and emergencies. Further reading is recommended

Reference & further reading:

1. Physiology of pregnancy: clinical anaesthetic implications ; Contin Educ Anaesth Crit Care Pain (2013)doi: 10.1093/bjaceaccp/mkt036 First published online: September 11, 2013
2. Guidelines in obstetric anesthesia .Victoria Hospital by J.Dugide,june2012
3. Stolteings Anesthesia and co existing diseases ;6th edition ;2012
4. Royal college of obstetricians and Gynecologists Green top guide lines 63nov2011
5. Royal college of obstetricians and Gynecologists Green top guide lines 27jan2011
6. WPH Obstetric anesthesia guidelines Dec2007
7. Obstetric anesthesia; Wylie and Churchill Davidson's: A Practice of Anesthesia 7th edition;2003
8. Obstetric hemorrhage in women who refuses blood transfusion: North Staffordshire Hospital NHS Trust; Feb 2002
9. Text book of Anesthesia by Aitkinhead et all; 4th edition :2002