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MANAGEMENT OF OBSTETRIC HAEMORRHAGE

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Obstetric haemorrhage is the world's leading cause of maternal mortality and accounts for an estimated 127,000 deaths each year. Postpartum haemorrhage (PPH) accounts for the majority of these deaths. Obstetric haemorrhage is often sudden, unexpected and may be associated with coagulopathy. Early recognition and treatment are essential to ensure the best outcome.

- Blood loss can be notoriously difficult to assess in obstetric bleeds. Bleeding may sometimes be concealed and the presence of amniotic fluid makes accurate estimation challenging.
- Massive obstetric haemorrhage is variably defined as blood loss from the uterus or genital tract >1500ml, a decrease in haemoglobin of > 4 g/dl or acute transfusion of > 4 units blood.
- Blood loss may be:
 - Antepartum: haemorrhage after 24th week gestation and before delivery;
 - placenta praevia, placental abruption, bleeding from vaginal or cervical lesions
 - Postpartum: Primary: within 24 h of delivery

Secondary: 24 h to 6 weeks post delivery

- uterine atony, retained products, genital tract trauma, uterine

inversion

Causes of post-partum haemorrhage may be conveniently remembered by the 4 'Ts':

Tone (uterine atony)

Tissue (retained products)

Trauma (cervical and genital tract damage during delivery)

Thrombin (coagulation disorder)

Other risk factors include:

- Prolonged labour
- Multiple pregnancy, polyhydramnios, large baby
- Obesity
- Previous uterine surgery
- Coagulopathy

Prevention

The most significant intervention shown to reduce the incidence of PPH is the active management of the third stage of labour (see below). Other measures to prevent or reduce the impact of major obstetric haemorrhage include:

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- Avoidance of prolonged labour
- Minimal trauma during assisted vaginal delivery
- Detection and treatment of anaemia during pregnancy
- Identification of placenta praevia by ant-natal ultrasound examination

Active Management of the Third Stage

This represents a group of interventions including controlled cord traction for placenta delivery and prophylactic administration of a uterotonic at delivery (e.g. Syntometrine®). Active management of the third stage is associated with a lower incidence of PPH and need for blood transfusion.

Placental Abruption

The premature separation of a normally sited placenta from the uterine wall after the 20th week of gestation and prior to delivery. It is a cause of antepartum haemorrhage and associated with a significant risk to both mother and fetus.

Risk factors:

- Previous history of abruption
- Maternal hypertension
- Smoking
- History of premature rupture of membranes
- Abdominal trauma
- Post-amniocentesis
- High parity
- Cocaine use

Signs and symptoms include:

- Vaginal bleeding. Beware, bleeding may be concealed in up to 30% of cases
- Lower abdominal tenderness
- Rapid abnormal uterine contractions
- Fetal heart rate abnormalities
- Premature labour
- Intrauterine death
- Maternal cardiovascular collapse
- Disseminated intravascular coagulation (DIC)
- Massive obstetric haemorrhage
 - Diagnosis of placental abruption is essentially clinical and must be considered without delay if any suggestive signs and symptoms are present.
 - Treatment includes resuscitation with oxygen and intravenous fluids.
- Immediate obstetric and neonatal support
- Urgent delivery if fetal distress. Caesarean section unless imminent vaginal delivery.
- Management of shock (see below) and coagulopathy should it develop.
- General anaesthesia is often the preferred technique due to the risk of hypovolaemia and coagulopathy and severe fetal distress. If regional anaesthesia is considered, the coagulation profile of the woman must be checked.

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Placenta Praevia

Encroachment of the placenta upon the cervical os.

- Grade 1: low-lying placenta (in lower uterine segment) that does not reach the os
- Grade 2: Placenta reaches the os
- Grade 3: Placenta covers os but is positioned to one side
- Grade 4: Placenta is positioned squarely over the os

Risk Factors

- Previous caesarean section
- Multiple pregnancy
- Multiparity
- Previous myomectomy

Major Obstetric Haemorrhage Management

Pregnant women are often young, healthy and have an increased blood volume of up to 20% at term and are therefore likely to compensate well to haemorrhage until the circulating blood volume is very low. In addition, blood loss may sometimes be concealed and difficult to calculate.

More commonly massive haemorrhage may be obvious; signs other than revealed haemorrhage include:

- Tachycardia
- Hypotension (beware, BP of healthy women may not drop until significant blood has been lost)
- Pallor
- Oliguria
- Cool peripheries
- Lower abdominal pain

Management of the Anticipated Major Haemorrhage

On some occasions, cases at high risk of massive obstetric haemorrhage can be predicted; e.g. caesarean section in a lady with a low lying anterior placenta and previous uterine scar. These cases may be at risk of placenta accreta and massive blood loss.

- 2 large bore IV cannulae
- Rapid infusion device or pressure bags in theatre
- Blood warmer and warming blanket
- Blood cross-matched and available
- Consider preoperative invasive monitoring
- Consider cell salvage if available (see below)
- Consider interventional radiological procedures if available (see below)

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Communication and teamwork are essential in cases of both anticipated and unanticipated maternal haemorrhage:

- Call for help. Alert senior obstetrician and anaesthetist
- Alert blood transfusion service and haematologist
- Alert portering service for transport of blood samples and collection of blood products
- Check blood is available. In the UK 2-4 units of O-negative blood is kept on labour ward for emergency use
- Allocate roles to team members
- Ensure departmental guidelines exist for the management of massive obstetric haemorrhage and regularly practice 'fire drills'

Goals of management

- Early identification of maternal bleed and institution of major haemorrhage drill
- Rapid access to circulation and infusion of fluid in first instance with rapid availability and administration of blood
- Avoidance/limitation of complications of massive blood transfusion namely: acid/base disturbance, transfusion related acute lung injury (TRALI), hypocalcaemia, hyperkalaemia, hypothermia and thrombocytopenia
- Efficient team working and management decision making

Resuscitation and immediate management

- ABC, 100% oxygen
- 2 large bore cannulae and bloods for X-match
- Fluid resuscitation; crystalloid / colloid 2000mls via rapid infuser or pressure bags e.g. Level 1™ Rapid Infuser (can achieve > 500ml/min warmed fluid flow)
- Transfuse blood ideally through fluid warming device. Give group specific blood if cross-matched blood not yet available. O-negative blood if available and life threatening bleed
- Transfer to theatre
- Non-surgical intervention for uterine atony:

"Rub up" the uterus

Syntometrine (syntocinon 5 units with ergometrine 500 mcg im)

Syntocinon 5 units repeated once if necessary

Followed by 30units/500mls infusion 125ml/h

Ergometrine: 0.5mg im. Give iv if bleeding continues and remains hypovolaemic. May cause hypertension and is relatively contraindicated in hypertensive conditions of pregnancy. High risk of vomiting.

Carboprost (Hemabate or prostaglandin F_{2a})

For uterine atony unresponsive to ergometrine or Syntocinon. Give 250mcg IM (not iv). May cause bronchospasm, flushing and hypertension.

Misoprostal 100mcg pr

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Surgical treatment and other interventions:

- Delivery for placental and uterine pathology
- B-Lynch suture (brace suture)
- Uterine tamponade e.g. Rusch urological balloon or Sengstaken-Blakemore tube
- Surgical ligation of uterine and internal iliac arteries
- Hysterectomy
- Compression/clamping aorta to buy time
- Uterine replacement if uterine inversion
- Radiological arterial embolisation or balloon occlusion (see below)

Anaesthetic management

- General anaesthetic with rapid sequence induction is generally advocated if actively bleeding or coagulopathic. Reduce dose of induction agent if severe on-going bleeding
- Regional anaesthesia is relative contraindication but may be maintained if patient has an epidural in situ and bleeding is controlled
- Consider arterial line, central venous catheter and urinary catheter but only after definitive treatment has commenced. Their insertion must not delay resuscitation and fluid management
- Use fluid warmer and aim to keep patient normothermic
- Regular monitoring of haemoglobin level and coagulation using near patient devices if available (e.g. HemoCue). Fresh frozen plasma, platelet transfusion and cryoprecipitate may be necessary if coagulopathy develops. Liaise early with the haematology department for optimal and timely product replacement.
- Consider systemic haemostatic agents
 - Aprotinin (Trasylo1®)
 - Vitamin K
 - Tranexamic acid
 - Recombinant Factor VIIa (NovoSeven®)

Postoperative management

- Transfer to a high dependency unit or intensive care facility
- Anticipate coagulopathy and treat clinically until coagulation results available

Interventional Radiological Techniques

Interventional techniques are gaining in popularity if the facilities and expertise exist and are especially useful for the anticipated massive bleed e.g. caesarean section in a woman with anticipated placenta accreta. Though evidence of effectiveness is still limited, there are increasing case reports of its successful use.

- Bilateral iliac artery balloons may be placed electively and inflated at caesarean section or should bleeding occur
- Selective uterine artery embolisation can be performed
- Complications appear rare and include: haematoma, false aneurysms and lower limb ischaemia

Intra-operative Cell Salvage

Cell salvage has now been used in hundreds of cases of obstetric bleeds and appears safe. Concerns relate to re-infusion of fetal cells which could theoretically cause haemolytic disease in future pregnancies and also the potential for amniotic fluid embolus. If cell salvage techniques are used, separate suction of amniotic fluid is recommended and a leukocyte depletion filter used during re-infusion of salvaged blood. Setting up cell salvage measures should not divert staff and attention from initial resuscitation.