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Chapter
Management of Obstetrics and Intrapartum Emergencies

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Abstract

Recent confidential enquiries into maternal deaths in the UK have concluded that deaths due to obstetric hemorrhage have nearly doubled during the past triennium. The latest “Each baby Counts” Reported by Royal college of Obstetricians and Gynecologists has noted that approximately 76% of perinatal deaths and brain injuries could have been avoided by an alternative management. Lack of knowledge and human factors were the main contributory factors to poor outcomes. Substandard care is often due to “too little being done too late”, especially while managing emergencies during antepartum, intrapartum, and postpartum. All health care professionals including nurses should be familiar with management of emergencies with pregnancy.

Keywords: pregnancy, childbirth, maternal morbidity and mortality, maternal collapse, antepartum, intrapartum and postpartum bleeding, preeclampsia, septic shock, amniotic fluid embolism, breathless in pregnancy, convulsions and epilepsy in pregnancy

1. Introduction

Intrapartum emergencies are rare, but can be associated with significant maternal and fetal morbidity and mortality. It is important to know how to respond rapidly and appropriately. This chapter reviews selected issues and nursing care associated with emergencies in the intrapartum period, including cord prolapse, shoulder dystocia, amniotic fluid embolism (AFE), and hemorrhagic complications such as placental abruption, uterine rupture, vasa previa, and immediate postpartum hemorrhage (PPH). Simulation of potential obstetric emergencies is helpful to proactively assess systems, processes, communication, collaboration, and team member roles. If an obstetric emergency occurs, a debrief session is helpful to organize timing of event, management, and personnel involved. In addition, this discussion allows for all team members to discuss what went well and improvement opportunities.
2. Principles of resuscitation for ‘maternal collapse’ during pregnancy, labor and postpartum

Maternal Collapse is an acute life-threatening event in which the mother becomes unconscious due to cardiorespiratory or neurological compromise at any stage in pregnancy or up to 6 weeks postpartum. The incidence of maternal collapse and severe maternal mortality is unknown. Recent studies estimate that maternal collapse occurs in between 0.14 and 6 per 1000 births. In the hospital, maternal collapse and sudden cardiac arrest are usually related to par-tum events and the outcome depends on effective resuscitation and identification and effective treatment of underlying cause. Therefore staff on the hospital must be expertly trained in advanced life-support techniques and resuscitation equipment should be readily available.

During resuscitation, the mechanical and physiological changes of pregnancy can have an impact on a successful outcome and should be considered.

Specific causes for maternal collapse.

While some underlying causes of maternal collapse are not preventable, it is important to note that maternal cardiac arrest occur frequently due to deterioration of underlying critical illness. Care for women with significant pre-existing illness should therefore occur in a multidisciplinary setting with place for pregnancy management and delivery. It is important to introduce a maternal early-warning chart for the observation of all pregnant patients in a hospital setting, to detect critical illness at the earliest possible stage [1, 2].

3. Most common causes of maternal collapse

3.1 Hemorrhage

Worldwide, Hemorrhage is still the leading cause of maternal mortality and it is the leading cause of maternal collapse on the delivery unit. The estimated incidence 3.7 per 1000 maternities. Predisposing factors are multiple pregnancy, high parity, placenta previa, uterine fibroids, and multiple previous caesarian sections, prolonged labour, maternal clotting disorders and preeclampsia. A high index of suspicion can be lifesaving. It is helpful to memorize the risk factors because hemorrhage can be concealed and pregnant women may lose a significant amount of blood without any hemodynamic disturbance. It is important to note that the blood loss is frequently underestimated and if hemodynamic changes become apparent, the mother has usually already lost third of her circulating blood volume.

3.2 Thromboembolism

A careful risk assessment for thrombotic complication should be performed in all pregnant women during the antenatal and postnatal periods. Multiple risk factors can make thromboprophylactic treatment necessary in pregnancy and postpartum for up to 6 weeks depending on risk assessment. Remember that deep venous thrombosis (DVT) of the pelvic venous system is often asymptomatic until pulmonary embolism develops.
3.3 Amniotic fluid embolism

The incidence of AFE is estimated at 1.25–12.5 in 100,000 maternities. While this is an unpreventable event, the speed of diagnosis determines the outcome. Survival rates have improved to 80%; however neurological morbidity is recognized. There is no diagnostic test to determine AFE; therefore, the clinical picture should lead to a high index of suspicion. Clinical features include respiratory distress, followed by cardiovascular collapse with hemorrhage due to coagulopathy within 30 minutes of delivery. AFE can also occur antepartum during labor and become manifest as fetal collapse of unknown origin that precedes maternal collapse. In all cases there is absence of any other significant medical condition or other explanation for the rapid deterioration.

3.4 Sepsis

Morbidity and mortality from pregnancy–related sepsis is common and has not significantly declined in recent years. Sepsis must be treated promptly as a medical emergency and appropriately managed with a 1 hour bundle to improve outcomes [3]. Obstetric risk factors include prolonged rupture of membranes, cervical cerclage, retained placenta and operative trauma. Patient related risk factors include obesity, diabetes mellitus, sickle cell disease and group B streptococcus infection. Adequate antibiotic prophylaxis for patients at risk is crucial. Common clinical signs are temperature, tachycardia and altered mental state, ranging from anxiety to confusion. Special attention should be paid to changes in the respiratory rate as an early diagnostic sign of the physiological reaction to a developing metabolic acidosis due to sepsis.

3.5 Complication of labor analgesia

Even in a correctly sited epidural catheter, a regular top up with local anesthetic drugs can cause maternal collapse due to hypotension; therefore regular blood pressure observations are required after each administration of local anesthetic.

3.6 Resuscitation ‘S&T and ABC’

Preventing a cardiac arrest should be a key priority. Unstable women should be immediately positioned left lateral or left lateral tilted to prevent vena cava compression syndrome. Compromised venous return and reduced cardiac output can precipitate cardiac arrest in critically ill pregnant women. High flow oxygen should be administrated, and venous access established. Maternal hypotension (<100 mmHg systolic or < 80% baseline blood pressure reading) should be treated with a fluid bolus of crystalloid or colloid infusion. Reversible causes of maternal collapse should be considered and treated as necessary. Resuscitation efforts in pregnant women should follow the standardized A, B, C approach with no alternations in the basic algorithm or drugs. The following modification should occur to take into account physiological changes in pregnancy that may hinder successful resuscitation.

S&T: Shout for help and ensure a safe environment. Tilt the patient left lateral if visibly pregnant or beyond 20 weeks gestation. Use a wedge or ask another person to manually displace the uterus during resuscitation.
A for airway: Assess and open airway. Turn the patient onto her back (keep left lateral tilt or manually displace uterus). Check for airway obstruction. Use head tilt and chin lift. Secure airway with endotracheal tube as soon as possible or consider second generation supraglottic airway devices that can prevent aspiration. There is a higher incidence of failed intubation in pregnancy with significant maternal morbidity and mortality. Airway maneuvers should therefore be performed only by an experienced operator and ideally capnography used to confirm correct tube placement.

B for breathing: Assess breathing for 10 seconds. If the patient is not breathing normally start cardiopulmonary resuscitation (CPR).

C for circulation: check the carotid pulse and ensure volume replacement via two large-bore cannulas.

CPR Chest compressions should be performed slightly higher on the sternum than usual, as the maternal diaphragm is elevated in lateral stages of pregnancy. It is important to deliver efficient compressions, which can be less effective with a 15–30 tilt.

Venous access should be established above the diaphragm as soon as possible.

Blood product including clotting factors should be made available at early stage of resuscitation.

Automated external defibrillator (AED): There is a small risk for inducing fetal arrhythmias with defibrillation; however, external defibrillation is considered safe in all stages of pregnancy [4].

4. Management of massive obstetric hemorrhage

Definition

Blood loss >2000 mL (or > 30% of blood volume) is defined as massive obstetric hemorrhage (MOH). There is a tendency to underestimate rather than overestimate the actual blood loss.

Types MOH can occur either in the antepartum period secondary to placental abruption, placenta previa or accrete or in the postpartum period due to the ‘4Ts’ (tone, trauma, tissue and thrombin). Other rare obstetric disorders such as AFE or acute inversion of the uterus may also present with MOH.

Incidence

PPH occurs in 2–10% of delivers but the incidence of major obstetric hemorrhage is estimated to be 3.7–5 per 1000 maternities.

It is estimated that every year about 356,000 women die during childbirth around the world. In the developing world the PPH occurs in about 4–10% of deliveries. The last report of the Confidential Enquiries into Maternal Deaths in the UK has listed PPH as the third most common cause of maternal mortality [5]. Massive blood loss leads to sudden and rapid cardiovascular decompensation and coagulopathy.

4.1 Key etiological factors

Antepartum

- Placenta previa
- Placental abruption
- Rupture of undiagnosed secondary abdominal pregnancy
- Uterine rupture
• Morbidly adherent placenta (accrete, increate, percreta)

Intrapartum

• Amniotic fluid embolism (AFE) with coagulopathy

• Uterine rupture secondary to previous uterine scar or grand multiparity, especially with injudicious use oxytocin.

• Surgical complications (extension of uterine angular tear during cesarean section)

4.2 Key points to massive obstetric hemorrhage

Visible Blood loss >2 L.
Ongoing bleeding (> 150 mL/min).
Loss of >30% of blood volume as assessed by visible blood loss (estimated blood loss or EBL expressed as percentage of estimated blood volume = EBL/100 mL/kg).
Rule of 30 (Rise of pulse >30/minutes, drop in systolic blood pressure by 30 mmHg, increased respiratory rate > 30 per minute, a drop in hematocrit [packed cell volume]by 30%), which is suggestive of at least 30% loss of blood volume.
Shock index (pulse rate/systolic blood pressure) 0.9. Normal Shock Index in pregnancy is between 0.7 and 0.9, as the pulse rate is less than systolic blood pressure.
Tense, tender abdomen with evidence of intrauterine death (massive placental abruption).

5. Management algorism HEMOSTASIS for postpartum hemorrhage

H Ask for Help and hands on uterus (uterine massage).
A Assess (ABC) and resuscitate (crystalloids 2 Colloids 1 L, oxygen by mask (15 L/min).
E Establish etiology (atonic, traumatic, coagulopathy or trauma) ensure availability of blood and administer ecbolic (drugs that contract the uterus: oxytocin or syntometrine intramuscularly).
M Massage uterus.
O Oxytocin infusion/prostaglandins: IV/IM/per rectal (second-line medication to contract the uterus).
S shift to theater: aortic pressure or anti-shock garment/bimanual compression as appropriate.
T Tamponade balloon/uterine packing: after exclusion of tissue and trauma.
A Apply compression structure: B-Lynch/modified.
S Systematic pelvic devascularisation: uterine/ovarian/quadruple/internal iliac.
S Subtotal/total abdominal hysterectomy [6].

6. Complete the ‘3 E’s’ after every obstetric emergency

Examine- For heart rate, blood pressure, uterine contractility and vaginal bleeding and monitor urine output. Replenish lost fluid, blood and blood products adequately.
Explain the delivery event, possible reasons, complications and future plan of the care to the patient (i.e., debrief).

Escalate – complete the Incident Reporting Form and inform senior colleagues as well as to the team to identify learning points to continuously improve patient care.

7. Abdominal pain in pregnancy

Acute abdomen refers to abdominal pain of less than 1 week’s duration requiring admission to hospital, which has not been previously treated or investigated.

Abdominal pain in pregnancy may be secondary to the anatomical and physiological changes of the pregnant state or may be totally unrelated to pregnancy.

Abdominal pain of any degree is a cause of significant maternal anxiety and constitutes a major reason for hospital attendance during pregnancy.

The gravid uterus enlarges to almost 20 times its normal ’non-pregnant ’size, which results in stretching of the supporting ligaments and muscles as well as pressure on the other intra-abdominal structures and layers of the anterior abdominal wall.

20% of the adnexal torsions occur during pregnancy. This rarely includes torsion of the morphologically normal ovary.

8. Common causes of abdominal pain during pregnancy

8.1 Miscarriage

A combination between pain and vaginal bleeding should alert a clinician to a possible threatened, inevitable, incomplete or septic miscarriage. Pain is typically described as a ‘cramping ache’. On examination, the fundal height of the uterus corresponds to the period of amenorrhea and signs of peritoneal irritation are absent.

The internal cervical os might be opened or closed based on the type of miscarriage. An open os is diagnostic of an inevitable or incomplete miscarriage. Ultrasound examination is helpful to confirm viability, intra-uterine pregnancy and exclude a subchorionic hematoma [7].

8.2 Ectopic pregnancy

Pregnancy is rarely located outside the normal endometrial cavity, most commonly in the fallopian tubes. Pain is typically unilateral and colicky. It may be superimposed on dull aching pain and may be associated with dizziness or fainting episodes. On clinical examination, unilateral iliac fossa tenderness, cervical excitation and adnexal tenderness may be elicited. The size (i.e., the measured fundal height) of the uterus is often less than what would be expected for the period of amenorrhea.

Demonstration of an empty uterine cavity on transvaginal ultrasound despite serum beta HCG levels of over 1500 IU/L may help clinician for the diagnosis. Presence of any symptoms including abdominal pain or evidence of significant hemoperitoneum is a contraindication for medical treatment and surgical treatment is indicated. This includes emergency salpingectomy via laparoscopy or laparotomy.
8.3 Ovarian cyst accidents

Ovarian cyst complicate 1 in 1000 pregnancies and a vast majority are benign (98%). Pain is often described as intermittent and unilateral. Torsion also occurs more frequently on the right than the left, by a ratio of 3:2, owing to the presence of the colon on the left that limits the space available for torsion. Clinical examination may confirm tenderness in either iliac fossa and a large cyst may be palpable during abdominal and/or bimanual examination. However, in modern obstetric practice, the cyst is usually detected on ultrasound.

Most torsions and cyst accidents present as an acute abdomen and would warrant surgical treatment. Twenty percent of adnexal torsions occur during pregnancy. This also includes torsion of morphologically normal ovary. About 50% of cases of adnexal torsion have an associated ovarian mass.

In early pregnancy, symptomatic benign ovarian cysts may be removed by laparoscopic ovarian cystectomy. In view of inaccessibility of the adnexa in late pregnancy, a midline or Para median incision is recommended. Any ovarian cyst that exhibits sonographic features that are suggestive of malignancy should be referred to the oncological team for further imaging and appropriate treatment.

8.4 Placental abruption

Abruption placenta refers to the premature separation of normally situated placenta and it occurs in 0.5–1.5% of all pregnancies.

Abdominal pain may be present with or without vaginal bleeding. Fetal heart rate may be absent in severe abruption secondary to utero-placental insufficiency.

There may be varying degrees of hemodynamic compromise secondary to blood loss either vaginally or inside the uterus in the concealed variety.

Immediate senior input should be sought and management includes maternal resuscitation, correction of hypovolemia and coagulation abnormalities through a multidisciplinary approach. Emergency cesarean section should be performed in the event of suspected fetal compromise, once the woman is hemodynamically stable and her coagulation abnormality is corrected.

If an intrauterine death is confirmed, an amniotomy and oxytocin infusion may be commenced. Hemodynamic instability warrants immediate uterine evacuation to avoid morbidity and maternal mortality.

9. HELLP syndrome

Hemolysis, elevated liver enzymes and low platelets (HELLP) Syndrome often arises following preeclampsia. However, in 20% of the women, HELLP Syndrome may be the first presentation of preeclampsia. Women often present with acute right upper quadrant or epigastric pain. They may also have other preeclampsia stigmata that include headaches, vomiting, visual disturbances, irritability and altered consciousness. Systemic examination may reveal raised blood pressure. Abdominal examination might note epigastric pain or right upper quadrant tenderness.

Investigation might depict hemolysis (raised lactate dehydrogenase >500 units/L; bilirubin >12 mg/L), raised liver enzymes (alanine transaminase >70 units/L) and low platelets. Management is aimed at stabilizing blood pressure, seizure prophylaxis, correction of any coagulation abnormality and delivery [8].
10. Conclusion

Obstetrics is a very high risk specialty associated with increased likelihood of patient safety incidents, mainly because this is the only specialty in which clinicians have to critically balance the interests of one human being (the mother) with that of another (the fetus), while providing care.

Rapid evolution of events during labour requires rapid decision-making skills in a highly pressured, high-risk environment, which may contribute to adverse incidents.

Maternity care involves multidisciplinary team approach involving midwives, obstetricians, neonatologists, anesthetists, hematologists, physicians, cardiologists, and other allied specialists. Therefore, issues with communication, culture and team as well as task factors may contribute to patient safety incidents.

In obstetric practice, human factor play an important role in adverse events associated with cardiotocograph (CTG) interpretation and management of obstetric emergencies. Therefore, multiprofessional training in maternity care should incorporate human factors as an essential component.
References


