Overview on Management of Obstetric Emergencies

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Obstetric Emergencies

- Major categories –
  - Haemorrhage
  - Hypertension and seizure
  - Shock and collapse
  - Obstructed labour
  - Fetal distress
- Timing – can begin at one time and then extend
  - Antepartum – from preterm to prelabour at term
  - Intrapartum – can involve both preterm and term labour
  - Postpartum – can occur with vaginal or caesarean delivery, and present several days after delivery
- Involvement – whether it begins with the mother or fetus, eventually both will be affected unless delivery has already occurred

Obstetric Haemorrhage

- Antepartum (APH)
  - Placenta praevia – major or minor type
  - Placental abruption – isolated or associated with other complications e.g. pre-eclampsia, prelabour rupture of membranes
  - Vasa praevia – misdiagnosed as “heavy show”
  - Cervical lesion / cancer
  - Uterine rupture
  - Other extra-uterine causes

Obstetric Haemorrhage

- Intrapartum
  - Continuation of any form of APH but could manifest for the first time especially for
    - Placental abruption
    - Vasa praevia
    - Uterine rupture
  - Lower genital tract lacerations
    - Cervical tear
    - Vaginal tear
  - Coagulopathy / DIC

Obstetric Haemorrhage

- Postpartum (PPH)
  - Continuation of any form of antepartum or intrapartum haemorrhage
  - De novo development of uterine atony – commonest cause of PPH, especially after prolonged stimulated labour
  - Genital tract lacerations / rupture – especially in a scarred uterus or instrumental delivery
  - Retained placenta
  - Combination of causes
  - Coagulopathy can eventually develop, especially if PPH from above causes is not controlled
  - Primary coagulopathy / amniotic fluid embolism

Obstetric Haemorrhage - Management

- Prevention and Anticipation
  - Antenatal identification of at risk cases
    - History – e.g. previous CD
    - Physical examination – e.g. high head
    - Ultrasound assessment – e.g. low-lying placenta
  - High index of suspicion
    - Symptoms – unusual pain with irregular contractions / in early labour
    - Heavy / persistent show
    - Maternal / fetal tachycardia
    - Suspicious cardiotocography
  - Precise diagnosis and clear plan of management
    - When to intervene
    - How to intervene
    - Other precautions / preparations e.g. blood and blood products

Obstetric Haemorrhage - Management

- Monitoring and Resuscitation
  - Maternal
    - Monitor vital signs and pulse oximeter, urine output, blood count and coagulation function, liver and renal function
    - Colloid and crystalloid solution (limited effect)
    - Blood transfusion – early, prompt, sufficient volume
    - Replacement of blood products – anticipation of continuing / increasing requirements if haemorrhage presents before delivery
  - Fetal
    - Monitoring of fetal heart rate and observe changes in pattern
    - Fetal haemorrhage suggested by sinusoidal FHR pattern
    - Maintaining maternal placental circulation
    - Tocolytic agent for APH

Obstetric Haemorrhage - Management

- Definitive Treatment
  - Delivery for antepartum and intrapartum haemorrhage
    - Remove the cause of bleeding
    - Salvage the fetus
    - Remedial action for rupture – e.g. repair / hysterectomy
    - Other treatment feasible after delivery – e.g. uterine artery embolisation
  - Specific treatment for different causes of PPH
    - Oxytocics
    - Surgical procedures – repair / hysterectomy / internal iliac artery ligation / uterine artery ligation / compression sutures / balloon tamponade
    - Replacement of blood and blood products
  - Treatment for other complications
    - ARDS
    - Renal failure

Hypertension / Seizures

- Hypertension can be due to
  - Chronic hypertension (essential or secondary)
  - Pregnancy-induced
  - Pre-eclampsia
- Seizures can be due to
  - Eclampsia
  - Cerebrovascular accident
  - Underlying neurological conditions e.g. epilepsy
  - Other conditions e.g. hyponatraemia

Confidential Enquiries into Maternal Deaths

	1997-99	2000-02	2003-05	2006-08
Cerebral total	7	9	10	14
ICH	7	9	9	9
Eclampsia	0	0	0	5
Infarct	0	0	1	0
Pulmonary total	2	1	0	0
Hepatic total	7	4	4	5

CMACE, BJOG 2011

Confidential Enquiries into Maternal Deaths

- Hypertension is one of the leading causes of maternal deaths, and related to age (>40 about 5-fold greater than ≤ 25)
- Underlying cause of death include cerebral and others such as pulmonary (ARDS, pulmonary oedema, pneumonia)
- Substandard care often involved, and include
  - Inadeqaute consultant involvement
  - Failure to take prompt action / appreciate the severity of the disease / appropriate monitoring including fluid balance
  - Failure to be transferred to a tertiary center

Confidential Enquiries into Maternal Deaths

- CNS related causes of death
  - Subarachnoid haemorrhage
  - Intracerebral haemorrhage
  - Epilepsy (sudden death is a feature of epilepsy)
  - Cerebral thrombosis
- So a pregnant women who happened to have hypertension and then died following a “seizure” could actually have died from an underlying CNS condition, or that pre-eclampsia could have aggravated the CNS condition leading to death

Confidential Enquiries into Deaths from Anaesthesia

- Perioperative anaesthetic management contributed to maternal death in 2 cases of pre-eclampsia / eclampsia in 2000-2
- Factors include
  - Lack of multidisciplinary cooperation
  - Lack of appreciation of the severity of the illness
  - Lack of perioperative care
  - The management of haemorrhage

Cooper & McClure, Br J Anaesthesia 2005

Management of Hypertension

- Identification of at-risk women
- Assessment of BP – SBP more reliable, better correlated with
  - Fetal prognosis
  - Risk of placental abruption
  - Risk of CVA, eclampsia
  - Risk of renal complications
- Adequate control of BP before labour / delivery helps to prevent adverse outcome
- Monitoring of maternal vital signs and urine output
- Serial laboratory tests to monitor progression
- Intrapartum analgesia
- Prepare for emergency CD and eclampsia
- Maintain adequate hydration and IV access
- Watch out for complications e.g. vaginal bleeding, CTG changes
- Prophylactic $MgSO_4$ treatment

Identification of At-risk Women for PE

- Traditional risk factors:
  - nulliparity/different spouse
  - family history
  - past obstetric history
  - underlying medical diseases esp chronic HT
  - maternal diabetes
  - IUGR / suspicious CTG (placental insufficiency)
  - APH
- Blood pressure ↑in labour compared with booking BP – SBP ≧ 30 and/or DBP ≧15

IP Monitoring of Hypertensive Women

- Standard monitoring
  - BP, pulse, temperature, respiratory rate, SaO_2
- Vaginal bleeding – distinguish from show
- Bruising, collapsed veins
- Clinical symptoms/signs - maternal distress, restlessness, unusual pain, struggling, sitting up, hyperreflexia, ankle clonus, epigastric / RUQ pain and tenderness, visual disturbances
- CVP / PCWP – only in special circumstances

IP Management of Hypertensive Women

- All hypertensive patients should be fasted in labour
- At least 2 IV access, one for medications and the other for fluid replacement
- Monitor fluid I/O, renal function and electrolytes, blood count and coagulation:
  - contracted intravascular volume
  - decreased renal perfusion
  - reduced plasma oncotic pressure
  - Na^+ and K^+ depletion
  - acidosis
  - Platelet consumption, development of DIC

Antihypertensive Treatment

- Aim to prevent the damage caused by hypertension such as cerebral haemorrhage, and eclampsia
- BP level for starting treatment depending on previous management – whether already given antihypertensive treatment before
- Generally start treatment if SBP ≧160 or symptoms / signs of impending eclampsia
- Avoid excessive hypotension →
  - ↓ placental perfusion → fetal distress
  - ↓ renal perfusion → oliguria
  - ↓ cerebral perfusion → eclampsia, stroke

Treatment for Acute Hypertension

- Aim to keep DBP at ~90 mmHg and SBP <140 mmHg
  - Hydrallazine 5mg IV, then 5-10mg q 15-30 min or infusion of 0.5-10mg/h
  - Labetolol 20mg IV, then 20-80mg q 20-30 min up to 300mg, or infusion of 1-2mg/min till desired effect, then maintenance at 0.5mg/min
- No Nifedipine in labour

Hyponatraemia in Pre-eclampsia

- Rare complication, diagnosed if serum Na^{++} <130 mmol/l
- Reported cases with high incidence of twins
- Tended to be associated with nephrotic syndrome or SIADH
- Can lead to seizures indistinguishable from eclampsia
- Fetus can be similarly affected
- Fluid restriction and delivery are the main lines of management

Clinical Aspects of Eclampsia

Timing

- Antepartum – 38% to 67%
- Intrapartum – 18% to 36%
- Postpartum – 11% to 44%
  - ≤ 48 hours – 5% to 39%
  - >48 hours – 5% to 26%

Symptoms

- Headache – 50% to 70%
- Visual changes – 19% to 32 %
- RUQ / epigastric pain – 12% to 19%
- One or more of the above – 59% to 75%

Sibai, Obstet Gynecol 2005

Management of Eclampsia

During convulsion

- Raise bedside rails (padded), physical restraints if necessary
- Padded tongue blade inserted between the teeth if possible
- Place in left lateral position
- Oral suction
- Oxygen via face mask (8-10 L/min)

Prevent recurrent convulsion

- $MgSO_4$ loading (4-6g IV) over 15-20 min, then maintenance of 2g/h by infusion. Serum Mg level requires monitoring only if renal dysfunction or absent reflexes
- About 10% will have a second convulsion after $MgSO_4$, for these women, another bolus of 2g can be given IV over 3-5 min
- Control BP – keep SBP at 140-160 and DBP at 90-110 with IV bolus doses of hydralazine (5-10 mg) or labetolol (20-40 mg) q15 min as needed

Sibai, Obstet Gynecol 2005

Management of Eclampsia

If Fetus still in utero

- It is advantageous to allow in utero recovery
- If bradycardia and/or recurrent late decelerations for 10-15 min, should arrange for urgent delivery

CS considered if

- GA <30 wks and not in labour
- Bishop score <5
- RA unless contraindicated as GA increases risk of aspiration and failed intubation due to airway oedema and risk of marked elevation of systemic and cerebral pressure during intubation and extubation

Vagina delivery if

- Already in labour
- If GA >30 wks, induce with oxytocin or PG, or Bishop score ≥ 5 at <30 wks
- Opioids or epidural for analgesia

Sibai, Obstet Gynecol 2005

Management of Eclampsia

Postpartum

- Continue $MgSO_4$ for at least 24 h after delivery and at least 24 h after the last convulsion. If oliguria, reduce rate of fluid infusion and dose of $MgSO_4$
- Close monitoring of vital signs, I/O, and symptoms for at least 48 h
- Look out for pulmonary oedema and exacerbation of HT
- Oral medications for control of HT
  - Labetolol 200mg Q8h, or
  - Nifedipine 10mg q6h
  - Profound neuromuscular blockade following the combined use of nifedipine and $MgSO_4$ is anecdotal. Can be reversed with 10% Ca gluconate (1g) IV Opiods or epidural for analgesia

Sibai, Obstet Gynecol 2005

If atypical neurological signs persisted, arrange MRI

Zeeman, Semin Perinatol 2009

Postpartum Eclampsia

- Occurring postpartum but within 6 weeks, tended to be in multiparas (55%) and 2/3 were readmitted after discharge
- Found in 16-18% of cases of postpartum pre-eclampsia (of which the majority were not diagnosed with pre-eclampsia beforehand)
- Accounted for 1/3 of cases of eclampsia
- Associated with high incidence of labour complications –
  - Chorioamnionitis
  - Abruption
  - PPH

Chames et al, AJOG 2002
Matthys et al, AJOG 2004
Yancey et al, J Emerg Med 2011

Postpartum Eclampsia

- Prodromal symptoms in all cases of seizure, include
  - Headache
  - Visual changes
  - Nausea and vomiting
  - SOB/ chest pain
  - Epigastric pain
  - Features of pre-eclampsia
- Complications include
  - Aspiration pneumonia
  - Pulmonary oedema
  - Pleural effusion
  - DIC
- No maternal death reported in recent series

Chames et al, AJOG 2002
Matthys et al, AJOG 2004
Yancey et al, J Emerg Med 2011

Risk Factors for Maternal Morbidity in Eclampsia

- Associated complications (n=399)
  - Abruptio placentae – 10%
  - HELLP – 11%
  - DIC – 6%
  - Neurologic deficit and aspiration pneumonia – 7%
  - Pulmonary oedema – 5%
  - Cardiopulmonary arrest – 4%
  - Acute renal failure – 4%
  - Death – 1%

Sibai AJOG 2000

Stroke In Association With Severe Pre-eclampsia / Eclampsia

- 61% were in multiparas (total cases=28)
- 57% postpartum within 5 days
- Imaging studies indicated that 93% were haemorrhagic-arterial stroke, multiple sites without distinct pattern in 37%
- In the 24 treated before stroke, all had SBP >155 mmHg but only 12.5% with DBP ≥ 110 mmHg, and only 25% had MAP of 130 mmHg. Antihypertensive given to 12.5% only
- Eclampsia occurred in 29%
- MgSO4 infusion was being given at time of stroke in 43%
- Poststroke DBP >110 mmhg only in 18%
- Mean elevation of SBP and DBP between baseline and prestroke values were 64.4 mmHg and 30.5 mmHg
- No difference in BP between patients with or without HELLP

Martin et al, Obstet gynecol 2005

Stroke In Association With Severe Pre-eclampsia / Eclampsia

Symptoms

- Headache – 95.8%
- Nausea and vomiting – 62.5%
- Epigastric pain – 54.2%
- Visual problems – 37.5%
- Somnolence or sensorium change – 29.2%
- Seizure – 25%
- Syncope – 12.5%
- Malaise – 12.5%
- Unilateral weakness – 8.3%

Signs

- Proteinuria 3-4 plus (58.3%)
- Facial oedema – 41.7%
- Macroscopic haematuria – 4.2%
- Oliguria – 4.2%

Martin et al, Obstet gynecol 2005

Stroke In Association With Severe Pre-eclampsia / Eclampsia

Morbidity and Mortality

- Coma – 53.6%
- Decreased consciousness – 42.9%
- Pulmonary oedema – 35.7%
- Eclampsia – 28.6%
- Visual compromise – 28.6%
- Slurred speech – 10.7%
- Subsequent seizure – 10.7%
- Other pulmonary – 10.7%
- Renal compromise – 7.1%
- Transfusion or plasma exchange – 25%
- Death – 53.6%

Martin et al, Obstet gynecol 2005

Paradigm Shift in the Management of Pre-eclampsia / Eclampsia (1)

- Alteration in cerebral circulation and failure of autoregulation may occur despite minimal BP ↑ or mild clinical picture, and it is difficult to predict the degree of endothelial dysfunction
- About 1/5 of eclamptic women had SBP <140 mmHg before convulsion, and 2/3 had maximum MAP <120 mmHg
- The critical threshold is therefore related to the patient's customary BP before onset of HT, and the relative rapidity of changes is of primary importance

Paradigm Shift in the Management of Pre-eclampsia / Eclampsia (2)

- Simply lowering BP below a preset threshold of 160/105 mmHg may not be enough in some subpopulations, but this is the most important consideration
- Blood pressure reduction alone does not always prevent either PRES or haemorrhagic stroke
- MgSO4 is effective in the prevention and treatment of eclamptic seizures, but it does not affect overall maternal and perinatal mortality and morbidities
- The following symptoms should be taken seriously
  - Persistent occipital or frontal headaches (loss of autoregulation)
  - Blurred vision / photophobia
  - Epigastric or RUQ pain
  - Altered mental status

Sibai AJOG 2004

Zeeman Semin Perinatol 2009

Shock and Collapse

- Can occur antepartum, intrapartum, and postpartum
- Usually following known complications
  - APH
  - Known previous CD / VBAC
  - PE / Hypertension
  - PPH
- Sudden onset without preceding features, consider
  - Uterine inversion – previous attempts at MROP
  - Amniotic fluid embolism – rapid labour / delivery, excessive oxytocin stimulation
  - Pulmonary embolism – prolonged bed rest especially after CD, history of DVT, previous AN anticoagulation prophylaxis
  - Cardiac arrhythmia / cardiomyopathy – relevant medical history, twins

Shock and Collapse

- Management
  - Resuscitation – following general principles
  - Identify associated features to facilitate diagnosis for definite treatment
  - If undelivered, consider urgent delivery – including paramortum CD
  - Involve other specialties and manage as a team
  - Do not give up easily especially for young and previously healthy mothers
  - Inform relatives – keep them updated
  - After stabilisation, transfer to ICU to work out the underlying problems if no immediate definitive diagnosis can be made
  - Neurological imaging studies should be arranged if diagnosis uncertain and / or patient remaining unconscious

Fetal Distress

- Can occur antepartum or intrapartum
- Often associated with known complications
  - APH
  - Known previous CD / VBAC
  - PE / Hypertension
  - Fetal growth restriction
  - Induction of labour
  - Rupture of membranes
  - Preterm labour
  - Polyhydramnios
- Sudden onset without preceding features, consider the following
  - Uterine rupture
  - Concealed accidental haemorrhage
  - Chorioamnionitis
  - Cord accidents
  - Fetal haemorrhage
  - Undiagnosed fetal anomalies
  - Undiagnosed fetal congenital infection

Fetal Distress

- An understanding of underlying factors and mechanisms can enhance treatment
- New stress on a normal or compromised fetus, or additional stress on a compromised fetus who then decompensated
  - Maternal circulatory disturbance – blood loss, decreased placental perfusion
  - Maternal hypoxia
  - Maternal infection / pyrexia
  - Maternal medication effect – e.g. hypotension from overtreatment
  - Uterine hyperstimulation
  - Cord compression / occlusion
  - Fetal blood loss – vasa praevia, fetal-maternal transfusion
- Underlying fetal compromise can be due to
  - Congenital anomalies, genetic / chromosomal problems
  - Congenital infection
  - Fetal growth restriction, often undiagnosed
  - Chronic placental inflammation
  - Fetal anaemia from various causes – e.g. isoimmunisation
  - Transplacental drug effect especially on the CNS – e.g. cocaine

Fetal Distress - Management

- Definitive treatment is delivery in the quickest and least traumatic way – may not be CD if fetal distress detected at the late first stage or second stage of labour
- Improvement of maternal condition while waiting for delivery
  - Prevent / reverse supine hypotension by turning the mother lateral
  - Re-hydration and expansion of intravascular volume
  - Oxygen
  - Discontinue oxytocin infusion
  - Maternal blood transfusion
  - Antipyretic treatment
  - Antibiotic treatment
- Fetal resuscitation before delivery
  - Tocolytics – nifedipine, beta-mimetics, nitroglycerine
  - Amnioinfusion
  - Replacement of prolapsed umbilical cord
  - Relief of umbilical cord compression
    - Distend the bladder
    - Maternal Trendelenberg position
    - Maternal knee-chest position

Obstetric Emergencies - Conclusion

- Obstetric emergencies will always happen and are unavoidable
- Outcome can be enhanced by
  - Availability of experienced staff and adequate manpower
  - Availability of support from other specialties – physician, anaesthetist, intervention radiologist, neonatologist
  - Established protocols – ensure everyone knows what to do for specific problems
  - Drills – ensure everyone knows how to respond and participate in teamwork
  - Audits – examine for pitfalls and learn from mistakes, revise protocols

Thank you for your attention

The pure and simple truth is rarely pure and never simple.

Oscar Wilde