

TRAUMA DURING PREGNANCY

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Introduction

- ▶ Trauma during pregnancy is a leading cause of maternal mortality in the UK
 - ▶ Mainly RTCs, violent suicide and homicide
- ▶ Complex management and decision-making
 - ▶ Needs of mother and fetus
 - ▶ Anatomical and physiological changes mandate modification of trauma management principles
 - ▶ Urgent delivery of the fetus may be required
 - ▶ Fetal injury can predominate over that of the mother
 - ▶ Obstetric teams may be unfamiliar with ED environment and major trauma management
 - ▶ Trauma team may be unfamiliar with emergency obstetric care

Epidemiology

- ▶ Progressive decline in morbidity and mortality after trauma since 2012
- ▶ 6-8% of pregnancies are reported to be complicated by **some degree of trauma**
- ▶ In the UK, 1 in 100 women of child-bearing age who suffer **major trauma** will be pregnant
- ▶ Most common mechanism of injury
 - ▶ RTC > Falls > Assault

Trauma Call

- ▶ Pre-alert
 - ▶ If a female of child-bearing age, specific enquiry should be made to pregnancy status
 - ▶ Gestation?
 - ▶ Any suspicion of pregnancy call for urgent request for obstetric and neonatology support
- ▶ TTL as per norm for your trust
- ▶ Additional roles (dependent on gestation and clinical status of woman)
 - ▶ Manual uterine displacement and fetal heart rate assessment (nurse/midwife)
 - ▶ Resuscitative hysterostomy team (obstetrics)
 - ▶ Neonatal resus team
- ▶ Contact haematology and lab regarding pregnancy status

Initial Assessment and Resuscitation

- ▶ Estimate gestational age if patient unable to inform team
 - ▶ Fundal height as crude estimate

Prime objective

Resuscitation and stabilisation of the mother

Prompt management of maternal hypoxaemia and hypotension will optimise oxygen delivery to the fetus and improve fetal outcome.

Airway and Spinal Immobilisation

- ▶ Airway management is increasingly difficult as pregnancy advances
 - ▶ Early intubation is appropriate if airway issues are present/anticipated
 - ▶ Induction drugs should be tailored to individual circumstances
- ▶ Preoxygenation
 - ▶ 30 degree head-up tilt and reduce aortocaval compression
 - ▶ Apnoeic oxygenation techniques are advocated
- ▶ Failed intubation
 - ▶ Maternal oxygenation must be prioritised
 - ▶ Follow DAS guidance
 - ▶ FONA may be challenging - longitudinal incision may be required

Breathing

- ▶ Respiratory compromise can be rapid
 - ▶ Increased O₂ demand, reduced supply
 - ▶ Aim for sats >94%
- ▶ Haemopneumothorax
 - ▶ Require immediate thoracic decompression
 - ▶ As pregnancy advances, cephalad displacement of abdominal viscera and the diaphragm occurs.
 - ▶ Place thoracostomy tubes 1-2 spaces above the usual 5th intercostal space but still within triangle of safety
 - ▶ Use ultrasound guidance for diagnosis and placement where appropriate
 - ▶ CT has a higher sensitivity than US, therefore if not unstable, delay decompression until CT performed

Circulation

- ▶ >20 weeks gestation - immediate relief of aortocaval compression
- ▶ 2 large bore cannulas or IO if required
- ▶ Blood tests as per non-pregnant trauma
 - ▶ Interpretation will depend on gestation of pregnancy
- ▶ Lower threshold for arterial line if cardiorespiratory compromise

- ▶ Kleihauer-Betke blood test
 - ▶ Provides indication of the degree of fetomaternal haemorrhage after uteroplacental injury

Catastrophic Haemorrhage

- ▶ Urgent need to achieve rapid haemostasis is compounded by pregnancy
- ▶ High index of suspicion and early identification is key
 - ▶ Examination, bedside investigations and CT
 - ▶ Placental abruption and uterine rupture lead to concealed, non-compressible haemorrhage
 - ▶ Pelvic fractures are of extreme concern
- ▶ Fetal assessment/monitoring is included in the primary survey if possible
- ▶ Approach to fluid resuscitation is controversial
 - ▶ Permissive hypotension
 - ▶ Fixed-ratio blood product replacement

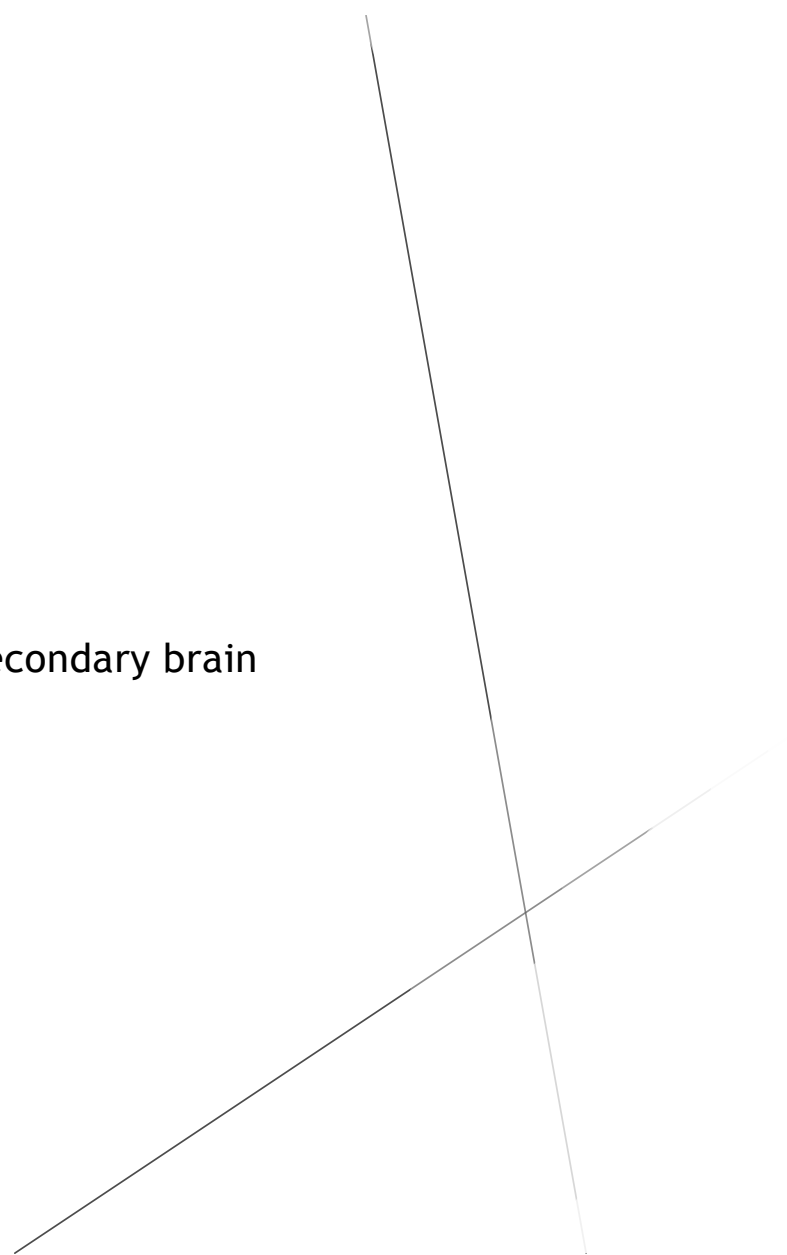
Maternal Cardiac Arrest

- ▶ Managed as per ALS principles
- ▶ Modifications after 20 weeks
 - ▶ Uterine displacement
 - ▶ Resuscitative hysterotomy
 - ▶ Relieves aortocaval compression
 - ▶ Improves respiratory dynamics
 - ▶ Provides placental autotransfusion
 - ▶ Ultimately, optimises chest compressions, oxygen delivery and cardiac output

Disability/Neurology

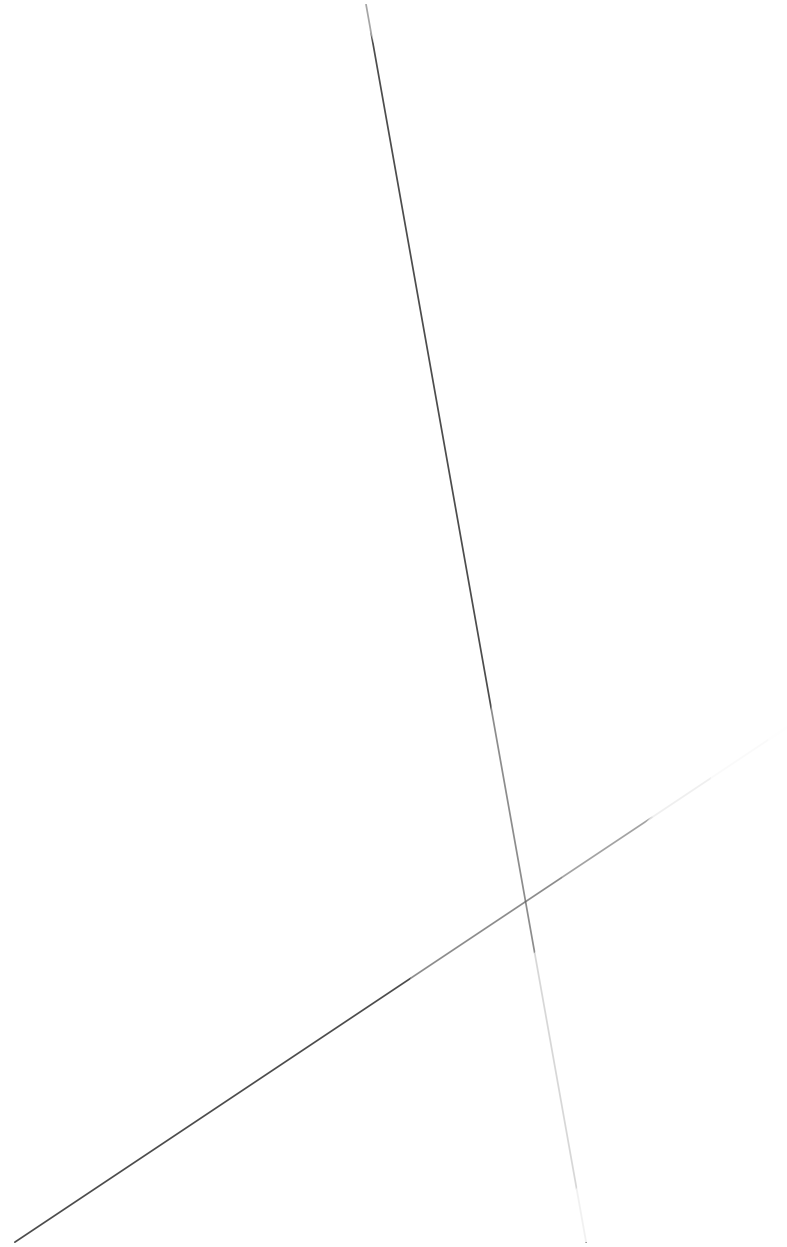
- ▶ GCS
- ▶ Pupils

- ▶ In suspected TBI, maintain cerebral perfusion and prevent secondary brain injury



Exposure and Environment

- ▶ Prevent hypothermia
- ▶ Identify concealed injury or haemorrhage
 - ▶ Particular attention to vaginal bleeding



Trauma Imaging

- ▶ Pregnant patients with high risk mechanisms of injury often have appropriate imaging withheld because of concerns relating to fetal irradiation and exposure to IV contrast
- ▶ The potential benefit to maternal and consequently fetal outcomes achieved through identification and rapid control of haemorrhage outweighs the minimal risk to the fetus secondary to irradiation
- ▶ US and plain films are appropriate during resuscitation of a patient to unstable to transfer to CT
 - ▶ eFAST is increasingly limited with increasing gestation

Stability after initial resus

Stable

- ▶ Definitive control required for bleeding points identified on CT
- ▶ May involve delivery of the fetus

Unstable

- ▶ Damage control surgery
- ▶ Ideally with CT but not always possible
- ▶ Obstetric team **MUST** be present
- ▶ Continue medical management of haemorrhagic shock

Mechanisms and patterns of injury

- ▶ RTC
 - ▶ >50% maternal trauma
 - ▶ Shear forces/contra-coup from rapid deceleration → placental abruption/uterine rupture without other obvious injuries
 - ▶ Incorrect or non-use of seat belts increase risk of such injuries
- ▶ Falls
 - ▶ Low-height falls are common, usually no significant injury
- ▶ Physical assault and self-inflicted violence
 - ▶ 8% of women experience domestic abuse, higher risk during pregnancy
 - ▶ Suicide attempts are more often by violent means during pregnancy

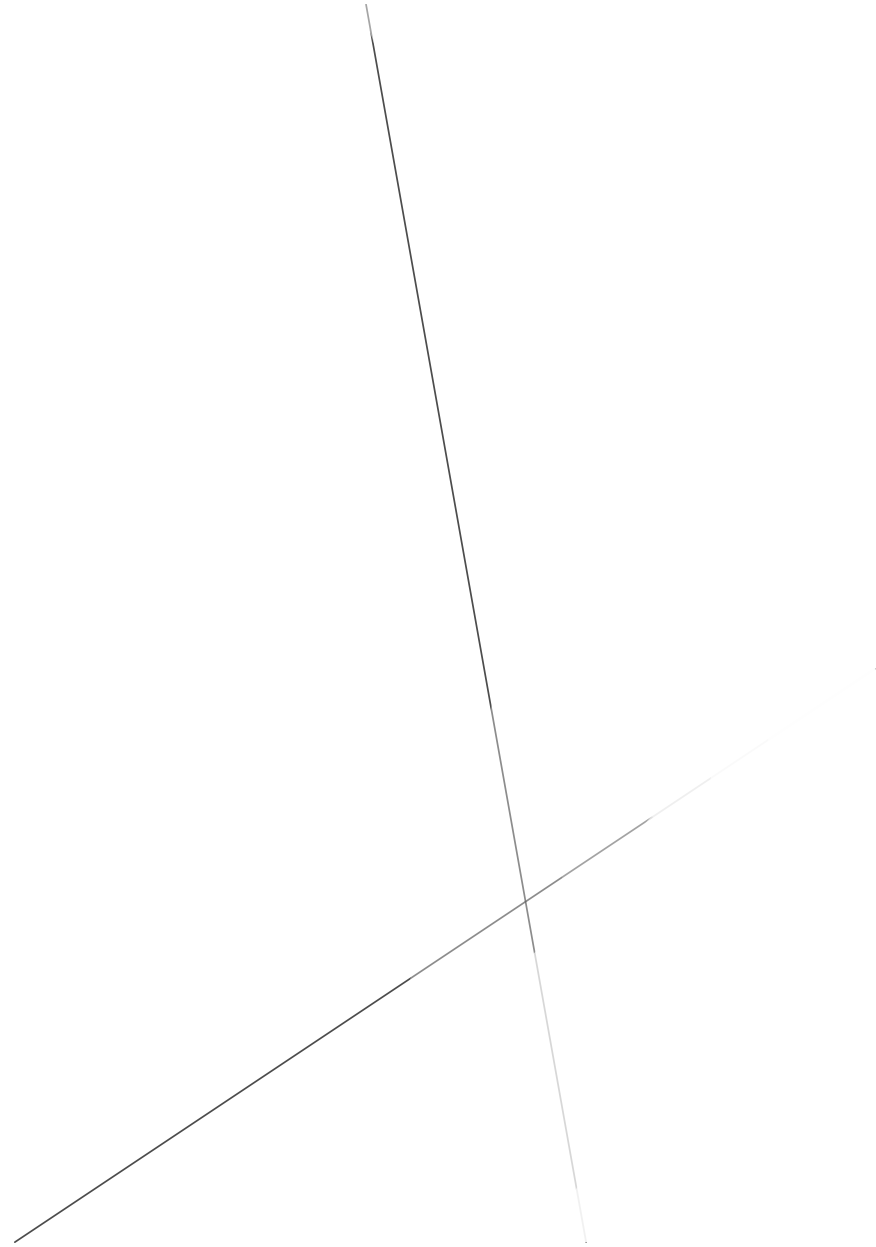
Mechanisms and patterns of injury

- ▶ Burns
 - ▶ Rare during pregnancy
 - ▶ Airway burns - intubate early
 - ▶ Significant burns require aggressive fluid resuscitation to maintain uteroplacental perfusion
 - ▶ Urgently manage hypoxaemia
- ▶ Blunt vs penetrating trauma
 - ▶ Vast majority of trauma is blunt
 - ▶ Higher incidence of penetrating trauma in pregnant vs non-pregnant women
 - ▶ Penetrating trauma consequences depend on gestation

Obstetric assessment and management

- ▶ Obstetric and fetal assessment should be completed as part of the secondary survey if input not required earlier in resuscitation
 - ▶ Early pregnancy - fetal heart auscultation
 - ▶ 26 weeks onwards - CTG
- ▶ Non-reassuring fetal assessment may indicate
 - ▶ Direct uterine trauma
 - ▶ Uterine rupture
 - ▶ Placental abruption
- ▶ Ultrasound
 - ▶ Gestation, uteroplacental pathology, fetal injury, placental localisation

Questions?



Summary

- ▶ Key principles of major trauma management remain the same
- ▶ Best care for mother means best care for fetus
- ▶ Particular attention
 - ▶ Gestation
 - ▶ Uterine displacement
 - ▶ Evidence of placental abruption and uterine rupture
 - ▶ Caution regarding clotting factors
 - ▶ Do not delay imaging
- ▶ Multidisciplinary working is a must
- ▶ Document and Debrief