PREGNANCY – MANAGEMENT OF THE PREGNANT TRAUMA PATIENT, ST GEORGE HOSPITAL

1. Purpose	A guide to providing treatment and management of pregnant women with trauma
2. Risk Rating	Medium
3. National Standards	1 – Clinical Governance 3 – Preventing and Controlling Healthcare Associated Infection 4 – Medication Safety 5 – Comprehensive Care 6 – Communicating for Safety 7 – Blood Management 8 – Recognising and Responding to Acute Deterioration
4. Employees it Applies to	Emergency Department nursing and medical staff, Trauma Service, General Surgery, Obstetric Services, Registered Midwives

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5. PROCESS

5.1 WOMEN WITH MINOR TRAUMA WHO CONTACT AND/OR ATTEND THE BIRTH UNIT

- Women who have minor trauma (e.g. a fall, minor motor vehicle accident) may attend the Birth Unit for review (contact 9113 2125 for advice)
- Women who describe non-obstetric trauma should be advised to attend the Emergency Department first
- On arrival, the woman should have a set of maternal observations, and a Cardiotocograph (CTG) if >25 weeks gestation, or fetal heart auscultation if <25 weeks gestation
- Arrange a medical review

- Consider Kleihauer test, and Anti D if Rh negative
- If >25 weeks, perform 4 hours of continuous CTG monitoring prior to discharge

5.2 WOMEN WHO ATTEND THE EMERGENCY DEPARTMENT

- In the first instance, a patient should be triaged and the Trauma Team Activation (process followed as usual practice based on mechanism of injury, identified/suspected injuries and clinical signs).

Initial treatment and imaging priorities in the pregnant trauma patient are the same as for the non-pregnant patient.

- For those women meeting Trauma Team Standby criteria, the obstetrics team should be asked to consult as per SGH WCH CLIN012 Management of pregnant & Post-partum (<6 weeks PP) women presenting to the Emergency Department at St George Hospital
- For those women meeting a Trauma Team Required criteria, an **Obstetric Rapid Response** should be also activated as per SGH WCH CLIN012 Management of pregnant & Post-partum (<6 weeks PP) women presenting to the Emergency Department at St George Hospital

5.2.1 Blunt trauma in the pregnant population

- Direct fetal trauma can cause organ rupture, c-spine and skull fractures, intracranial haemorrhage and cord rupture
- Indirect fetal trauma such as crush mechanism, deceleration, contra-coup and shearing forces can cause uterine rupture, placental abruption, feto-maternal haemorrhage and pre-term labour
- Pre-hospital extrication of the pregnant woman may be prolonged due the increased body habitus

5.2.2 Penetrating trauma in the pregnant population

- Penetrating injuries in the pregnant woman is managed in the same manner as the non-pregnant woman

5.2.3 Patients who meet the Trauma Team Standby (TTSB) Criteria

- A consult from the obstetric registrar +/- midwife should be requested upon triage and activation of TTSB
- For those patients < 25 weeks gestation the fetal heart should be assessed by auscultation
- For those patients ≥ 25 weeks gestation the fetal heart should be monitored using CTG for a minimum of 4 hours
- Observations: record the maternal observations on Standard Maternity Observation Chart (SMOC) or Antenatal Short Stay Observation Chart (ASSOC).
- Activate an **Obstetric Rapid Response** if:
  - Active vaginal bleeding
  - Severe pain
  - Maternal observations in the Red Zone on SMOC
  - Fetal heart rate abnormal
- Complete comprehensive history and physical examination
- Pathology: Normal ED bloods, Beta HCG level in early pregnancy plus Kleihauer for all patients. The Kleihauer is the method for detection of feto-maternal bleeding. For those who are Rhesus

negative a dose of Anti D according to gestation as per NSW Health GL2015_011 Maternity - Rh (D) Immunoglobulin (Anti D) should be given regardless of Kleihauer result. Once the Kleihaur result is available, a subsequent dose should be based upon the Kleihauer result

- For most women ≥ 25 weeks gestation continue CTG monitoring for at least 4 hours, or FHR recording every 15 - 30 minutes < 25 weeks gestation NSW Health GL2018_025 Maternity Fetal Heart Rate Monitoring
- If the patient requires an admission this should be a joint admission with AMO2 being obstetrics

5.2.4 Patients who meet the Trauma Team required (TT) Criteria

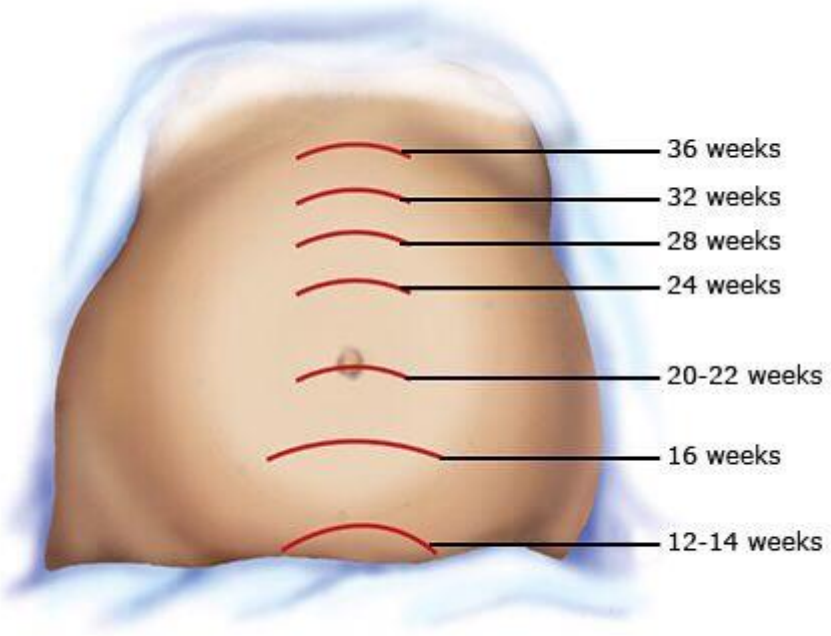
- An Obstetric Rapid Response should be activated upon the activation of TT (even with pre-hospital notification) regardless of gestational age
- The general approach to the hemodynamically unstable trauma patient should be applied in the first instance

5.2.5 Obstetric Assessment

- A patient history should include the estimated due date (EDD), date of last menstrual period if ultrasound EDD is yet to be performed or not known and any relevant pregnancy related history

Gestational age can be determined by measuring the fundus. A viable fetus is 24-26 weeks gestation

Gestational Age in weeks	Location of the uterus
12-14	Sits just above the pubis
16	Halfway between the pubis and umbilicus
20-22	At the umbilicus
28	Halfway between the umbilicus and xyphoid
32	¾ of the way between the umbilicus and xyphoid
36-40	Near xyphoid



5.2.6 Physiological Considerations

5.2.6.1 Airway

- There is an increase in patient habitus, respiratory tract mucosal oedema, decreased function residual capacity, reduced respiratory compliance and increase airway resistance and increased oxygen requirements therefore an increase in intubation difficultly should be anticipated
- A difficult airway should be anticipated and a smaller size ETT is recommended

5.2.6.2 Cardiovascular

- Increased preload from an increase in circulating blood volume
- Decreased afterload from declining vascular resistance
- Increased maternal heart rate, by 15-20bpm
- Supine positioning can decrease cardiac output by 25-30% due to inferior vena cava compression, therefore patient should be wedged at 15° to the left lateral position
- Systolic BP should be maintained above 90mmHg

5.2.6.3 Pulmonary

- Decreased functional residual capacity due to the displacement of the diaphragm after 20 weeks gestation
- Oxygen consumption increase by 20%

5.2.6.4 Haematological

- Plasma volume increase by 50% by 32 weeks gestation
- Increasing haemo-dilution as the pregnancy progresses
- Pro-coagulant state with the normal fibrinogen concentration greater than in the non-pregnant population

5.2.6.5 Gastrointestinal

- Increased risk of aspiration therefore the need for an orogastric tube in the intubated pregnant trauma patient should be considered early
- Stretching of the peritoneum decreases its sensitivity and may mask sings of peritonitis

5.2.6.6 Uterus

- For the first 12 weeks, the uterus is contained within the pelvis therefore protected by the bony structure
- In the second trimester and the third trimester, injures to the fetus tend to be more severe. There is a physiological decrease in the amniotic fluid and the majority of the fetus lies above the protective confines of the bony pelvis. Once the fetal head has entered the inlet of the pelvic ring, the fetus is more vulnerable to acceleration/deceleration forces
- The pelvic vasculature is dilated in pregnancy therefore there is an increased risk in rapid exsanguination
- Uterine blood flow is as high as 600ml/minute in the 3rd trimester and not auto-regulated, thus a decreased in maternal systolic pressure can cause a significant fall in blood flow leading to a fall in fetal oxygenation. Consideration in this patient group should be given to bladder and urethral injury as well as fetal skull fracture.

5.2.7 Modification of Trauma Adjuncts for Pregnancy

- Oxygen: should be supplemented due to increase oxygen requirements
- Positioning and C-Spine immobilisation: women 20+ weeks gestation should continue to be managed with spinal precautions are indicated however should be wedged to the left lateral position
- Intercostal Catheter for pneumothorax and haemothorax given the diaphragm is elevated during pregnancy the procedure should be modified with the insertion point 1 or 2 intercostal spaces higher than for the non-pregnant patient
- Transfusion: Massive Transfusion Protocol should be activated as per usual practice. O-Neg blood should be used as per usual practice until cross matched product is available. In maternity patients, fibrinogen levels increase to an average of 5–6 g/L by term. Hypofibrinoginaemia is < 2.0g/L, so consideration to correcting hypofibrinoginaemia should occur at this level or if levels are rapidly falling.
- Cardiopulmonary Resuscitation (CPR): Standard Traumatic cardiac arrest principles should be followed. See 6.0 for further information
- Pathology: Normal ED bloods plus Kleihauer for all patients. The Kleihauer is the method for detection of feto-maternal bleeding. For those who are Rhesus negative a dose of Anti D 625 units should be given regardless of Kleihauer result. Once the Kleihaur result is available, a subsequent dose should be based upon the result.
- Investigations: In cases of major Trauma, radiological studies are indicated for maternal evaluation and should not be deferred or delayed due to concerns regarding fetal radiation exposure

5.2.8 Early Identification of Uterine Trauma

- Upon the completion of the primary survey and as part of the secondary survey in a Hemodynamically unstable pregnant trauma patient the following should be assessed rapidly:
  - Presence of vaginal blood loss

- Description of severe abdominal pain either described by the trauma patient or described on scene prior to airway being secured/patient being sedated
- Signs of fetal HR abnormality
- Sustained contractions
- Rupture of membranes
- Fibrinogen < 2.0g/L
- Uterine tone

5.2.9 Investigations

- FAST: The diagnostic yield of FAST decreases as the 2nd and 3rd trimesters advances
- An urgent obstetric ultrasound scan should be undertaken when the gestation age is undetermined and need for delivery is anticipated

5.3 TRAUMATIC CARDIAC ARREST IN THE PREGNANT PATIENT

- Follow usual practice for trauma cardiac arrest giving special consideration to the following:
  - Activation of an **Code Blue Obstetric**
  - CPR is less effective due to reduced chest compliance in the pregnant trauma patient use a wedge or displacement device under left side
  - CPR becomes less effective towards the later stages of pregnancy even with uterine displacement

Emptying the uterus by performing a **Resuscitative Hysterotomy (Peri-Mortem Caesarean section)** increases the effectiveness of CPR and can save a mother's life. The aim would be to perform a Resuscitative Hysterotomy (24 weeks + gestation) within 4 minutes of loss of mothers output (refer to SGH-TSH WCH CLIN007 Maternal Collapse). Call **Code Blue Neonatal**

- Equipment: necessary equipment can be found in the Baby Box (Perimortem set) and in Resus 4.
- Once the Resuscitative Hysterotomy has been performed, the Trauma Team should continue with usual practice for Traumatic Cardiac Arrest

5.4 DOMESTIC FAMILY VIOLENCE

- Domestic and family violence (DFV) increases in pregnancy. Most common site of injury is the abdomen. Clinicians must have a high level of suspicion when a woman presents with abdominal trauma and screen the woman accordingly.

5.5 DISCHARGE

- Women are suitable for discharge if:
  - No uterine activity, or resolution if present
  - Normal fetal heart or CTG
  - Intact membranes
  - No uterine tenderness/pain
  - No vaginal bleeding
  - Observations BTF
  - Safe home environment if DFV has been suspected or confirmed.
- On discharge:

- Ensure the woman has a follow-up antenatal appointment.
- Document presentation in Clinical Notes, Antenatal File & Yellow Card.
- Can be referred to the outpatient trauma clinic on Thursday afternoons if ongoing concern.
- Provide discharge advise to return to Birth Unit if:
    - Signs of preterm labour.
    - Abdominal pain.
    - Vaginal bleeding or unusual PV discharge.
    - Change in fetal movement pattern.
    - Contact Birth Unit for advice if any further concerns.

- If the woman insists on being discharged against medical advice she must sign “Discharge against Medical Advice” form and document in Clinical Notes, Antenatal File.

6. Cross References	**5.6 CROSS REFERENCES** SESLHDPR/283 *Deteriorating Patients - Clinical Emergency Response System for the Management of Adult and Maternity Inpatients* SGH CLIN372 *Trauma Triage Team Activation Criteria - SGH* NSW Health GL2015_011 Maternity - Rh (D) Immunoglobulin (Anti D) SGH CLIN217 MASSIVE TRANSFUSION PROTOCOL (MTP) - ST GEORGE HOSPITAL (SGH) SGH WCH CLIN012 Management of pregnant & Post-partum (<6 weeks PP) women presenting to the Emergency Department at St George Hospital SGH-TSH WCH CLIN007 Maternal Collapse NSW Health GL2018_025 Maternity Fetal Heart Rate Monitoring
7. Keywords	Trauma, Pregnancy, Emergency Department
8. BR Location	SGH-TSH Business Rule Webpage M, ED
9. External References	Emergency Care Institute NSW Trauma in Pregnancy https://www.aci.health.nsw.gov.au/networks/eci/clinical/clinical-resources/clinical-tools/obstetrics-and-gynaecology/trauma-in-pregnancy Queensland Clincal Guideline Trauma in pregnancy 2019 http://www.health.qld.gov.au/qcg/documents/g-trauma.pdf state-trauma-guidelines-for-the-management-of-injured-pregnant-women.pdf (health.wa.gov.au) Jain, V. et. al. 2015. *Guidelines for the management of a pregnant trauma patient.* Journal of Obstetrics and Gynaecology Canada. Volume 36, Iss 6, pages 553-571 Kilpatrick, S. 2016. *Initial evaluation and management of pregnant women and major trauma.* Up to Date. Online:
10. Consumer Advisory Group (CAG) Approval	Not Applicable
11. Aboriginal Health Impact Statement	Aboriginal Health Impact Statement
12. Implementation and Evaluation Plan	**Implementation:** The revised BR will be distributed to all medical, nursing and midwifery staff via @health email. The BR will be discussed at ward meetings, education and patient quality and safety meetings. Education will occur through in-services and local ward implementation strategies to address changes to practice e.g. handover huddles and take 5. The document will be published on the SGH-TSH business rule webpage and distributed via the monthly SGH-TSH CGD report. **Evaluation:** IMS+ meeting will review any clinical incidents related to this BR. eMaternity audits can be conducted to review compliance
13. Knowledge Evaluation	Q1: What is the priority in the care of the pregnant trauma patient? A1: The clinical stability of the mother in the first instance

	Q2: If a pregnant patient has a trauma required activated, what should happen in conjunction? A2: Obstetric Rapid Response is activated by calling 2222 Q3: why do we need to use a wedge to support a pregnant woman in left lateral? A3: Supine positioning can decrease cardiac output by 25-30% due to inferior Vena Cava compression
14. Who is Responsible	Director of Emergency Department

Approval for: PREGNANCY – MANAGEMENT OF THE PREGNANT TRAUMA PATIENT, SGH	
Specialty/Department Committee	Committee: Women's & Children's Health Clinical Governance Documents Sub-Committee Chairperson: Louise Everitt, CMC SGH, Rebecca Smith A/CMC SGH and Dr Trent Miller, O&G Staff Specialist SGH Signature: Date: Click or tap to enter a date.
Nurse Manager / Divisional Director (SGH)	Maria Bulmer, A/Divisional Director WCH Signature: Approved Date: 8/12/2023
Medical Head of Department (SGH)	Prof Michael Chapman, Medical Director WCH Signature: Approved Date: 8/12/2023
Executive Sponsor / s	Prof Michael Chapman, Medical Director WCH Signature: Approved Date: 8/12/2023
Contributors to BR	**Contribution** (current revision) Dr Trent Miller O&G Sarff specialist Louise Everitt CMC SGH Rebecca Smith A/CMC Kelsey Langley A/CNC Trauma Christine Bowles ED Consultant Faith Robertson CMC SGH Lynne Roberts CMC SGH Sophie Kalatzis CME SGH Pauline Kazanis CME SGH Mary Langcake – Trauma director Lillian Jenkins – Deputy Trauma Director Leanne Stroud – Trauma Fellow
	Consultation: W&CH CGD subcommittee August 2023

Revision and Approval History

Revision Date	Revision number	Reason	Coordinator/Author	Revision Due
Jul 2018	0	New	Louise Everitt CMC Lauren Neuhaus CNC ED	Jul 2021
Mar 2020	1	Update: BTF added	Louise Everitt CMC Lauren Neuhaus CNC ED	Jul 2021
Sep 2020	2	Revision: Number changed, previously SGH CLIN447	Amanda Reilly CMC	Sep 2023
Feb 2024	3	☒ Minor Review	Louise Everitt CMC	Feb 2027

General Manager's Ratification
Angela Karooz (SGH) Date: 07.03.2024