

# L10: Pregnancy and Trauma

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## Introduction

Evaluation of the pregnant patient with major trauma presents a unique challenge for paramedics, since the presence of a fetus means that two patients are potentially at risk. Most cases of maternal major trauma are the result of motor vehicle collisions and domestic or intimate partner violence, but falls, burns, homicide, penetrating trauma, and toxic exposure can also be responsible. Compression of a pregnant woman's abdomen as a result of a fall, intentional violence, or a low-speed motor vehicle collision can be considered major trauma.

## Essentials

- Paramedics can quickly make a rough estimate of the gestational age by feeling for the uterine fundus: if the fundus is below the mother's umbilicus, the pregnancy is likely less than 20 weeks.
- Pregnancy causes significant physiological changes, and as a result traumatically injured pregnant women may take longer to show signs of shock.

## Additional Treatment Information

- Paramedics can quickly make a rough estimate of the gestational age by feeling for the uterine fundus: if the fundus is below the mother's umbilicus, the pregnancy is likely less than 20 weeks.
- Pregnancy causes significant physiological changes, and as a result traumatically injured pregnant women may take longer to show signs of shock.

## General Information

- Every female of reproductive age with significant injuries should be considered pregnant until proven otherwise by a definitive pregnancy test or ultrasound scan. (III-C)
- A nasogastric tube should be inserted in a semiconscious or unconscious injured pregnant woman to prevent aspiration of acidic gastric content. (III-C)
- Oxygen supplementation should be given to maintain maternal oxygen saturation > 95% to ensure adequate fetal oxygenation. (II-1B)
- If needed, a thoracostomy tube should be inserted in an injured pregnant woman 1 or 2 intercostal spaces higher than usual. (III-C)
- Two large bore (14 to 16 gauge) intravenous lines should be placed in a seriously injured pregnant woman. (III-C)
- Because of their adverse effect on uteroplacental perfusion, vasopressors in pregnant women should be used only for intractable hypotension that is unresponsive to fluid resuscitation. (II-3B)
- After mid-pregnancy, the gravid uterus should be moved off the inferior vena cava to increase venous return and cardiac output in the acutely injured pregnant woman. This may be achieved by manual displacement of the uterus or left lateral tilt. Care should be taken to secure the spinal cord when using left lateral tilt. (II-1B)
- To avoid rhesus D (Rh) alloimmunization in Rh-negative mothers, O-negative blood should be transfused when needed until cross-matched blood becomes available. (I-A)
- In Traumatic Maternal Cardiac arrest, consider rapid transport to hospital. A Caesarean section should be performed for viable pregnancies ( $\geq 23$  weeks) no later than 4 minutes (when possible) following maternal cardiac arrest to aid with maternal resuscitation and fetal salvage. Transfer to health care facility.
- Transfer or transport to a maternity facility (triage of a labour and delivery unit) is advocated when injuries are neither life nor limb-threatening and the fetus is viable ( $\geq 23$  weeks), and to the emergency room when the fetus is under 23 weeks' gestational age or considered to be non-viable. When the injury is major, the patient should be transferred or transported to the trauma unit or emergency room, regardless of gestational age. (III-B)
- When the severity of injury is undetermined or when the gestational age is uncertain, the patient should be

evaluated in the trauma unit or emergency room to rule out major injuries. (III-C)

- Women who are pregnant experience a number of physiological changes. Of relevance to paramedics:
  - Cardiovascular
    - Blood pressure experiences minimal changes, though there is an initial decrease in the first and second trimesters, with a return to baseline in the third. Systolic blood pressures above 170 mmHg, and diastolic pressures greater than 110 mmHg are considered significant.
    - Heart rates elevate by 15 to 20 beats per minute. Normal heart rates in pregnancy are between 80 and 110 beats per minute.
    - Cardiac output increases by 30-40%, to a normal volume of 6-7 L per minute during pregnancy
    - Non-specific ST segment changes are sometimes seen on ECG, along with Q waves in lead III and aVF and atrial and ventricular ectopic beats
    - Systemic vascular resistance often decreases due to blood volume and the effects of progesterone
  - Respiratory
    - Respiratory rate increases by 15% (2-3 breaths/minute)
    - Oxygen demand increases by 15-20%
    - Tidal volume and minute ventilation increase by 25-50%
    - Arterial pH rises to 7.40-7.45
    - PaO<sub>2</sub> increases by 10 mmHg
    - PaCO<sub>2</sub> decreases to 27-32 mmHg
  - Hematological
    - Blood volume increases by 30-50%
    - Hemoglobin falls to 100-140 g/L
    - Hematocrit falls to 32-42, producing physiological anemia
    - Plasma volume increases by 30-50%
    - Platelet count experiences a small reduction
    - Pregnancy is a pro-coagulant state. A variety of changes occur in pro- and anti-coagulant pathways, which on the whole increases the coagulation potential while reducing anticoagulation and fibrinolysis.
  - Gastrointestinal: pregnant women are at high risk of gastric aspiration, most likely related to decreased lower esophageal sphincter tone and increased intra-abdominal pressure. Gastric emptying is not affected by pregnancy, though it is slowed by labor and opioid analgesics.
  - Renal: the glomerular filtration rate and renal blood flow rise markedly during pregnancy. Serum creatinine concentration falls accordingly.
  - The pelvic vasculature is dilated in pregnancy. Injury to the pelvis can result in rapid exsanguination. Uterine blood flow is as high as 600 mL/minute in the third trimester, and is not subject to autoregulation: a decrease in maternal systolic blood pressure can cause a significant fall in blood flow and, in turn, fetal oxygenation.
- Always consider the possibility of an abrupted placenta in any pregnant woman being assessed following a traumatic injury

## Interventions

### First Responder

- Provide airway management and supplemental oxygen as required
  - → [B01: Airway Management](#)
  - → [A07: Oxygen and Medication Administration](#)

### Emergency Medical Responder – All FR interventions, plus:

- Apply spinal motion restriction as indicated. Package patients with left lateral tilt to prevent occlusion of the inferior vena cava.
- Consider ACP intercept
- Transport following local trauma destination guidelines. If destination choice is unclear, consult with ClinICall.

### Primary Care Paramedic – All FR and EMR interventions, plus:

- Establish vascular access, and consider fluid bolus to correct hypoperfusion or hypotension if clinically indicated.
  - → [D03: Vascular Access](#)
- Consider [tranexamic acid](#) in cases of shock secondary to blood loss, and hypovolemia secondary to occult bleeding. Consultation with CliniCall highly recommended.

#### Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Airway management
  - Early intubation is warranted if unable to achieve adequate oxygenation

#### Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Treat for shock
  - Consider blood products in consultation with EPOS
- Perimortem c-section?

## References

Society of Obstetricians and Gynaecologists of Canada. Guidelines for the Management of a Pregnant Trauma Patient. 2015. [[Link](#)]

