

Review Article

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Evaluation of Mother and Fetus after a Traumatic Event: An Overview

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Abstract

Trauma due to accidents or violence is a common complication during pregnancies. Every woman in reproductive age who has been admitted due to trauma should be considered pregnant until proven otherwise. A multidisciplinary approach is usually warranted to optimize the outcome for both the mother and her fetus and some headlines should always be taken into consideration when dealing with a pregnant trauma patient. In major trauma, obstetrician consultation should be done as soon as possible. You should not delay indicated radiographic studies due to concerns regarding fetal exposure to radiation. It is preferable to perform one computed tomography (CT) scan with iodinated contrast rather than multiple suboptimal imaging procedures without contrast. Physiologic changes during pregnancy put injured pregnant woman at increased risk, necessitates special attention. In this paper we try to overview on some important aspects of a pregnant trauma patient management.

Key words: Emergency Medicine; Multiple Trauma; Pregnant Women

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CONTEXT

Trauma due to accidents or violence is a common complication during pregnancies. Physical trauma occurs in 1 out of 12 pregnant women and has important effects on pregnancy outcome and also maternal mortality and morbidity (1, 2). Every woman in reproductive age who has been admitted due to trauma should be considered pregnant until proven otherwise; On the other hand, the percentage of incidental pregnancies among childbearing age females in previous studies was reported considerable (3, 4). Therefore, some believe that it is better to rule out pregnancy by a definitive pregnancy test or ultrasound scan in these ages.

PATIENTS APPROACH

A multidisciplinary approach is usually warranted to optimize the outcome for both the mother and her fetus. In major trauma, obstetrician consultation should be done as soon as possible; because she/he plays a major role in ascertaining gestational age, optimizing uteroplacental perfusion, evaluating fetal well-being, determining the risks of radiation exposure and use of drugs, and deciding on an emergency cesarean section and performing it (5-7).

Imaging

It is preferable to perform one computed tomography (CT) scan with iodinated contrast

rather than multiple suboptimal imaging procedures without contrast (8). When the uterus is in the direct X-ray beam, and not if it interferes with imaging, use of lead gown is recommended (6, 9). We use focused assessment with sonography in trauma (FAST) for detecting solid organ injury, intraperitoneal or pericardial fluid, and assessment of fetus presentation, location of placenta, fetal viability, gestational age, and amniotic fluid volume. It should be mentioned that, ultrasonography study is not reliable for detecting recent placental abruption (6, 7, 10).

Special aspects during primary survey

Because of physiologic changes during pregnancy, the injured pregnant woman is at risk for failure to maintain a patent airway and secured ventilation; so whenever airway problems are anticipated, early intubation should be considered. A pregnant woman must be considered to have full stomach for up to 24 hours after her last meal, because there is delay in gastric emptying in pregnancy. This increases aspiration risk in injured pregnant females. In an injured pregnant woman with complete or semi-complete loss of consciousness nasogastric tube (NGT) should be inserted to establish the integrity of the upper gastrointestinal tract and to empty the stomach of its contents (5). Rules of resuscitation are mostly similar to non-pregnant patients, except for some considerations;

for example, vasopressor should be avoided (uteroplacental vasculature is highly responsive to vasopressor and its use may result in decreased placental perfusion) unless the mother's hypotension does not respond to replenishment of intravascular volume (11). Supine hypotension should be prevented after mid-pregnancy by manual displacement of uterus or left lateral tilt. Compression of IVC by enlarged uterus in supine position decreases cardiac output up to 30% (12). When suspecting spinal injury, you can use a back board for this tilt. Maternal defibrillation has little effect on the fetus (13).

Since intubation is more difficult during pregnancy, for successful intubation of injured pregnant patients we should use smaller endotracheal tubes, to decrease the risk of aspiration, cricoid pressure can be considered. Insertion of NG tube in unconscious or semiconscious patients helps prevention of aspiration. In addition, rapid correction of maternal acidosis can reduce compensatory hyperventilation. After that you should be careful when prescribing sodium bicarbonate (14).

Fetal assessment

After primary assessment and resuscitation of the mother, then fetal assessment should begin. Gestational age should be estimated based on uterine fundal height and a previous ultrasonography image or obstetric ultrasonography during injury evaluation. We know that biparietal diameter of 60mm corresponds to around 24 weeks (15).

Fetal heart rate (FHR) is a good indicator of maternal hemodynamics and fetal wellbeing. Normal FHR is between 110-160 bpm (16). After 24 weeks of pregnancy, continuous fetal monitoring via cardiotocography (CTG) should be done for at least 4 hours (4). If there is vaginal bleeding or uterine contraction (>1 contraction in 10 min) or any other sign of placenta abruption, CTG and external tocometry must be continued (4). Direct fetal injuries may occur in penetrating trauma and severe pelvic trauma in the third trimester, which has resulted in pelvic fracture as well as fetal skull fracture. In these situations, management does not differ in pregnant patient. Low threshold for exploratory laparotomy is recommended and exploratory laparotomy does not necessitate a cesarean section (6).

Except for cases of maternal death, first trimester loss could not be explained by trauma. The most common causes of fetal death after the first trimester were maternal death, abruptio placentae, and maternal shock (5). In burn trauma during

pregnancy, maternal and fetal outcomes are dependent on the extent of mother's injury (17). If total body surface area of burns (TBSAB) is >50% the risk of both maternal and fetal death increases significantly. If TBSAB IS \geq 55% and the fetus is viable, urgent cesarean section, without waiting for corticosteroid to take effect, is recommended. This decision is based on the fact that fetal injuries are not typically direct injuries, but rather secondary to maternal state (18).

A fatal but rare complication of abdominal trauma is amniotic fluid embolism also known as anaphylactic syndrome of pregnancy. A high level of clinical suspicion is vital. The most common symptoms include respiratory distress, hypoxia, hypotension and coagulopathy (19, 20).

HEADLINES

- Ordinarily indicated radiographic examination should not be avoided during pregnancy. This amount of irradiation has little risk for the fetus compared to the dangers of undiagnosed maternal trauma.
- All pregnant women whose Rhesus (Rh) factor is negative, should receive ROGAM (Anti-D Ig) for prevention of Rh isoimmunization.
- After mid pregnancy, the uterus must be displaced to the left so it is moved off inferior vena cava (IVC) and venous return increases, resulting in improved cardiac output.
- Maintain maternal oxygen saturation > 95% with prescription of O₂ to ensure adequate fetal oxygenation.
- In pregnant women, thoracostomy tube should be inserted 1 or 2 intercostal spaces higher than usual to avoid potential abdominal injury due to raised diaphragm.
- You should not delay indicated radiographic studies due to concerns regarding fetal exposure to radiation. Magnetic resonance imaging (MRI) does not have radiation and is appropriate for assessment of spinal cord injury as per non-pregnant patients.
- Gadolinium-based contrast utilization can be considered, when the maternal benefits outweigh the disadvantages.
- If the mother has vaginal bleeding at or after 23 weeks, before speculum or digital vaginal examination, placenta previa should be ruled out by a previous or current ultrasound scan.
- Administer tetanus toxoid (0.5 mL) to all patients.

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CONFLICT OF INTEREST

None declared.

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