Penetrating Liver Trauma in Pregnancy

Nonoperative Treatment

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Abstract
Penetrating abdominal injury during pregnancy is extremely rare. The case of an 18-year-old primigravid woman at 29 weeks’ gestation is presented who sustained a low-velocity handgun penetrating liver injury. Due to her hemodynamic stability, absence of fetal distress and also absence of radiographic and clinical signs of hollow viscus injury, the patient was conservatively treated and discharged in perfect condition on the 10th day following admission.

Key Words
Trauma · Pregnancy · Liver trauma · Penetrating trauma in pregnancy

Case Study
An 18-year-old primigravid woman at 29 weeks’ gestation was brought to our emergency department after sustaining a low-velocity handgun injury during a family conflict. The patient was conscious, alert, and hemodynamically stable. She had a blood pressure of 140/70 mmHg, pulse rate of 100/min, and her respiratory rate was 16 breaths/min. On physical examination, a single entry wound was present on the lower right chest wall in the anterior axillary line. An exit wound was not found. Abdominal examination revealed tenderness and guarding in the right upper abdominal quadrant without evidence of generalized peritonitis. The uterine fundus was palpable above the level of the umbilicus, and there was no vaginal bleeding.

Real-time ultrasonography demonstrated a 29-week-old viable fetus. Fetal heart rate was reassuring, and there were no uterine contractions.

Plain chest and abdominal X-rays showed no abnormalities but the presence of a bullet at the level of the fourth lumbar vertebra (Figure 1).

Abdominal CT scan revealed liver injury. The bullet had penetrated liver segments IV and V (Figure 2) and, without injuring the right kidney, wedged in the right semispinalis muscle just to the right of the processus spinosus of the fourth lumbar vertebra (Figure 3).

Patient’s hemodynamic stability, absence of fetal distress, and also absence of abdominal signs of perforated hollow viscus permitted nonoperative management. The patient was transferred to the intensive care unit for close observation, maternal and electronic fetal monitoring. To avoid trauma infection, broad-spectrum
cephalosporin and metronidazole were given and because of unknown previous immunization, tetanus toxoid and tetanus immune globulin were also administered.

In subsequent days, the patient remained hemodynamically stable and hemoglobin level dropped from 11.9 to 9.7 g/dl after 4 days. Blood transfusion was not considered necessary, and the patient was discharged in perfect condition the 10th day following admission.

**Discussion**

Despite increasing violence, penetrating abdominal trauma during pregnancy remains rare and the management protocols are based largely on case reports and small series [2, 3]. The largest reported series is that of Awwad et al. [4], who presented their experience with 14 patients from the civil war in Lebanon. According to these authors, an aggressive approach to laparotomy is necessary for the management of gunshot abdominal wounds in pregnancy. Nonoperative treatment may be contemplated in a hemodynamically stable pregnant woman only under special circumstances. As prerequisites, the entry site has to be anterior, below the level of the uterine fundus, and radiographic studies must demonstrate that the bullet has not crossed the posterior uterine wall [1, 4–6]. In these cases, intraabdominal viscera do not sustain severe injury because they are displaced cephalad from the enlarged uterus. By contrast, in the case of an entry site in the upper abdominal area, there is a high possibility of complex injuries of a hollow viscus, and laparotomy is indicated. Extremely valuable is the use of plain abdominal X-rays, ultrasonography and CT scan, to clearly define the presence of a retained bullet, to analyze the bullet tract and also to quickly identify bowel and solid-organ injuries. Penetrating liver injuries even in the absence of pregnancy, until recently, were an indication for early laparotomy because of the fear of major vascular and biliary injury as well as bowel perforation [7]. However, it is now widely accepted that even patients with penetrating liver injuries may also be candidates for nonoperative therapy in the absence of hemodynamic instability when experienced surgeons are readily available [8, 9].

Laparotomy for fetal indications is considered only in those women with pregnancies of > 23 weeks’ gesta-