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# Blows to the Maternal Abdomen Causing Fetal Demise: Report of Three Cases and a Review of the Literature

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**ABSTRACT:** Traumatic abruption results in 6% of third-trimester gravidas who are hit or kicked in the abdomen during assaults. Three cases are presented in which blows inflicted to the abdomen of pregnant women in their third trimester resulted in the death of the fetus due to abruptio placentae. Two cases were domestic altercations while one was a third-party criminal assault. In all cases the gravida herself escaped significant intra-abdominal injury, and external abdominal findings were minimal. The clinical signs were a history of loss of fetal movements shortly after the assault and loss of fetal heart tones within hours after the assault. One patient had vaginal bleeding; one had uterine contractions. In the cases of domestic abuse, both women initially gave false histories of how the injury occurred.

**KEYWORDS:** pathology and biology, abruptio placentae, fetal death, domestic abuse

A medicolegal question of causation may arise when a pregnant woman loses her fetus following an assault. Blows to the gravid abdomen can cause abruptio placentae and fetal demise. Where the death of a previously normal fetus occurs within hours after such an assault due to abruptio placentae, a homicidal manner of death is appropriately diagnosed.

## Case Reports

### *Case 1*

A 21-year-old gravida 6, para 4, aborta 1 black female, 34 weeks pregnant, had a domestic altercation with her male companion at 10:00 P.M. The assailant pinned her against the wall and struck his knee into her lower abdomen. He also struck her several times in the face, inflicting bruises and a bloody nose. The woman noted loss of fetal movements shortly afterward. At 4:00 A.M. the woman had onset of painful uterine cramps. At 6:00 A.M. she had onset of heavy vaginal bleeding. At 10:00 A.M. she presented to the emergency room. She initially told examiners she had been attacked by

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strangers on the street, but when interviewed further she admitted that the assailant had been her boyfriend.

Physical examination showed swollen facial bruises and epistaxis. No abdominal injury was found. Her blood pressure was 172/119, pulse 92. There was blood in the vagina, and fetal heart tones were absent. Emergency ultrasonography showed a dead intrauterine fetus and a 100% placental abruption. Within a few minutes, the woman was delivered vaginally of a stillborn female fetoplacental unit *en caul*, along with 500 cc of blood clot. The fetus weighed 1670 g. The maternal hematocrit was found to be 21%, and disseminated intravascular coagulation (DIC) was diagnosed. Surgical consultation was obtained for the facial injuries. A drug screen of maternal urine was negative. Hospitalization lasted six days. The clinical diagnosis of the decedent fetus was intrauterine fetal demise due to abruptio placentae due to trauma to maternal abdomen. The police were notified and a charge of murder was filed against the assailant.

At autopsy the decedent fetus weighed 1670 g and had anatomic maturation of 34 weeks. The placenta weighed 280 g. Fetus and placenta were lightly meconium stained. The fetus was in a fresh condition with minimal local skin-bleb formation on the lower abdomen and left leg. The amniotic membranes were normal and intact. The maternal face of the placenta had a large 9 by 11 cm bowl-like depression, and soft blood clots were adherent to this area. The placental parenchyma beneath this depression was compressed and hemorrhagic. The remainder of the placenta had one chronic infarct. The fetus was without evidence of infection, trauma, or malformation. It had intrathoracic petechiae. There was diffuse thin subarachnoid hemorrhage. Toxicology on the fetal brain tissue was negative for alcohol and drugs of abuse. The manner of death was diagnosed as homicide.

*Case 2*

A 28-year-old unmarried white female nine months pregnant, with regular prenatal care had a normally developing singleton pregnancy until 10:30 P.M. February 8th when she got into a fight with her ex-husband. She was forced down onto a sofa and kicked in the abdomen. She immediately complained of uterine contractions and was taken to the hospital by ambulance at 11:32 P.M. At the scene she initially told the ambulance personnel that she had fallen down stairs. At the emergency room she disclosed the true nature of the assault. Examination at the emergency room showed bruises on the left side of the woman's abdomen, as well as on her left arm, and a dislocated left index finger. Uterine contractions were present every 5 to 6 minutes. The cervix was 2 cm. There was no vaginal bleeding. The maternal hematocrit was 25 and DIC was diagnosed. An emergency obstetrical ultrasound disclosed absence of fetal cardiac activity. She was taken to the operating room at 2:45 A.M. where she underwent emergency exploratory laparotomy and caesarean section. Abdominal exploration disclosed ecchymosis of the left abdominal wall with no visceral injuries. Caesarean section disclosed bloody amniotic fluid with a stillborn 3530 g male fetus and attached 390 g placenta with complete placental separation. Postmortem examination showed a normally formed fetus with no evidence of maceration. The maternal face of the placenta had a torn cotyledon with hemorrhage and a large flattened area with adherent blood clots. The fetal face had a focal tear at the cord attachment and extensive subchorionic hemorrhage. The fetus had pale, bloodless internal organs. He had a focal subgaleal and periosteal hemorrhage of the right parietal scalp and skull without fracture or intracranial injury. Toxicology studies on maternal and fetal fluids were negative for drugs of abuse. The cause of death was certified as exsanguination due to placental laceration consistent with abruptio placentae due to maternal blunt force trauma/assault. The manner of death was certified as homicide.

*Case 3*

A 24-year-old married gravida 3 para 0 aborta 2 woman had regular prenatal care and a normal pregnancy until at 32 weeks gestation she was kicked in the abdomen by a male assailant at 2:00 A.M. She went to an emergency room, where fetal tachycardia was diagnosed. She was sent home. Within a short time she noted loss of fetal movements. At 2:00 P.M. the next day she presented to the emergency room with abdominal pain. There was no vaginal bleeding. Ultrasonography revealed intrauterine fetal demise. There was an anterior placenta. A Kleihauer-Betke test was positive for fetomaternal transfusion. Labor was induced, and at 12:30 the next afternoon a stillborn male fetus weighing 2126 g (4 pounds 11 ounces) was delivered vaginally. Autopsy examination showed very early postmortem changes. The placenta had a 9 by 5 cm central area of parenchymal hemorrhage with a 2-cm parenchymal hematoma and adherent retroplacental clots. The fetus was normally developed. There was a 15 cc clotted left-sided hemothorax with contusions to the pericardium, left diaphragm, and left mesenteric root. The cause of death was certified as placental and fetal contusions due to maternal blunt force trauma.

## Discussion

The medical literature contains reports of 136 incidents of blunt force assault upon pregnant women. Of these assaults, nine resulted in abruptio placentae. Of these nine abruptions, eight caused fetal demise.

In all the reported cases of fetal loss due to blunt-force assault, the mechanism of fetal demise was abruptio placentae. This finding may be viewed in the context of the disorder of abruptio placentae generally. The overwhelming majority of placental abruptions are spontaneous. Buchsbaum in his 1968 review concluded that trauma was demonstrable as the etiologic factor in only about one percent of abruptions [*1*]. Three other published reviews of abruptio placentae, totalling 1017 cases, found no traumatic abruptions [*2–4*].

How often does blunt-force assault cause abruptio placentae? Dyer and Barclay reviewed the world literature in 1962 and found no obstetrical complications in 53 trauma cases including 13 falls and 3 blows to the abdomen [*5*]. Fort and Harlin in a 1970 study using clinic questionnaires found 192 falls and 21 blows to the abdomen, with no obstetrical sequelae [*6*]. In 1978, Rothenberger et al. retrospectively studied 103 cases of trauma to pregnant women, including 30 falls and 18 blunt-force assaults, but did not report the obstetrical outcomes [*7*]. In 1980, Golan et al. reported three cases of blows to the maternal abdomen at 34+ weeks gestation, resulting in two placental abruptions and one premature delivery [*8*]. Crosby stated that as of 1989 he was aware of 797 cases of trauma to pregnant women, (including automobile accidents), and that these included 17 cases of abruptio placentae [*9*]. In 1989 Timberlake and McSwain reported 17 cases of blunt trauma in pregnancy including three beatings, four falls, one burn, and nine motor vehicle accidents. In one of the beatings the woman was beaten to death and her fetus did not survive. No cases of abruption [*10*]. In 1990, Farmer et al. reported retrospectively on 32 trauma admissions of pregnant women to a city general hospital. Twenty-seven of the cases involved mothers with minor injuries or no clinically evident injuries. Of these 27, there was one fetal death due to abruptio placentae in a woman at 30 weeks gestation who was kicked in the abdomen [*11*]. In 1990, Williams et al. reported a retrospective study of 84 pregnant patients with blunt abdominal trauma, including 22 cases of blows to the abdomen and 33 falls. The blows and falls led to no obstetrical complications. Two placental abruptions and one premature delivery resulted from 29 traffic accidents. These authors concluded that placental abruption after blunt abdominal trauma is "a rare occurrence," with a frequency of two percent or less [*12*]. Goodwin and Breen in 1990 reported on 205 pregnant patients presenting to a county general hospital with noncatastrophic trauma. They included 56 motor vehicle accidents,

87 falls, 41 assaults, and 21 others. There were five cases of placental separation. Six women were kicked or punched in the abdomen, resulting in two placental abruptions with stillbirth and two premature deliveries [*13*]. Pearlman et al. reported in 1990 a prospective series of 85 patients and 85 controls. These included 12 blows to the abdomen and 22 falls. The 34 patients with blows and falls suffered two abruptions with stillbirth and two premature deliveries. The authors concluded that abruptio placentae after blunt abdominal trauma complicates about 1 to 5% of minor injuries and 20 to 50% of major injuries [*14*]. In 1991 Kissinger et al. reported 91 trauma center admissions of pregnant patients, including 11 assaults and 9 falls. The assaults led to one fetal death due to abruption, while the falls led to none [*15*]. Lifschultz and Donohue in 1991 reported two cases of fetal death due to maternal blunt abdominal trauma. One was a head-on collision. In the other case, a woman nine months pregnant was hit in the abdomen with a milk crate by a male assailant. She had no clinically evident abdominal injury, but the next morning she delivered a stillborn term fetus due to abruptio placentae [*16*].

A conservative approach is customarily followed in ascribing fetal demise to maternal trauma. The classic minimal criteria set forth by Hertig and Sheldon are that the trauma "must immediately precede, by a matter of hours, the onset of the sequence of events that results in the expulsion of a normal ovum," and that "the ovum must be shown to be developing normally" [*17,18*]. In addition, a pathologic mechanism of fetal demise must be demonstrated either clinically or by autopsy, and there must be no other equally plausible explanation for the fetal death [*16*]. In the case of assaultive blows to the abdomen, the pathologic mechanism of death has invariably been found to be abruptio placentae. This is the most common mechanism of fetal death following minor trauma to the mother [*14*].

The literature supports three risk factors for fetal demise in the context of a blunt-force assault upon the gravida. These are third trimester gestation, blows to the abdomen, and the setting of domestic violence.

*Third Trimester*—The youngest gestational age reported for traumatic abruption due to blunt-force assault was 30 weeks.

*Blows to the Abdomen*—This mode of attack was specifically reported in 70 of the 136 published cases. Of these 70 cases, five were stated to involve kicks, and two of these were fatal to the fetus. Two cases involved the use of a blunt instrument (a hose and a milk crate) and one of these was fatal to the fetus. Goodwin and Breen in their prospective study of 205 patients found that a history of direct abdominal trauma was an independent risk factor for pregnancy complications [*13*].

*Domestic Violence*—In Goodwin and Breen's series, 36 out of 41 assaults resulted from domestic discord. Their data suggested that "the incidence and severity of morbidity may be greater for this type of trauma," perhaps because of repeated attacks [*13*].

*Other Risk Factors*—Pearlman et al. found that an anteriorly placed placenta was a risk factor for fetomaternal transfusion in trauma [*14*]. Other possible risk factors for fetal compromise in assault cases, such as parity, pre-existing maternal health, age, marital status, prenatal care, delay in obtaining aid, fetomaternal hemorrhage, drug use, and assailant, have not been separately evaluated.

## Conclusion

Three cases are presented of fetal demise due to traumatic abruptio placentae caused by blows to the maternal abdomen during altercations. Traumatic abruption has been reported in 6% of third-trimester gravidas who were hit or kicked in the abdomen by assailants, with fetal demise resulting in nearly all cases.

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