Iatrogenic uterine perforation with abdominal extrusion of fetal parts: A rare radiological diagnosis

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ABSTRACT

Background: Failure to detect uterine perforation during surgical abortion may result in adverse patient outcome besides having medicolegal implications. This rare case of uterine perforation was diagnosed seven days after abortion and underscores the importance of remaining vigilant for this complication during and after the procedure. Case: A female underwent surgical abortion at sixteen weeks gestation and was discharged after the procedure, assuming no complication. She presented with abdominal pain seven days after the event. Ultrasound and CT revealed uterine perforation with abdominal expulsion of fetal parts. Conclusion: A patient complaining of abdominal pain following recent abortion related instrumentation should alert the clinician regarding possibility of perforation. Secondary signs on ultrasound may reveal the diagnosis even if rent is not identified. CT is valuable in emergent situations.

CASE REPORT

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A 21 year married female presented in the emergency department of our hospital with complaints of pain and tenderness in lower abdomen. She was gravida 3 and para 2 with previous normal institutional vaginal deliveries. Seven days back, she had undergone an elective dilatation and curettage procedure in a private clinic at 16 weeks period of gestation for a congenital anomaly, the details of which were not available. She had been discharged with the assurance that the termination procedure had been uneventful and a post procedure ultrasound was not deemed necessary. At the time of presentation her vitals were normal with pulse rate of 82/min, blood pressure of 126/88 mm Hg and respiratory rate of 20/min. She had low grade fever with body temperature of 37.6?C. Abdominal examination revealed tenderness in the pelvis and left iliac fossa with no signs of peritoneal irritation. On pelvic examination, the uterus was enlarged, of approx 12 weeks size and slightly tender. Per speculum showed closed internal os with no active bleed. Routine laboratory investigations were significant for mild anemia with Hb of 9.0g/dL (normal range in adult females is 12-16 g/dL) and elevated total leukocyte counts of 15,000 x 109 /dL (normal range in adults is 4 to 11x 109/L). The patient was admitted with clinical suspicion of endometritis or retained products of conception and ultrasound of pelvic organs was requested.

Transabdominal ultrasound of pelvic organs revealed small foci of air within the endometrial cavity along with free fluid in pelvis and left paracolic gutter. Left mid and lower abdomen was obscured due to overlying air distended gut loops, however careful scanning in oblique coronal plane showed fetal parts in the left iliac fossa in the form of fetal limbs, spine and a deformed fetal skull (Figures 1a and 1b). The uterine defect was not identifiable. Contrast enhanced CT scan of abdomen was done preoperatively and confirmed the extruded fetal parts in the left iliac fossa with surrounding fluid collections (Figures 2 and 4). Additionally it showed a

hypodense, nonenhancing transmural defect of size 2.5 x 2.5 cm in the uterine fundus, slightly to the right of midline consistent with uterine perforation (Figures 3 and 4). Multiple foci of free intraperitoneal air were also identified; however no contrast extravasation was noted. Based on sonographic and the corroborative CT findings, a diagnosis of uterine perforation with intraabdominal expulsion of fetal contents was made and a likelihood of gut injury was also suggested in view of free intraperitoneal air pockets. The patient underwent emergency laparotomy and the perforation was identified in the right side of uterine fundus along with the extruded fetal parts in left iliac fossa surrounded by localized pus collections (Figure 5). A perforation was also identified in the sigmoid colon. Closure of uterine perforation with removal of fetal parts, sigmoid colostomy and abdominal toileting was done. The patient was discharged after 2 weeks of uneventful postoperative recovery.

DISCUSSION

Uterine perforation can be a result from diverse etiologies which can be either iatrogenic or spontaneous. The iatrogenic causes include procedures like dilatation and curettage, hysteroscopy, endometrial ablation, insertion of intrauterine contraceptive devices or brachytherapy tandems [1, 2]. Spontaneous causes are less commonly responsible and include conditions like gestational trophoblastic disease, pyometra, placenta accreta or degenerating myoma [3-5]. Dilatation and curettage is a commonly performed gynecological abortion procedure and is considered to be relatively safe with low overall complication rate of 0.7 % [6]. The incidence of uterine perforation with this procedure is reported to be in between 0.07 % to 1.2 % [7]. According to World health Organization (WHO) estimates there is a case fatality rate of 250-500 deaths per 100,000 illegal abortion procedures. Some factors like instillation of saline or prostaglandins, advanced gestational age have been associated with a higher complication rate. Cases with presence of acutely retroflexed uterus or uterine leiomyomas at the time of surgical termination are also more prone for uterine perforations. The use of realtime intraoperative ultrasound guidance during surgical termination of pregnancy has been advocated to lower the complication rates and procedure related morbidity, especially in procedures performed in period of gestation greater than 15 weeks [7, 8].

The commonest site of myometrial perforation in uterine surgeries is the relative avascular anterior or posterior midline surfaces [9]. Perforations are more likely to be troublesome if the rent is located laterally, the defect is more than 1.2 cm, they occur after first trimester, or there is associated bowel injury. In most of the abortion related cases, perforation is recognized by the operator during the procedure. However in many cases perforation may remain clinically undiagnosed and the patient is discharged. Some of these patients present subsequently with serious complications. The usual presenting complaint is abdominal pain and not excessive bleeding per vaginum. Ultrasound is often the initial diagnostic modality to be used for evaluation. On sonography, the perforation may be implied by presence of indirect findings like visualization of bowel loops in myometrial or endometrial cavity or demonstration of extrauterine fetal parts in a pregnant female who has undergone surgical abortion procedure recently. Sonography may sometimes be able to demonstrate the site of uterine rupture as a hypoechoic or anechoic transmural defect in myometrium extending to endometrium with presence of extrauterine fliud [6]. Usage of high resolution transvaginal probes can enhance the detection of perforation defect and mural hematomas [10]. CT has also been used in diagnostic evaluation of uterine perforations in a few instances [9,11]. On CT, the site of perforation is seen as a hypoattenuating defect with disruption of myometrial continuity. In addition extruded fetal parts may be identified in the abdomen along with free fluid. Foci of air may also be sometimes visualized in the endometrial cavity which can be secondary to prior instrumentation. In our case the diagnosis of uterine perforation on ultrasound was made on the basis of indirect signs like presence of extrauterine fetal parts and free fluid in abdomen. CT scan complimented the initial sonographic examination by confirming the findings and additionally demonstrated the exact site and extent of perforation and also suggested possibility of bowel perforation.

MRI has seldom been used in evaluation of cases of uterine perforation with associated intraabdominal extrusion of fetal parts. There are only two case reports which mention the usage of MRI in conjunction with ultrasound in such a scenario. In the case mentioned by Gakhal et al, MRI could not demonstrate the extruded extrauterine fetal parts despite the fact that they were identifiable on sonography[6]. However, in the case described by Bhole et al, MRI was able to identify the extruded fetal parts [12]. In both these cases MRI did clearly demonstrate the site and extent of the transmural uterine defect. The signal intensity of the transmural disruption is hyperintense on T1 weighted images in case blood products are present while on T2 weighted images, it shows a variable signal. On post contrast T1 weighted images it is seen as a nonenhancing area except in cases where there is presence of retained and viable products of conception within the defect [6].

Diagnosis for iatrogenic uterine perforation with abdominal expulsion of fetal parts is straightforward if a clear history of recent surgical abortion is there and there is no differential diagnosis for this condition. However when such a history is not forthcoming, confusion may theoretically occur with a nonviable abdominal pregnancy. Ultrasound features of abdominal pregnancy described are: uterus identified separate from the extrauterine fetus, absence of uterine wall between bladder and fetus, extrauterine placenta or poorly visualized/ pseudo placenta previa, fetal parts close to abdominal wall, abnormal lie and /or no amniotic fluid between placenta and fetus [13]. Role of MRI in abdominal pregnancy is under investigation. Features described are extrauterine fetus and/or placenta, absence of uterine wall between fetus and maternal abdominal wall, unusual fetal position, oligohydraminos and close relationship between the placenta and maternal bowel [14]. Placental identification with MRI is also more accurate. Free fluid may be seen in case of hemoperitoneum. In case of

secondary abdominal pregnancy due to cesarean scar rupture, uterine rent may be identified on MRI in the lower segment.

Conclusion:

Our case illustrates the importance of maintaining a high index of suspicion by the Gynecologist as well as the Radiologist for uterine perforation in patients presenting with abdominal pain a few days after undergoing surgical abortion related instrumentation. Ultrasound remains the modality of choice for initial radiological evaluation and a careful search for indirect signs of perforation will lead to the correct diagnosis even if the mural defect is not identifiable. CT can complement the ultrasound by accurately identifying the exact site of perforation and any associated visceral organ injury if any. It can also be used directly without a preceding ultrasound scan in emergent situations. The role of MRI is not clearly defined especially in cases where extruded fetal parts are suspected to be present. At the present moment it does not seem to offer any significant diagnostic advantage over CT scan.

TEACHING POINT

Suspicion of uterine perforation should be kept in a female patient with abdominal pain and recent history of abortion. The rent may not be identifiable on ultrasound and a careful search for indirect signs of uterine perforation often leads to correct diagnosis. CT scan is useful in emergent situations and can reveal additional information on any coexisting visceral organ injury.

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FIGURES

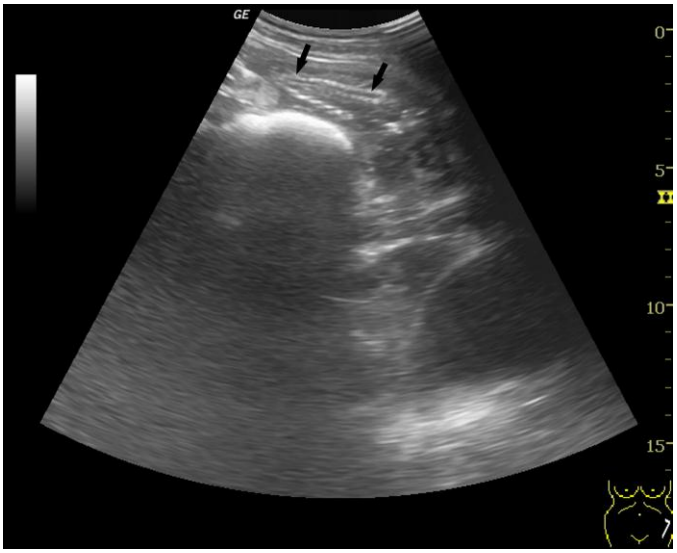

Figure 1a: A 21 year old female patient with uterine perforation and abdominal expulsion of fetal parts. Oblique coronal grayscale ultrasound image obtained on GE logic 5 machine using 3.5 MHz convex transducer shows series of two parallel echogenic foci in the left iliac fossa (arrows) representing the extruded fetal spine.

Figure 1b: A 21 year old female patient with uterine perforation and abdominal expulsion of fetal parts. Oblique coronal grayscale ultrasound image obtained on GE logic 5 machine using 3.5 MHz convex transducer shows deformed fetal skull bones in the left iliac fossa (arrows)

Figure 2: A 21 year old female patient with uterine perforation and abdominal expulsion of fetal parts. Contrast enhanced CT was obtained on Philips Brilliance 16 slice CT machine with 100 ml non ionic contrast solution injected with pressure injector at 2.5 ml/sec flow rate using the following parameters- mAs-250, Kv-120 , slice thickness- 3mm, increment- 3mm, collimation- 16x1.5, pitch 0.938 . Sagittal volume rendered image (slab- approx 25 mm) using the slab viewer tool with abdominal viscera (B&W) preset and opacity of 33.5. (Philips Brilliance workspace v3.5.02254) shows multiple bony fetal parts comprising mainly the spine and limb bones in the left iliac fossa (arrows).

Figure 3: A 21 year old female patient with uterine perforation and abdominal expulsion of fetal parts. Contrast enhanced CT was obtained on Philips Brilliance 16 slice CT machine with 100 ml non ionic contrast solution injected with pressure injector at 2.5 ml/sec flow rate using the following parameters- mAs-250, Kv-120 , slice thickness- 3mm, increment- 3mm, collimation- 16x1.5, pitch 0.938. Sagittal multiplanar reconstruction (MPR) image (slab- approx 10mm) shows the fundal perforation as a hypoattenuating defect in the myometrium (arrowheads) along with a focus of air within the endometrial canal (arrow).

Figure 4: A 21 year old female patient with uterine perforation and abdominal expulsion of fetal parts. Contrast enhanced CT was obtained on Philips Brilliance 16 slice CT machine with 100 ml non ionic contrast solution injected with pressure injector at 2.5 ml/sec flow rate using the following parameters- mAs-250, Kv-120 , slice thickness- 3mm, increment- 3mm, collimation- 16x1.5, pitch 0.938 . Oblique coronal multiplanar reconstruction (MPR) image (slab- approx 10mm) shows extruded fetal parts in the left iliac fossa comprising of mainly the spine and limbs along with multiple foci of air (arrows). The uterine perforation site is also well seen as a hypoattenuating area in the fundus (arrowhead)

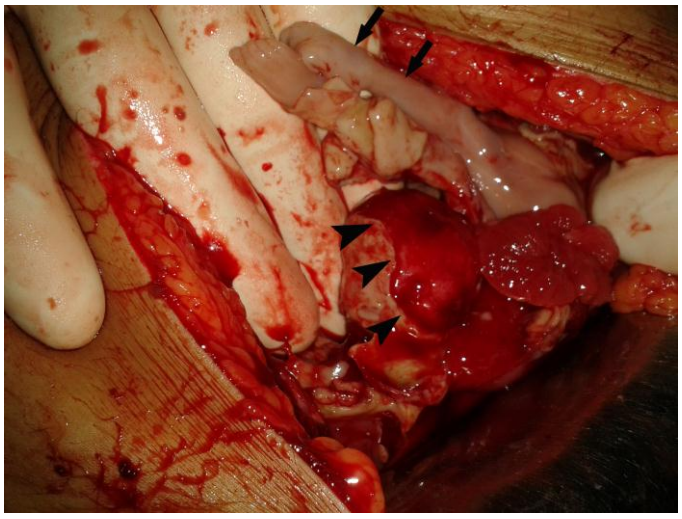

Figure 5 (right): A 21 year old female patient with uterine perforation and abdominal expulsion of fetal parts. Intraoperative photograph demonstrating the fundal defect (arrowheads) and the extruded fetal limbs (arrows)

Etiology	Iatrogenic causes -Surgical abortion procedures like dilatation and curettage Iatrogenic causes (non obstetric): -Hysteroscopy -Endometrial ablation -Insertion of intrauterine contraceptive devices or brachytherapy tandems.
Incidence	Rare with incidence of 0.07 to 1.2%
Gender Ratio	Not applicable (Seen exclusively in females)
Age predilection	More frequent in younger women of child bearing age
Risk factors	-Instillation of saline or prostaglandins -Advanced gestational age -Presence of uterine leiomyomas -Acutely retroflexed uterus at the time of surgical termination
Treatment	-Laparotomy with repair of the uterine defect or any coexisting injuries. -Conservative treatment (if the rent is small and no other injury is suspected).
Prognosis	Depends on case to case. With timely surgical intervention, prognosis is good.
Finding on imaging	Ultrasound: -Site of rupture sometimes seen as a hypoechoic or anechoic transmural defect in myometrium -Bowel loops in myometrial / endometrial cavity or demonstration of extrauterine fetal parts (indirect findings). -Extrauterine fluid CT Scan: -Hypoattenuating defect with disruption of myometrial continuity -Extruded fetal parts may be identified in the abdomen with free fluid -Foci of air in endometrial cavity MRI: The transmural disruption is : -Hyperintense on T1W (if blood products are present) -Variable signal on T2W -On post contrast T1W, defect is seen as a nonenhancing area. -Extruded fetal parts may or may not be identifiable.

Table 1: Summary table of iatrogenic uterine perforation with abdominal expulsion of fetal parts

Diagnosis	**USG**	**CT Scan**	**MRI**
Iatrogenic uterine perforation with abdominal expulsion of fetal parts. (There is clear history of recent abortion related instrumentation)	-Identification of the myometrial rent (in some cases) -Indirect signs: fetal parts in abdominal cavity, presence of bowel in myometrium/ endometrium, free fluid	-Hypoattenuating defect with disruption of myometrial continuity -Extruded fetal parts identifiable in abdominal cavity -Free fluid -Foci of air in endometrial cavity	The signal intensity of defect: -T1W: hyperintense (if blood products present) -T2W: variable -Post contrast T1W: nonenhancing area. Extruded fetal parts may or may not be identifiable
Primary or secondary abdominal pregnancy (There is no history of abortion related instrumentation)	-Uterus identified separate from the extrauterine fetus -Absence of uterine wall between bladder and fetus -Extrauterine placenta or poorly visualized / pseudo placenta previa -Fetal parts close to abdominal wall -Abnormal lie -No amniotic fluid between placenta and fetus -Free fluid	CT: not routinely done in a viable abdominal pregnancy. If performed (nonviable state/ emergent settings): -Can differentiate between primary and secondary abdominal pregnancy -Atypical sites of implantation may be identified	Role of MRI is still under investigation -Placental identification is accurate -Extrauterine fetus and/or placenta -Absence of uterine wall between fetus and maternal abdominal wall -Unusual fetal position -Oligohydraminos -Close relationship between placenta and maternal bowel.

Table 2: Differential diagnosis table of uterine defect with intraabdominal fetal parts/fetus

ABBREVIATIONS

CT: Computed tomography
MRI: Magnetic resonance imaging
T1W: T1 weighted
T2W: T2 weighted
USG: Ultrasonography

KEYWORDS

Uterine perforation; septic abortion; surgical abortion; myometrial perforation