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Case Report

Computed Tomography Imaging of Intrauterine Gas Gangrene: A Case Report

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Abstract

A 29-year-old pregnant woman presented with active signs of labor and absent fetal movements. She was febrile, tachycardic, and had a necrotic, open cervical os and tender, rigid abdomen. Bedside ultrasound showed no viable fetus and a large mass and a computed tomography (CT) scan was done. The patient tested positive for COVID-19. Unenhanced CT demonstrated a fetus in breech presentation associated with mottled gas lucencies. Gas pockets were found in the fetal skull, chest, abdomen, and surrounding soft tissue. Free gas was noted in the amniotic cavity, while the placenta and uterine wall did not contain significant amounts of gas. No signs of COVID-19 were observed on the lung bases. The uterus was incised, and the fetus was macerated and delivered. In summary, fetal gas gangrene is a rare and life-threatening condition. CT scans are useful in determining the degree of emphysematous alterations in fetal and maternal organs.

Keywords: *CT Scan; Gangrene; Fetal Death; COVID-19; Case Report*

Introduction

Intrauterine fetal death is one of the most common adverse pregnancy events. Stillbirths are defined as fetuses with no signs of life in utero after the 20th week of pregnancy [1]. It is a fact that the overall incidence has declined over the years with appropriate prenatal care and improvements in clinical practice [2,4]. The incidence of stillbirths varies worldwide and between reported studies, but generally ranges from 3.1 to 6.2 in 1000 births, or 1 in 160 deliveries [2]. Many intrauterine fetal deaths remain unexplained, with no identifiable cause, and most cases have been observed in lower socioeconomic populations [2,4]. Maternal diseases and their associations, such as a history of pregnancy loss and unsupervised deliveries, have played a role in intrauterine fetal deaths [2,4]. Undeniably, patients with poor or no prenatal health routine follow-up demonstrated poor obstetrical outcomes [3]. Stillbirths may be fresh or macerated depending on the intrauterine fetal stay after death [7]. Maceration is a term referring to the effect of the softening of tissues due to prolonged liquid exposure [5,6,8]. Obstetric gas gangrene is an unusual encounter nowadays because of advanced diagnostic tools and patients seeking early medical care. Most reported cases followed abortions. However, cases of intrauterine gas gangrene have occurred late in pregnancy, with prolonged deliveries. [9]. Only 10 reported fetal gas gangrene cases have occurred during term pregnancies; moreover, no reported cases were associated with COVID-19 infection. As a result, a strategy for detecting and treating fetal mortality and gas gangrene has yet

to be identified due to the scarcity of this joint diagnosis. This report describes the CT scan findings of the 11th case of gas gangrene in a fetus at term and the first case associated with COVID-19 maternal infection.

Case Presentation

A 29-year-old pregnant Somalian woman presented to the emergency department at our institution with active signs of labor and absent fetal movements for four days. The patient confirmed a history of premature rupture of membranes but could not recall the timing. She also reported having a fever for two days and had not undergone any prenatal diagnostic tests until she was well into her pregnancy.

Upon examination, the patient was febrile and tachycardic. Pelvic examination revealed a 9-centimeter open cervical os with foul necrotic tissues. Her abdomen was tender and markedly more rigid. A feto-maternal consultant then performed a bedside ultrasound on the patient. The scan showed no viable fetus or a large-looking mass (images were not available due to technical factors). Referral to radiology was made to characterize this mass further, as the patient's pain worsened and she might require urgent surgery. A computed tomography (CT) scan was requested to further delineate bedside sonographic findings and guide the surgical operation. The patient was septic, with a white blood count of 26.66 and a positive blood culture for Escherichia coli. In addition, the patient tested positive for COVID-19 and was admitted to the isolation department.

An unenhanced CT scan (Figure 1 and 2) was performed, demonstrating a fetus with a breech presentation. The scout image (Figure 1) demonstrated mottled lucencies, likely representing gas in the uterine cavity. The axial, coronal, and sagittal reformats (Figure 2A-2C) revealed many gas pockets in the skull, chest, abdomen, and surrounding soft tissues. A large amount of free gas was also noted in the amniotic cavity, which is associated with minimal free fluid levels. The placenta and uterine wall did not contain significant amounts of gas. The uterus displaced and compressed the solid maternal organs (Figure 3) and urinary bladder. No signs of COVID-19 were observed on the lung bases (Figure 4).

Figure 1

Figure 2A

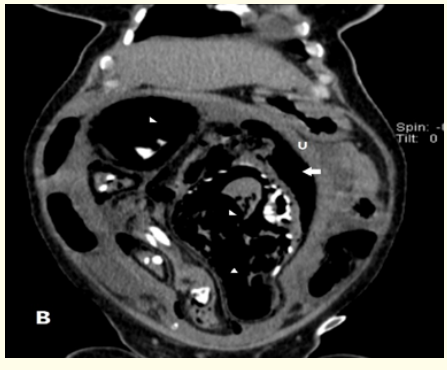

Figure 2B

Figure 2C

Figure 3A

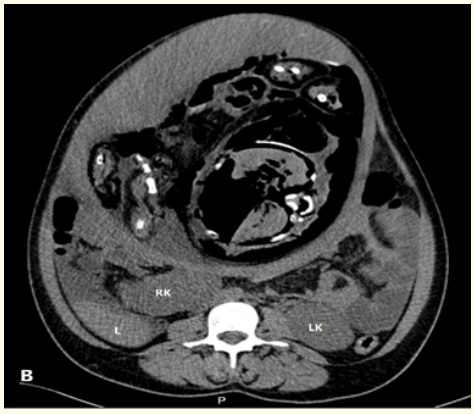

Figure 3B

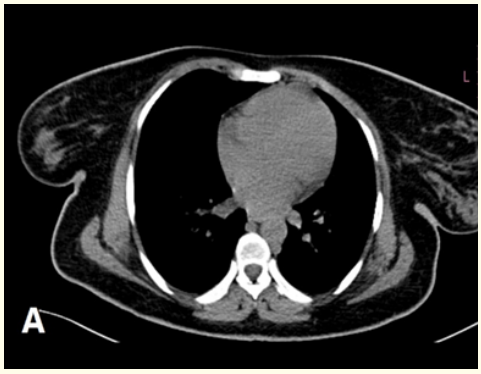

Figure 4A

Figure 4B

The patient underwent many failed attempts at vaginal delivery and was offered emergency surgery following her clinical scenario of chorioamnionitis and imaging results. In the operating room, the uterus was incised, releasing odor, pus discharge and necrotic material. The fetus was then macerated and delivered. The placenta was removed and sent for histopathological examination to confirm a diagnosis of chorioamnionitis and funisitis. Postoperatively, the patient was well and tolerated the procedure satisfactorily. The patient was kept under observation for the first 24 hours, where she remained tachycardic, febrile, and slightly hypotensive. The patient was placed on the appropriate antibiotics and continued to be isolated.

Discussion

Gas gangrene infection is a clinical diagnosis that can be made without the need for organism isolation [9,10]. Fetal gas gangrene is an uncommon condition that can be fatal to the mother. Lawson and Stewarts identified four phases of uterine infection: 1) infection restricted to dead fetal tissue, creating gas; 2) infection affecting the endometrium, presenting no systemic symptoms and 3) destruction of the myometrium, and spread of the infection to adjoining muscle tissue, causing gas. It has the potential to travel to the peritoneal cavity, and exotoxins induce rapid hemolysis in the maternal tissue. It is possible that the kidneys, liver and other viscera are involved [9].

The use of CT is not widely practiced during pregnancy. However, it is reliable in detecting signs of fetal necrosis and liquefaction. Air in the fetal skull, chest, abdomen, and occupying the amniotic cavity are the main abnormalities. The extent of emphysema is an important factor to be reported in CTs, as the involvement of the placenta and uterine muscles reflects a poorer prognosis. Consequent laparotomy with hysterectomy would be recommended. Thus, CT imaging is valuable in such cases.

In this case, we observed premature rupture of membranes, delayed patient presentation to the hospital, and prolonged obstructed labor, which induced chorioamnionitis and consequently resulted in intrauterine fetal death and gas gangrene confined to the dead fetus. Few intrauterine fetal deaths have been reported in the babies of mothers who are COVID-19 positive. However, these outcomes could result from maternal inflammation, altered respiration, and decreased oxygenation.

Conclusion

Gas gangrene in the fetus is an extremely uncommon and potentially fatal condition. In our case, a CT scan allowed for the diagnosis of fetal gas gangrene in a term pregnancy linked to COVID-19.

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