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Case Report

Teardrop owl eye appearance in enhanced MDCT for diagnosis of ectopic pregnancy with tubal rupture ☆☆☆

Fumikazu Sato, MD, MD^{a,b}, Satoshi Uramoto, MD, PhD^a, Teruyoshi Amagai, MD, PhD^{a,c,*}

^aDepartment of Medicine, Kikai Tokushukai Hospital, Kagoshima, Japan

^bDepartment of Emergency Medicine, Shonan Kamakura General Hospital, Kanagawa, Japan

^cFaculty of Health Care Sciences, Department of Clinical Engineering, Jikei University of Health Care Sciences, 1-2-8, Miyahara, Yodogawa-Ku, Osaka, 532-0003, Japan

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ABSTRACT

A 31-year-old female patient, presented to the emergency room with vaginal bleeding and a three day history of left sided lower abdominal pain. She showed shock status and an “ as “She came in with a hypovolumic shock and an enhanced 3-dimensional multidetector-computed tomography (3D-MDCT) images showed a specific teardropping owl's eye appearance consistent with an active bleeding around fetal sac and from ruptured tubal ectopic pregnancy (EP) spreading into peritoneum at the 9th gestational week. According to accurate radiological diagnosis, she has been able to receive a successful urgent transportation via helicopter to the consultee obstetricians and received an urgent salpingectomy with the diagnosis of tubal rupture in EP. Her post-surgical course was uneventful and discharged hospital on 8th day. From this case experience, an urgent diagnosis of a ruptured tubal EP in shocked female using not US but MDCT is accurately diagnosed because MDCT has radiological advantage to visualize active hemorrhage using contrast-medium.

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Introduction

Ectopic pregnancy (EP) occurs in 1%-2% of all reported pregnancies when the embryo implants outside the uterine cavity

[1–3]. Of all EP cases, 98% occur in the fallopian tubes [3]. If not diagnosed early, EP can be a gynecologic emergency with significant peritoneal hemorrhage, hypovolemic shock, and maternal and/or fetal death [4]. In the study of 49 EP cases to compare the incidence of EP between during the Coronavirus disease (COVID-19) pandemic (2020, n = 19) and be-

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* Corresponding author.

E-mail address: amagait@yahoo.co.jp (T. Amagai).

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fore (2018-2019, $n = 30$), tubal rupture was significantly higher in the COVID-19 period (58% vs 17%, $P = .005$) [5]. The authors speculated that the reason for this phenomenon was the longer delay in seeking medical care after the onset of symptoms during the COVID-19 pandemic. This delay may be one of the reasons for the higher incidence of tubal rupture, hemoperitoneum, and hemorrhagic shock [5]. Ultrasonography (US) is the primary examination for earlier and more accurate diagnosis of EP [2]. However, US is limited by its inability to visualize progressive hemorrhage from ruptured adnexa. In these situations, contrast-enhanced multidetector computed tomography (MDCT) may be useful to diagnose active bleeding with hemodynamic compromise. In this case report, we present a case of ruptured tubal pregnancy (RTP) with hemorrhagic shock due to delayed presentation for fear of COVID-19 infection. It is worth presenting radiologically specific MDCT findings identical to life-threatening RTP.

Case report

A 31-year-old woman visited our outpatient clinic with a complaint of bloody vaginal discharge and mid-lower quadrant (MLQ) abdominal pain for 11 days during the COVID-19 pandemic period. She had presented to our outpatient clinic 11 days earlier for a positive home pregnancy test at 7 weeks' gestation. The US images taken at that time showed bleeding without a fetal sac in the vaginal cavity. Spontaneous abortion was diagnosed. At the present visit, height was 157.4 cm, body weight was 71 kg, temperature was 35.9°C, blood pressure was 73/43 mm Hg. The laboratory results were: erythrocyte count $285 \times 10^4 / \text{mm}^3$ (reference value (ref.) $376\text{--}516 \times 10^4$), hemoglobin 8.6 g/dL (11.2–15.2), hematocrit, lymphocytes 21.4% (ref. 18–50.0), white blood cells $22,510 \text{ cells}/\text{mm}^3$ (reference value (ref.) 3300–8600), lymphocytes 7.7% (ref. 18.5–50.0), platelets $43.8 \times 10^4 \text{ cells}/\text{mm}^3$ (ref. $15.8\text{--}34.8 \times 10^4$), serum albumin (Alb) 3.3 g/dL (ref. 4.1–5.1), and C-reactive protein 0.24 (mg/dL) (ref. 0.00–0.14), and serum hCG was positive. Her liver panel showed no abnormalities; aspartate aminotransferase (AST), alanine aminotransferase (ALT), and total bilirubin were 7 IU/L (ref. 13–30), 10 IU/L (ref. 7–23), and 0.8 mg/dL (ref. 0.4–1.5), respectively. If the prognostic nutritional index (PNI) value, calculated from $\{10 \times [\text{Alb}] + 0.005 \times [\text{TLC}]\}$ [6], is $<$ the cutoff of 46.9, it has been reported that there is a high likelihood of surgical complications [7]. Her PNI was 41.7, which was interpreted as a high probability of postoperative surgical complications. To confirm the cause of abdominal emergency, emergency enhanced MDCT was performed, and it showed teardrop owl's eye appearance, identical active hemorrhage around the fetal sac, and hemorrhage from ruptured adnexa extending into the peritoneum (Fig. 1). Based on these radiologic findings, she was diagnosed with a hemorrhagic tubal rupture due to a left-sided ectopic pregnancy. Her vital signs deteriorated to hemorrhagic shock status, and emergency exploratory obstetric procedures such as laparoscopy or laparotomy would have been required to control the hemorrhage. However, because our hospital is located on an isolated rural island with no attending obstetricians or surgeons, she needed to be transported to a consultant obstetrician. She was

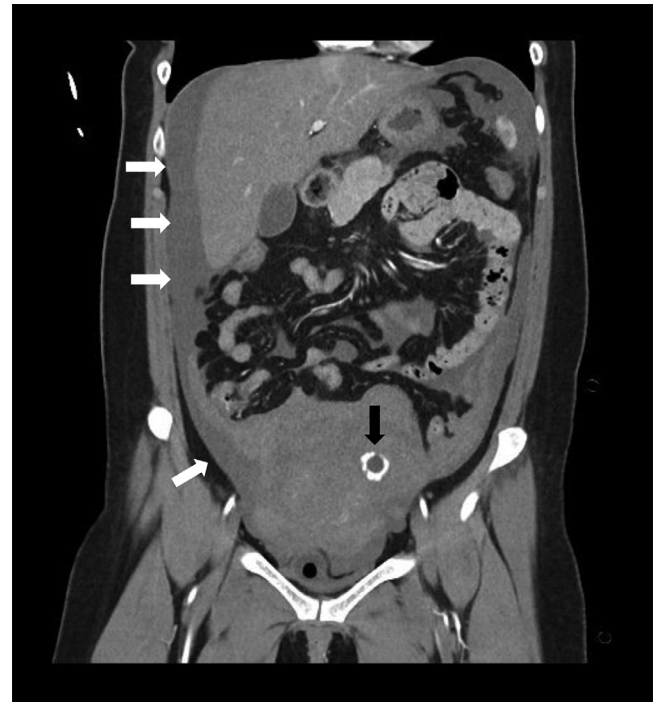


Fig. 1 – The contrast-enhanced multidetector CT (MDCT) pelvic images of the case at the early stage of the vaginal artery - owl's-eye appearance. The enhanced contrast was around the fetal sac (black arrow) at an early stage. It was referred to as "owl's eye" appearance in the low density peritoneal space.

successfully transported by a self-defense army helicopter for 90 minutes, and four units of packed red blood cells (RBCs) were transfused and 2500 mL of plasma expander was added via a double-lumen central access catheter. After these transfusions and infusions, her blood pressure and heart rate were stabilized to 93/76 mm Hg and 124 bpm, respectively. She then underwent an urgent laparotomy and left salpingectomy, and 3600 mL of hemorrhagic drainage was performed with a diagnosis of tubal rupture in EP. Her postoperative course was uneventful and she was discharged on the 8th day (Figs. 2 and 3).

Discussion

The teardrop owl's eye appearance on enhanced MDCT indicates active bleeding around the fetal sac and hemoperitoneum

US is the most reliable radiologic modality, followed by serum hCG measurement, to diagnose EP. However, because US has limitations in visualizing active hemorrhage, enhanced MDCT has an advantage in visualizing adnexal bleeding [8]. In our present case, the specific radiological finding of teardrop owl's-eye appearance seems to be identical with bleeding around the fetal sac and active bleeding from the ruptured tube into the peritoneum in EP. In addition, when the find-



Fig. 2 – Contrast-enhanced multidetector CT (MDCT) of the pelvis in the late phase of the vaginal artery. This image showed hemorrhage from the vaginal cavity consistent with an ectopic pregnancy. Contrast was also seen in the Douglas pouch (white arrows).



Fig. 3 – Contrast-enhanced multidetector CT (MDCT) of the pelvis in the late phase of the vaginal artery - owl's eye appearance. Contrast appears to leak from the ruptured fallopian tube in ectopic pregnancy like a drop of tears from an owl's eye (white arrow). The vaginal cavity shows heterogeneous enhancement with intravaginal bleeding.

ings of massive hemoperitoneum are associated with a specific teardrop owl's eye appearance, urgent surgical intervention must be indicated to save the mother's life.

First-trimester MDCT radiation exposure is safe for mother and fetus

Adverse effects of radiation exposure to the fetus are critical as pregnancy progresses. In the United States, the background radiation exposure to the whole body per year is estimated to be 20 mSv during the period of organogenesis from 3 to 8

weeks during the first trimester, while exposures above the threshold of 100 mSv may be associated with congenital malformations [9]. An estimated fetal absorbed radiation dose has been studied to be linearly related to the MDCT dose, and the fetal absorbed dose did not exceed the above threshold [10]. However, repeated MDCT scans may affect not only maternal but also fetal outcomes and must be avoided in the same context. To prevent adverse events in fetuses and children, physicians examining pregnant women must consider the cumulative fetal radiation exposure during the prenatal period [9].

Conclusion

We presented a 31-year-old woman with vaginal bleeding and left lower abdominal pain of three days' duration. She was in a state of shock, and an enhanced MDCT image showed a specific teardrop owl's eye appearance, which was identical to hemorrhage around the fetal sac and active bleeding from the ruptured tubal ectopic pregnancy into the peritoneum. Based on these radiological findings, an urgent and accurate diagnosis of ruptured tubal ectopic pregnancy can be made even in a shocked woman using enhanced MDCT, because this radiological modality has the ability to visualize active bleeding from the adnexa and lead to urgent surgical intervention.

Patient consent

Informed consent for publication of this case report was obtained from the patient. This case report was approved by the hospital ethics committee and the approval number is 2023-2.

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