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Cornual ectopic pregnancy: A report of three clinical cases
Gravidez ectópica cornual: Relato de três casos clínicos

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Abstract

Cornual ectopic pregnancy is a rare condition, accounting for 2-4% of ectopic pregnancies. It is associated with a high risk of uterine rupture and severe hemorrhage. Early diagnosis is often challenging due to the proximity of the gestational sac to the uterine cavity and the operator-dependent nature of ultrasound interpretation. We present three cases diagnosed by transvaginal ultrasound, two occurring in the context of medically assisted reproduction. None of the patients showed signs of rupture at admission, however, elevated β-hCG levels, advanced gestational age, and embryonic cardiac activity precluded medical management. All patients underwent cornual resection with favorable outcomes.

Keywords: Ectopic pregnancy; Cornual pregnancy; Interstitial pregnancy; Cornual pregnancy/case report.

Resumo

A gravidez ectópica cornual é uma entidade rara, representando aproximadamente 2-4% das gravidezes ectópicas, e está associada a elevado risco de rutura uterina e hemorragia grave. O diagnóstico precoce é frequentemente desafiante devido à proximidade do saco gestacional à cavidade uterina e à natureza operador-dependente da interpretação ecográfica. Apresentam-se três casos diagnosticados por ecografia transvaginal, dois dos quais ocorreram no contexto de procriação medicamente assistida. Nenhuma das doentes apresentava sinais de rutura, no entanto, níveis elevados de β-hCG, idade gestacional avançada e atividade cardíaca embrionária inviabilizaram tratamento médico. Todas as doentes foram submetidas a resseção cornual, com evolução favorável.

Palavras-chave: Gravidez ectópica; Gravidez cornual; Gravidez intersticial; Gravidez cornual/relato de caso.

INTRODUCTION

Ectopic pregnancy (EP) refers to the implantation of the embryo outside the uterine cavity and accounts for approximately 2% of all pregnancies in developed countries, representing a significant cause of maternal morbidity and mortality in the first trimester[1]. Among the possible locations, cornual ectopic pregnancy (CEP) is a rare entity, responsible for approximately 2-4% of EP. Despite an estimated maternal mortality risk of 2.0-2.5%, it accounts for 20% of maternal deaths from EP[2,3].

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Some authors differentiate CEP as "angular" or "interstitial", but in the literature, the terms "cornual" and "interstitial" are often used interchangeably[4].

In CEP, the embryo implants in the intramural segment of the fallopian tube, which traverses the myometrium before reaching the uterine cavity. The myometrium's thickness, compliance, and rich vascularization, allows the CEP to progress further than other ectopic locations[5]. This often leads to delayed diagnosis and increases the risk of uterine rupture, massive hemorrhage and hypovolemic shock[6,7], typically between 7 and 16 weeks of gestation[5], however, cases up to the third trimester have been reported[8]. The lack of established guidelines and the scarcity of large-scale studies reflect the rarity of CEP, with literature mostly limited to case reports or small clinical series.

We present three clinical cases of CEP that occurred consecutively at our center in 2024.

CLINICAL CASE 1

A 36-year-old nulliparous woman, with three previous spontaneous miscarriages and history of infertility was referred to our center with suspected left CEP. She had been submitted to medically assisted reproduction (MAR) techniques and, according to the date of the embryo transfer, had a 9 weeks + 4 days gestation. She was asymptomatic at admission and β-hCG level was 23,981 IU/L. Transvaginal ultrasound showed a heterogeneous endometrial lining of 11 mm and a 15 × 10 mm anechoic left retrouterine image with adjacent vascular ring, compatible with ectopic pregnancy. No signs of uterine rupture were observed. Given the high β-hCG levels, surgical intervention was proposed. Diagnostic laparoscopy confirmed a left CEP, requiring conversion to laparotomy for cornual resection and ipsilateral salpingectomy, which was performed without complications. Postoperatively, Klebsiella pneumoniae bacteremia was isolated and successfully treated with targeted antibiotic therapy. She was advised to avoid pregnancy for six months and to deliver by cesarean in future pregnancies. Histopathology confirmed the diagnosis.

CLINICAL CASE 2

A 35-year-old nulliparous woman, with endometriosis and previously submitted to bilateral salpingectomy, was referred with the diagnosis of right CEP at 6 weeks + 6 days of gestation, after in vitro fertilization. She presented with mild suprapubic pain, no vaginal bleeding and hemodynamically stable. Ultrasound revealed an eccentric gestational sac measuring 32 × 30 × 33 mm with a yolk sac present and an 8 mm crown-rump length embryo with positive cardiac activity, along with features of deep endometriosis. Given the presence of embryonic cardiac activity, surgical treatment was proposed. Laparotomy was performed with right cornual excision, complicated by entrance in the endometrial cavity. The patient was advised to avoid pregnancy for six months and to deliver by cesarean in future pregnancies. Histopathology confirmed the diagnosis.

CLINICAL CASE 3

A 26-year-old multiparous woman, with one term pregnancy and two spontaneous abortions, presented to the emergency room with vaginal bleeding and mild abdominal pain. Ultrasound revealed a gestational sac adjacent to the left uterine cornu with a 24 mm crown-rump length embryo with positive cardiac activity, corresponding to 9 weeks + 1 day of gestation, compatible with left CEP. Due to positive embryonic cardiac activity, surgical approach was proposed. Diagnostic laparoscopy confirmed the diagnosis and was followed by convertion to laparotomy, with left cornual resection and ipsilateral salpingectomy (Figure 1). Postoperatively, she had mild anemia, with no further complications. She was advised to avoid pregnancy for six months and to plan cesarean delivery for future pregnancies. Histopathological confirmed the diagnosis.

DISCUSSION

CEP represents a rare but potentially serious condition, with high risk of uterine rupture and maternal mortality. Risk factors include pelvic inflammatory disease, endometriosis, prior tubal surgery, uterine fibroids,

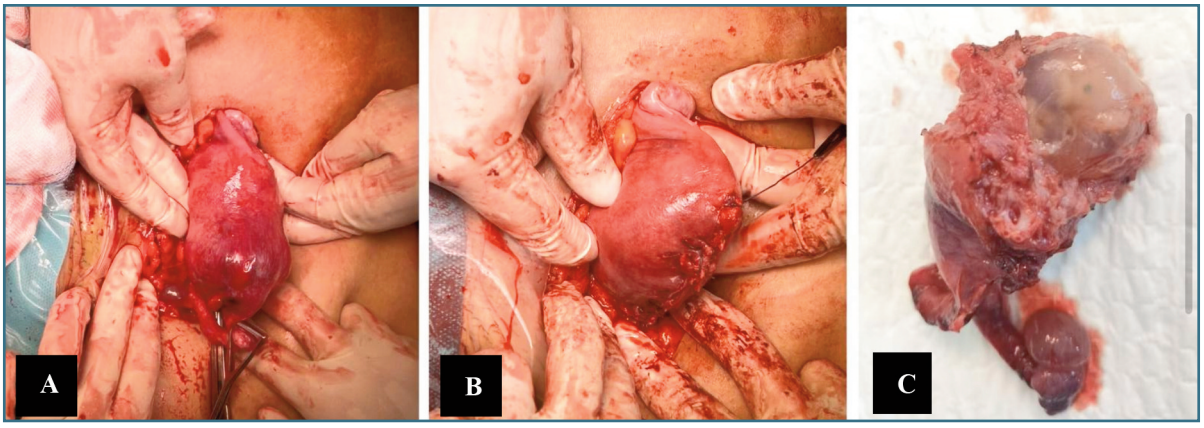

FIGURE 1 (A-C). Intraoperative appearance and surgical piece of a left cornual pregnancy. (A) Visualization of the distended left uterine cornua prior to resection. (B) Intraoperative appearance after cornuectomy and uterine repair. (C) Operative piece corresponding to the resected left cornua, containing an intact gestational sac with a visible embryo.

previous ectopic pregnancy, and voluntary or spontaneous pregnancy termination[2,3]. The incidence of CEP has been particularly noted in women undergoing MAR, particularly in in vitro fertilization, with rates reaching 0.8% of pregnancies[9].

In the present series, two of the three cases occurred in MAR context, highlighting its relevance as a risk factor. In Case 2, the patient also had endometriosis and previous salpingectomies, factors that predispose to ectopic implantation.

Clinical presentation of CEP may vary considerably. Early or unruptured CEP may be asymptomatic or symptoms are often nonspecific, including intermittent/constant pelvic pain or pressure, minimal or absent vaginal bleeding, with generally stable vital signs and minimal tenderness on abdominal or gynecological examination, complicating early diagnosis[4,8,10]. All three cases presented with hemodynamic stability, without rupture, allowing structured diagnosis and management. In contrast, ruptured CEP presents acutely and potentially life-threatening, characterized by severe abdominal pain, abdominal distension, muscular guarding and tenderness, and ultimately signs of intraperitoneal hemorrhage and hypovolemic shock, requiring immediate surgical intervention to control bleeding[6,7].

Early diagnosis remains a significant clinical challenge. Transvaginal ultrasound is the first-line imaging method, but is highly operator-dependent, and the proximity between the gestational sac and the uterine cavity may lead to significant diagnostic errors. Soriano et al. reported only 55.6% correct identification of CEP by ultrasound, frequently being misdiagnosed as intrauterine miscarriage or tubal EP[11].

The Timor-Tritsch criteria (empty uterine cavity; gestational sac located eccentrically > 1 cm from the uterine cavity; thin myometrial mantle <5 mm surrounding the gestational sac) remain widely accepted and applied[12]. The "interstitial line sign," extending from the upper region of the uterine cornu to the border of the intramural portion of the fallopian tube, is the ultrasound finding with the highest sensitivity and specificity for this entity[13].

Color Doppler complements ultrasound by assessing adnexal vascular patterns, showing marked peripheral low-resistance and high-flow velocity ("ring of fire" sign), while three-dimensional ultrasound allows more precise anatomical localization of the gestational sac, facilitating differential diagnosis[14,15].

Management options include medical therapy with methotrexate and surgical treatment via laparoscopy or laparotomy. Methotrexate, administered systemically or locally, has been described as a valid option in selected cases, particularly in clinically stable patients without severe abdominal pain, embryo <35 mm, absent embryonic cardiac activity, and serum β-hCG levels <1,500 IU/L[2]. The likelihood of medical treatment failure increases in patients with amenorrhea

>9 weeks, β-hCG levels >10,000 IU/L, crown-rump length >10 mm, or presence of embryonic cardiac activity, with treatment success being strongly correlated with lower β-hCG levels[16]. In the three cases presen-ted, these unfavorable features were present, preclu-ding medical management and justifying surgical intervention. Surgery remains a common and safe treatment, particularly in cases with a viable embryo or high serum β-hCG levels and it is considered the first line treatment in situations of rupture, hemodynamic instability, persistent pain, or gestational sac >40 mm[17].

Surgical treatment for CEP includes laparoscopic or laparotomic approaches. Laparoscopy is considered the preferred approach in hemodynamically stable patients, with lower morbidity and faster recovery[5]. However, conversion to laparotomy is frequent, mainly due to hemostatic or reconstruction challenges, as well as limited availability of experienced laparoscopic teams[4]. In the series reported by Soriano et al., 27.3% of patients initially managed laparoscopically required conversion[11]. Laparoscopic techniques are increasingly used and require advanced hemostatic control and uterine reconstruction, with strategies such as vasopressin injection and purse-string suturing reducing blood loss[18].

Surgical options are cornuostomy, cornuectomy/cornual resection, salpingotomy, salpingectomy and hysterectomy. The choice of the procedure depends on clinical stability, implantation size and depth, reproductive desire, and surgical team experience. Cornual resection allows complete removal of the gestational sac but carries an increased risk of uterine weakening and rupture in subsequent pregnancies. Cornuostomy constitutes a more conservative option, particularly for small pregnancies, showing outcomes comparable to cornual resection, with shorter surgery.[5,19]

Hysterectomy is reserved for uncontrollable hemorrhage or no reproductive desire.

Reproductive prognosis after CEP varies and depends on individual characteristics and therapeutic approach. Liao et al.[20], report up to 30% uterine rupture risk after cornuectomy, justifying a six-month interval before subsequent conception, early ultrasound, and planned cesarean delivery. In the three cases, uterine preservation was possible and all patients received appropriate counseling. The first two patients had a previous history of infertility and one of them also had endometriosis and prior tubal surgery, which may be the most contributing factors to their reproductive future.

This case series highlights the importance of the awareness for this entity and its early diagnosis, especially in the context of MAR, as well as the need for individualized management. When medical treatment is unfavorable, surgical intervention remains a safe and effective option. The absence of formal guidelines highlights the need for further studies to systematize clinical experience and optimize the approach of CEP.

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AUTHOR CONTRIBUTIONS

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CONFLICT OF INTEREST

Authors declare they have no conflicts of interest.

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