

## CASE SERIES

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# Experience in the management of cornual ectopic pregnancy

## Experiencia en el manejo del embarazo ectópico cornual

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### ABSTRACT

**Background:** Cornual ectopic pregnancy accounts for 2%-4% of ectopic pregnancies and is potentially fatal due to uterine rupture and consequent massive hemorrhage, with a mortality rate of up to 2.5%. There is no consensus on the most appropriate management of this pathology. **Objective:** To describe the experience in the management of cornual ectopic pregnancy at the Instituto Nacional Materno Perinatal, Lima, Peru. **Methods:** Descriptive and retrospective study of patients with a diagnosis of cornual ectopic pregnancy during the year 2022. Data were obtained from medical records. Statistical analysis was processed in the SPSS 19 program. **Results:** Out of 9 cases of cornual ectopic pregnancy registered, 7 met the inclusion criteria. The mean age was 31 years and the mean gestational age 7.3 weeks. Of the cases 71.4% had no risk factors. The majority presented vaginal bleeding associated with pelvic pain (71.4%). The average initial value of  $\beta$ -hCG was 8,262.3 mIU/mL. The average size of the tumor was 36.7 mm and 28.6% of the cases presented uterine rupture. 57.1% had surgical treatment consisting of cornual resection, cornuostomy or local injection of methotrexate. **Conclusions:** Surgery is the most commonly used treatment for cornual ectopic pregnancy. In recent years, laparoscopy has become an important surgical option with certain advantages over laparotomy. **Key words:** Pregnancy, ectopic, cornual, Methotrexate

### RESUMEN

**Antecedentes.** El embarazo ectópico cornual representa del 2 al 4% de los embarazos ectópicos y es potencialmente mortal debido al riesgo de rotura uterina y consecuente hemorragia masiva, con una tasa de mortalidad de hasta 2,5%. No existe consenso sobre el manejo más adecuado de esta patología. **Objetivo.** Describir la experiencia en el manejo del embarazo ectópico cornual en el Instituto Nacional Materno Perinatal de Lima, Perú. **Metodología.** Estudio descriptivo y retrospectivo de pacientes con diagnóstico de embarazo ectópico cornual durante el año 2022. Los datos se obtuvieron de los registros en las historias clínicas. El análisis estadístico se procesó en el programa SPSS 19. **Resultados.** De 9 casos de embarazo ectópico cornual registrados, 7 cumplieron los criterios de inclusión. La edad promedio fue de 31 años y la edad gestacional promedio 7,3 semanas de amenorrea. El 71,4% de los casos no tenía factores de riesgo. La mayoría presentó sangrado vaginal asociado a dolor pélvico (71,4%). El valor promedio inicial de la hCG- $\beta$  fue 8,262,3 mUI/mL. El tamaño promedio de la tumoración fue 36,7 mm y 28,6% de los casos se complicó con rotura uterina. El 57,1% recibió tratamiento quirúrgico consistente en resección cornual, cornuostomía o inyección local de metotrexato. **Conclusiones.** La cirugía es el tratamiento más utilizado en el embarazo ectópico cornual. En los últimos años, la laparoscopia es una opción quirúrgica importante con ciertas ventajas sobre la laparotomía. **Palabras clave.** Embarazo ectópico, cornual, Metotrexato

### INTRODUCTION

Cornual ectopic pregnancy is a rare pathology and represents 2%-4% of ectopic pregnancies<sup>(1,2)</sup>. The blastocyst implants at the level of the uterine horns or in the interstitial portion. As these terms are difficult to distinguish, they are considered synonymous<sup>(1,2)</sup>. Mortality can be high, up to 2.5%, due to massive hemorrhage from uterine rupture, since this area is very vascularized<sup>(2-6)</sup>. The risk factors are similar to those of tubal ectopic pregnancy<sup>(3)</sup>.

The clinical picture is variable, the most frequent symptoms being vaginal bleeding and pelvic pain. Occasionally it may be asymptomatic. Symptomatology will depend on the size of the mass and the expansion of the affected area. When complicated, hypovolemic shock and death



may occur if not diagnosed early<sup>(1,3)</sup>. Rupture occurs when the muscular wall is destroyed in the area of least resistance by infiltration of the trophoblast which leaves a thin layer of uterine muscle in the affected horn. The distensibility of the myometrium is associated with rupture in advanced gestational age. According to the literature, uterine rupture occurs in 20%-50% of cases, with an increase as pregnancy progresses<sup>(4,7,8)</sup>.

There is no consensus on the most appropriate management of this pathology and, among the various treatments, systemic treatment with methotrexate and surgery are the most commonly used. Surgical treatment consists of cornual resection or hysterectomy<sup>(3)</sup>. In recent years, minimally invasive surgery has been performed by laparoscopy, with some advantage over laparotomy. According to studies including a meta-analysis, laparoscopy is associated with less blood loss during surgery, less postoperative pain and a short hospital stay, which is why it is considered an important surgical option<sup>(2,7)</sup>. Some articles report the use of local injection of methotrexate with good results. They do not recommend expectant management due to the high risk of uterine rupture and massive hemorrhage<sup>(1,3,8)</sup>.

The purpose of the present study is to describe the experience in the management of cornual ectopic pregnancy at the Instituto Nacional Materno Perinatal.

## METHODS

A descriptive, retrospective and observational study was performed. The study population was the ectopic pregnancies treated in 2022 at the Instituto Nacional Materno Perinatal, Lima, Peru. Diagnosis was based on clinical examination, quantitative measurement of the beta fraction of human chorionic gonadotropin hormone ( $\beta$ -hCG) and ultrasound imaging. The patient was informed of the risks and advantages of the treatment applied. All patients signed an informed consent of the treatment performed. Patients with a diagnosis of cornual ectopic pregnancy with available clinical history and complete information were included. Patients treated in another hospital, lack of clinical history or incomplete information required were excluded.

The study variables were patient age, risk factors, clinical picture, gestational age, initial  $\beta$ -hCG, size of the ectopic mass, affected cornual region, uterine rupture and type of treatment.

The documentary observation technique was applied in clinical histories and a registration form was used. The data were recorded in the SPSS version 19.0 spreadsheet. The descriptive and analytical analysis was performed with the support of this statistical package. For quantitative variables, measures of central tendency and dispersion were determined, and for qualitative variables, frequencies and percentages were established. The data were presented in tables and graphs.

Evaluation of the study by the ethics committee was not necessary since the management of ectopic pregnancy is protocolized in the Institute's Gynecologic Practice and Procedure Guidelines. No risk was added to the patients in the study because a documentary analysis was performed.

## RESULTS

During the study period, 166 ectopic pregnancies were recorded, of which 9 were cornual ectopic pregnancies. Only 7 cases met the inclusion criteria. The 2 excluded cases did not have the required information in the clinical history.

The mean age was 31 years (range 23-36 years), all patients being younger than 40 years. The mean gestational age was 7.3 weeks (range 5-10 weeks), with 57.1% of the cases being less than 8 weeks (Tables 1 and 2). Of the cases, 71.4% had no risk factors, only 14.3% had a history of uterine curettage or were carriers of Copper T. In relation to the clinical picture, the majority presented vaginal bleeding associated with pelvic pain (71.4%). The second most frequent sign was pelvic pain (20.6%).

The mean initial  $\beta$ -hCG value was 8,262.3 mIU/mL (range 996-23,500 mIU/mL). In 71.4% of cases, baseline  $\beta$ -hCG levels were less than 10,000 mIU/mL. The average size of the ectopic mass was 36.7 mm (range 20-57 mm). In 28.6% of cases, the size of the ectopic mass was larger than 4 cm. The right cornual region was the most affected (71.4%). Uterine rupture occurred in only 2 cases (28.6%) (Table 1).



Regarding treatment, most cases (57.1%) had surgical treatment with cornual resection and cornuostomy performed by laparotomy. Local injection of methotrexate was performed under transvaginal ultrasound guidance. Systemic treatment with methotrexate was given in 28.6% of cases and in 14.3%, management was expectant (Table 1). There were no complications with the treatments indicated. All cases progressed favorably until hospital discharge.

## DISCUSSION

Cornual ectopic pregnancy is a challenge to diagnose and treat<sup>(3,8)</sup>. It has an incidence between 1/2,500 and 1/5,000 of all pregnancies and 2%-4% of ectopic pregnancies<sup>(9)</sup>. In the present study, cornual ectopic pregnancy accounted for 5.4%. It has a high morbidity and mortality rate due to massive intraperitoneal hemorrhage, so early diagnosis may prevent this life-threatening complication<sup>(3,9)</sup>.

The risk factors associated with cornual ectopic pregnancy are similar to those of tubal ectopic pregnancy, the main ones being a history of tubal surgery, previous ectopic pregnancy, pelvic inflammatory disease, the use of assisted reproductive techniques and the presence of an intrauterine device<sup>(4,6,8-10)</sup>. In recent years its incidence has increased along with heterotopic pregnancy due to the increasing use of highly complex human reproductive techniques<sup>(4)</sup>. In the study, the majority of cases (71.4%) did not present risk factors similar to those reported by most authors.

The clinical picture of cornual ectopic pregnancy is variable and, like other ectopic pregnancies, includes mainly vaginal bleeding and pelvic pain. Occasionally they may be asymptomatic.

When the diagnosis is late, there is a high risk of massive hemorrhage due to uterine rupture because the affected anatomical area has great uterine artery-dependent vascularization in its ascending branches<sup>(2-4,8,9,11)</sup>. Uterine rupture occurs in 20%-50% of cases, mainly in gestations greater than 12 weeks<sup>(4,8)</sup>. In the study presented, most cases had vaginal bleeding associated with pelvic pain (71.4%), as in most studies, and uterine rupture in 28.6% of cases.

Thanks to advances in ultrasonography and the quantitative measurement of the  $\beta$ -hCG, ectopic pregnancies are detected earlier. This avoids the complications of more advanced gestations such as uterine rupture, massive hemorrhage and maternal death and allows the use of more conservative treatments<sup>(4,6,12-14)</sup>. In the study, all cases were detected at early gestational ages, 57.1% in pregnancies of less than 8 weeks. Levels of  $\beta$ -hCG in cornual ectopic pregnancy are usually higher than in tubal ectopic pregnancies<sup>(5)</sup>.

There is currently no consensus on the most appropriate treatment for cornual ectopic pregnancies. There are few publications, and most are single case or case series reports. Since most of the affected patients are young women, treatment will depend individually on the gestational age, the hemodynamic status of the patient, embryonic or fetal viability and whether the patient wants to preserve her fertility<sup>(3,4,9)</sup>. In the present study, all cases were in women under 40 years of age who wished to preserve their fertility.

According to the literature, surgical treatment is the decisive decision for cornual ectopic pregnancies, mainly cornual resection and hysterectomy. Especially in cases of uterine rupture it allows control of life-threatening bleeding<sup>(2,3,14)</sup>. However, there are cases in which systemic

TABLE I. MAIN CHARACTERISTICS OF ECTOPIC PREGNANCIES.

Case	Age (years)	Risk factors	Gestational age (ws)	Initial $\beta$ -hCG (mIU/mL)	Ectopic mass size (mm)	Affected cornual region	Uterine rupture	Type of treatment
1	35	None	7	3,900	29	Right	No	Methotrexate 2 doses
2	23	Copper T carrier	5	9,200	26	Left	No	Methotrexate 1 dose
3	31	None	10	996	33	Right	No	Expectant management
4	36	None	8	10,600	36	Left	No	Cornual resection
5	31	None	5	4,660	57	Right	Yes	Cornuostomy
6	26	None	7	4,980	56	Right	Yes	Cornuostomy
7	35	Uterine curettage	9	23,500	20	Right	No	Methotrexate local injection

ws: weeks,  $\beta$ -hCG: beta-human chorionic gonadotropin hormone, mm: millimeters



treatment with methotrexate in single or multiple doses is utilized, following the criteria used for tubal ectopic pregnancy, with a success rate between 66.7% and 91%<sup>(2-4,9)</sup>. Jermy et al, in 2004, performed a prospective study of 17 cases of cornual ectopic pregnancy treated with a single dose of intramuscular systemic methotrexate, with a success rate of 94% and only 6 patients required a second dose<sup>(15,16)</sup>. In the present study, 28.6% of cases received systemic treatment with intramuscular methotrexate with a single dose of 50 mg/m<sup>2</sup>; one case required a second dose because the  $\beta$ -hCG level did not decrease more than 15% from the initial measurement.

Cases with expectant management are few and most studies do not recommend it due to the high risk of uterine rupture and massive hemorrhage<sup>(1,3,8)</sup>. In the study presented, there was expectant management in a patient with an initial  $\beta$ -hCG level of 996 mIU/mL and  $\beta$ -hCG controls every 48 hours, with a decrease in  $\beta$ -hCG values and favorable evolution, and therefore she did not require surgical treatment.

In recent years, new more conservative forms of treatment are being introduced to avoid the complications caused by classic surgical treatment and thus preserve future fertility, such as laparoscopic cornual resection, laparoscopic cornuostomy, salpingostomy with subsequent cornual curettage, hysteroscopy-guided evacuation, local injection of methotrexate, among others<sup>(4,9,14)</sup>. Several authors have described surgical management by laparoscopy. According to the study by Marchand et al, in 2021, in a meta-analysis they compared the laparoscopic route with laparotomy, supporting laparoscopy as the main surgical option because it was associated with less blood loss, less postoperative pain and a shorter hospital stay<sup>(2,7,13,17-21)</sup>. In our institution there is a lack of experience in performing these procedures laparoscopically (cornual resection, cornuostomy).

Case series of local injection of methotrexate under transvaginal or transabdominal ultrasound control, as well as laparoscopically or hysteroscopically, are being published, with success rates of up to 80%<sup>(2,9,14)</sup>. Its main advantage is the administration of the drug in lower doses and with fewer side effects<sup>(5)</sup>. Lin et al. reported that in unruptured cornual ectopic pregnancies, local injection of methotrexate was a better option

than systemic methotrexate<sup>(6,9)</sup>. In our study, a transvaginal ultrasound-guided local injection of methotrexate was performed at a dose of 1 mg/kg, which successfully responded to treatment without any complications.

Uterine scar after surgery for a cornual ectopic pregnancy may be a site of uterine rupture in a subsequent pregnancy. Cornual resection has been associated with lower fertility rates and a higher incidence of rupture in future pregnancies due to myometrial loss and uterine scarring<sup>(1,4,12,18)</sup>. There are no conclusive studies on this subject. Cases of uterine rupture in the second and third trimesters have been described<sup>(4,20)</sup>. There are also doubts about the quality of the myometrium in the case of local methotrexate treatment. If a subsequent pregnancy occurs, elective cesarean section is recommended<sup>(4,12)</sup>.

In conclusion, cornual ectopic pregnancy is a rare and potentially fatal pathology due to the risk of uterine rupture and consequent massive hemorrhage, which can even lead to death. Currently, there is no consensus on its management, and there are several types of treatment, with surgery being the most commonly used. In recent years there has been a more conservative management with minimally invasive approaches, one of which is laparoscopy, with certain advantages over laparotomy.

## REFERENCES

1. Gaetani M, Di Gennaro D, Vimercati A, Vitagliano A, Dellino M, Malvasi A, et al. Cornual pregnancy. *Gynecol Minim Invasive Ther.* 2023;12(3):130-4. doi: 10.4103/gmit.gmit\_10\_23
2. Salinas V, Cadena G, Tubón S, Solís S. Factores de riesgo en el embarazo ectópico cornual. *Medicinas UTA.* 2020;4(2):67-73. <https://doi.org/10.31243/mdc.uta.v4i2.340.2020>
3. León CI, Rodríguez IG, Segura FAB. Experiencias en el tratamiento del embarazo ectópico del cuerno uterino. *Revista Cubana de Medicina Militar.* 2020;49(4):e0200678.
4. Monzón C, Tejada M, Oliva G, Gutiérrez S. Embarazo cornual. Presentación de un caso de evolución inusual con dosis única de metotrexato. *Rev peru ginecol obstet.* 2020;66(1):83-8. <https://doi.org/10.31403/rpgo.v66i2237>
5. Roca C, Henere S, Molinero S, Ballber B, Arnau B, Vives A. Tratamiento conservador de la gestación intersticial. A propósito de dos casos. *Prog Obstet Ginecol.* 2019;62(1):59-62. doi: 10.20960/j.pog.0017
6. Tuncay G, Karaer A, Coskun E, Melekoglu R. Treatment of unruptured cornual pregnancies by local injections of methotrexate or potassium chloride under transvaginal ultrasonographic guidance. *Pak J Med Sci.* 2018;34(4):1010-3. doi: 10.12669/pjms.344.14600



7. Zarama M, Buitrón G, Córdoba G, Cortés C, Zarama E. Embarazo ectópico cornual. Tratamiento combinado con metotrexato e histerotomía y evacuación por laparoscopia. Reporte de un caso. *Ginecol obstet Méx.* 2019; 87(10):676-9. <https://doi.org/10.24245/gom.v87i10.2924>
8. Zolfaroli I, Martínez A, Raga B, Mata C, Cano S. Embarazo ectópico intersticial tratado con metotrexato y cirugía: caso clínico. *Rev chil obstet ginecol.* 2019;84(1):64-9. <http://dx.doi.org/10.4067/S0717-75262019000100064>
9. Parker B, Gupta A, Lymperopoulos A, Parker J. Methotrexate for Cornual Ectopic Pregnancy. *Cureus.* 2020;12(8):e9642. doi: 10.7759/cureus.9642
10. Tulandi T, Al-Jaroudi D. Interstitial pregnancy: results generated from the Society of Reproductive Surgeons Registry. *Obstet Gynecol.* 2004;103(1):47-50. doi: 10.1097/01.AOG.0000109218.24211.79
11. Marchand G, Taher M, Sainz K, Azadi A, Ware K, Vallejo J, et al. A systematic review and meta-analysis of laparotomy compared with laparoscopic management of interstitial pregnancy. *Facts Views Vis Obgyn.* 2021;12(4):299-308.
12. Pramayadi C, Bramantyo A, Gunardi E. Successful Procedure in Conservative Management of Interstitial (Cornual) Ectopic Pregnancy. *Gynecol Minim Invasive Ther.* 2018;7(4):172-4. doi: 10.4103/GMIT.GMIT\_9\_18
13. Choi Y, Eun D, Choi J, Shin KS, Choi JH, Park HD. Laparoscopic cornuotomy using a temporary tourniquet suture and diluted vasopressin injection in interstitial pregnancy. *Fertil Steril.* 2009;91(5):1933-7. doi: 10.1016/j.fertnstert.2008.02.013
14. Kahramanoglu I, Mammadov Z, Turan H, Urer A, Tuten A. Management options for interstitial ectopic pregnancies: A case series. *Pak J Med Sci.* 2017;33(2):476-82. doi: 10.12669/pjms.332.12093
15. Ibáñez C, Soto del Pino Y, Pérez G, Portales C. Tratamiento con metotrexate para el embarazo ectópico cornual. *Rev Cubana Obstet Ginecol.* 2017;43(3):136-42.
16. Jermy K, Thomas J, Doo A, Bourne T. The conservative management of interstitial pregnancy. *BJOG.* 2004;111(11):1283-8. doi: 10.1111/j.1471-0528.2004.00442.x
17. Marchand G, Masoud AT, Galitsky A, Azadi A, Ware K, Vallejo J, et al. Management of interstitial pregnancy in the era of laparoscopy: a meta-analysis of 855 case studies compared with traditional techniques. *Obstet Gynecol Sci.* 2021 64(2):156-73. doi: 10.5468/ogs.20299
18. Bertín V, Montecinos O, Torres V, Pinto M. Embarazo ectópico cornual, diagnóstico y tratamiento: reporte de dos casos y revisión de la literatura. *Rev Chil Obstet Ginecol.* 2019; 84(1):55-63. doi:10.4067/S0717-75262019000100055
19. MacRae R, Olowu O, Rizzuto M, Odejinmi F. Diagnosis and laparoscopic management of 11 consecutive cases of cornual ectopic pregnancy. *Arch Gynecol Obstet.* 2009;280(1):59-64. doi: 10.1007/s00404-008-0872-4
20. Chen P, Lin H, Hsiao S. Predictors of subsequent pregnancy in women who underwent laparoscopic cornuostomy or laparoscopic wedge resection for interstitial pregnancy. *J Chin Med Assoc.* 2019;82(2):138-42. doi: 10.1097/JCMA.000000000000016
21. Hwang J, Lee J, Lee N, Lee K. Open cornual resection versus laparoscopic cornual resection in patients with interstitial ectopic pregnancies. *Eur J Obstet Gynecol Reprod Biol.* 2011;156(1):78-82. doi: 10.1016/j.ejogrb.2010.12.014