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Research Article

Ectopic Pregnancy: Gynecology Emergency Department Admission Criteria

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Abstract

Introduction: The incidence of ectopic pregnancy has increased over the past few years and it still represents one of the main causes of maternal death in the first trimester. It is therefore important to address the issue of early diagnosis and management of this pathology.

Objectives: This work aims to study the means of diagnosis of ectopic pregnancies and the different therapeutic options.

Methods: It is a retrospective study of 50 cases of ectopic pregnancy treated in the CMNT emergency department, over a six-month period from November 01st, 2016 to April 30th, 2017. We consider all the EP in the study.

Results: Among participants, 54% of patients presented at least one risk factor.

The main symptoms that led patients to seek medical attention were pelvic pain in 90% of cases, metrorrhagia in 62% of cases, and amenorrhea in 76% of cases.

Once the diagnosis was suspected, its confirmation relied on βHCG levels and ultrasound confrontation.

The median β-HCG level at the time of the diagnosis of the EP was 2378 mIU/ml. Ultrasound examination showed indirect signs in most cases, such as a thickened endometrium in 10 cases (20%), or a significant peritoneal effusion in 76.31% of cases. An extrauterine gestational sac containing an embryo was found in 4 patients (8%), including 2 cases with positive cardiac activity.

Clinical, biological and ultrasound data helped guide the therapeutic choices of these patients: 84% have undergone surgical treatment and 16% of them had a medical treatment.

Conclusion: The improvement of diagnostic strategies for ectopic pregnancy have led to early detection of this pathology and allowed more conservative medical treatments to be employed. However, ultrasound imaging still has its limitations, and is one of the most operator-dependent imaging.

Keywords: *Ectopic Pregnancy (EP); Maternal Death; First Trimester*

Introduction

An ectopic pregnancy (EP) occurs when a fertilised egg implants outside of the uterus. CNGOF study (2010) and Gervaise and Fernandez (2010), concluded that during the past fifteen years, the incidence of ectopic pregnancies (EP) has doubled, due to the existence of risk factors such as salpingitis, fallopian tube surgery, and cigarette smoking [1-3].

The CNGOF study (2010) also revealed that ectopic pregnancy ruptures represent 10 to 15% of pregnancy-related deaths in the first trimester [1]. The diagnosis of ectopic pregnancies has been revolutionized by medical imaging advances, especially in endovaginal sonography, allowing their early detection. Barillier (2007) has shown that two-thirds of ectopic pregnancies are now diagnosed before rupture compared to one quarter in the 1980's [2]. Therefore, it appears that endovaginal sonography in conjunction with biological diagnosis, improves considerably the sensitivity of ultrasound-based diagnosis, and helps to avoid unnecessary diagnostic uterine curettage, or diagnostic laparoscopies. It also plays a role in preventing severe intra-abdominal hemorrhage.

However, this imaging technique has its limitations. Indeed, several studies including Ardaens, Guerin., *et al*. 2003, indicated that ultrasonography had a modest level of performance, with low specificity and frequent diagnostic errors [4], hence the relevance of our study to emphasize the contribution of pelvic ultrasonography in the positive diagnosis of ectopic pregnancies and its confrontation to clinical and biological data, which was also discussed by Elito, Reichmann., *et al*. (1999) [5].

Aim of the Study

The aim of this work is to study the means of diagnosis of ectopic pregnancies and the different therapeutic options.

Materials and Methods

It is a retrospective study of 50 cases of ectopic pregnancy treated in the CMNT emergency department, over a six-month period from November 01st, 2016 to April 30th, 2017. We consider all the EP in the study.

For each patient consenting to participate in the study; a medical information sheet was filled out anonymously, including history taking (past medical, surgical and obstetrical history, risk factors of ectopic pregnancy, symptoms reported by the patient), physical examination, biological and ultrasound data.

This study was conducted in accordance with the guidelines for biomedical and biological research.

Ethical approval was obtained from the Ethics Committee of the Maternity and Neonatology Center of Tunis (approbations n° 6/2018), and written informed consent was obtained from all participants at the time of enrollment.

Results

We enrolled 50 patients. The patients were aged between 21 and 47 years old, with a median age of 33 years. Patients belonging to the age group of 35 - 39 represented 32%. The average gravidity was 2.8. Multiparous women (gravidity > 4) represent the population with the highest risk of EP. Regarding parity, 64% of the patients were nulliparous women or primigravidas, which brought up the issue of the subsequent fertility of these patients.

The main characteristics of the patients are summarized in table 1.

Risk Factors	Number of cases	Percentage %
History of miscarriages and hypofertility	17	34%
Previous abdominal and/or pelvic surgeries	8	16%
History of voluntary abortions	2	4%
Previous ectopic pregnancies	2	4%
Contraception methods (intrauterine device)	1	2%

Table 1: *General characteristics of the patients.*

54% of patients presented at least one risk factor. The remaining 46% of women did not have known risk factors, thus forming the group of "sporadic" ectopic pregnancies.

The main symptoms that led patients to seek medical attention were pelvic pain in 90% of cases (the location of the pain was diffuse pelvic pain in 74% of cases), metrorrhagia in 62% of cases, and amenorrhea in 76% of cases (the duration varied between 1 week and 8 weeks and 3 days with an average duration of 5 weeks and 3 days).

The classic clinical triad of EP combining: pain, metrorrhagia and amenorrhea was found in only 22 patients, i.e. in 44% of cases (Table 2).

Symptoms	Number of cases	Percentage (%)
Pain	45	90
Metrorrhagia	31	62
Amenorrhea	38	76
Triad	22	44

Table 2: *Symptoms reported by the patients.*

Hypovolemic shock was observed in only one case. In the majority of cases, our patients were in a good general state and hemodynamically stable.

The median β-HCG level at the time of the diagnosis of the EP was 2378 mIU/ml with levels ranging from 279 to 7131 mIU/ml.

Ultrasound examination showed, a thickened endometrium in 10 cases (20%), while a thin endometrium (less than 8 mm) was noted in 11 cases (22%).

An extrauterine gestational sac containing an embryo was found in 4 patients (8%), including 2 cases with positive cardiac activity.

A suggestive image of a hematosalpinx was observed in 34 cases (68%). The size of these masses was not mentioned in 20 cases, and it was greater than 3 cm in 13 cases, i.e 65% of cases.

A hemoperitoneum was observed in 76% of cases (38 patients). The peritoneal effusion was considered significant in 76.31% of cases.

Clinical, biological and ultrasound data helped guide the therapeutic choices of these patients.

84% of patients have undergone surgical treatment and 16% of them had a medical treatment (Table 3).

Treatment	Number	Percentage
Medical	8	16
Laparoscopic surgery	41	82
Laparotomy	1	2
Total	50	100

Table 3: *Classification of patients according to the received treatment.*

Discussion

The incidence of EPs in developed countries is around 100 - 175 EPs per year per 100,000 women aged between 15 and 44 years old, i.e. about 2 EPs per 100 births, according to CNGOF study (2010); Gervaise and Fernandez (2010); Gabkika, Abdessalem., *et al.* (2015) and Panelli Philips., *et al.* (2015) [1,3,6,7].

The CNGOF study (2010); CNGOF recommendations (2003); Buss and Stucki (2005) and Bouyer (2003) concluded that this increasing incidence is related to the resurgence of risk factors namely: STIs, salpingitis or endometritis. *Chlamydia trachomatis* is the most frequent germ and despite benign clinical symptoms, women with *C. trachomatis* have severe tubal damage [1,8-10].

Bouyer (2003), also revealed that cigarette smoking is the second major risk factor of EP. It causes a ciliary dysfunction, that can be reversed if the patients quit smoking [10].

The clinical diagnosis of EP is difficult and should be suspected in any woman of childbearing age who presents with abdominal pain or bleeding.

Pelvic pain, due to peritoneal irritation, is oftentimes unilateral in one of the two iliac fossae. In our series, pain was the main symptom that led patients to consult a doctor, it was found in 90% of patients.

EP is generally diagnosed between the 6^{th} and 10^{th} week, however, menstruations can occur at an expected time, but there are abnormalities in abundance or duration. In our series, amenorrhea was reported in 76% of our patients, which is consistent with data reported by Gabkika, Abdessalem., *et al*. (2015); Boudhraa, Bensalah., *et al*. (2008) and Oliveira, Abdelmassih., *et al*. (2001) [6,11,12].

Metrorrhagia is usually a symptom that alerts the woman and prompts her to consult a doctor. Bleeding is light, recurrent, classically dark brown, sometimes mixed with red blood. In our series, metrorrhagia was the third reason for consultation and was found in 62% of cases.

The classical symptomatic triad associating pain, amenorrhea and metrorrhagia was found in 44% of our patients. Bouyer (2003), reported a frequency that varies between 29% and 79.2% [10].

When the diagnosis of pregnancy is not biologically confirmed (βHCG not done or results not ready yet), the endovaginal sonography, apart from the visualization of the egg, will look for two almost constant associated signs that evoke a pregnancy: the corpus luteum and the aspect of the uterine decidua.

Identifying the corpus luteum plays an important role in guiding the diagnosis. Elito Reichmann., *et al*. (1999), and Poncelet, Leconte., *et al*. (2009) research works demonstrated that the corpus luteum was located on the same side as the EP in nearly 85% of cases [5,13]. In some cases, as shown by Monnier-Barbarino (2003), the corpus luteum can be mistaken for an EP, thus the importance of correctly indentifying the ovary [14]. In rare cases, the ultrasound shows a gestational sac with an embryo outside of the uterus, which is a 100% reliable argument, but this situation is only observed in 10 to 20% of cases, as reported by Kenfack, Noubom., *et al*. (2012) [15]. In the absence of a living embryo, the diagnosis is less formal, but the patient is more likely to have an ectopic pregnancy if a trophoblastic ring and a yolk sac are visualized. According to some authors, including CNGOF recommendations (2010) and Lédée-Bataille (2004), the hypervascularity of the tubal wall in contact with the egg, observed on Doppler images constitutes a major element in the prognosis of this affection [8,16]. Another sign to look for on an ultrasound is hematosalpinx. It is the most common ultrasound sign, observed in 89 to 100% of EP cases, with a specificity of 90% [17]. In our series, this sign was observed in 76% of cases.

It can thus be concluded that βHCG levels greater than 1500 mIU/mL in conjunction with a non-visible intrauterine pregnancy is a key element in the diagnosis of ectopic pregnancy. Nonetheless, the examiner's ultrasound experience, as well as the quality of the equipment have a significant impact on the performance of the ultrasound examination; therefore, Ardaens, Guérin., *et al*. (2003), CNGOF recommendations (2010), as well as Buss and Stucki (2005), deduced that the concept of a threshold defined as a β-HCG level of 1500 mIU/mL must be put into perspective because it applies essentially to experienced sonographers [4,8,9].

In about 15 - 20% of EP cases, the endovaginal sonography shows no adnexal mass, at least on first examination.

It could be an EP that is too small to be found or even poor examination conditions. The coexistence of a positive βHCG and an empty uterine cavity remains the Gamental element. Ardaens, Guérin., *et al*. (2003), showed that, depending on the clinical presentation of the patient and the level of βHCG, physicians may opt for close monitoring (24 - 48h), or medical treatment [4].

Several diagnostic algorithms for EP have been described and compared. The most classical ones are based on a βHCG-ultrasound confrontation. Other teams, such as Doumerc., *et al*. rather use a chronological succession of items allowing a more representative assessment of the multiple possible situations.

In our department, given the clinical polymorphism of this pathology, we consider that suspecting the diagnosis of EP is crucial in front of warning signs such us pain and metrorrhagia: when the diagnosis of EP is suspected-apart from hemorrhagic forms- endovaginal sonography and a qualitative βHCG blood test are decisive for subsequent management. Likewise, Canis, Savary., *et al*. (2003) supposed that there are 2 levels for the quantitative βHCG blood tests: a β-hCG discriminatory level of 1500 mIU/ml for the appearance of an intrauterine gestational sac and a level of 5000 mIU/ml as a threshold indicating surgical diagnostic or therapeutic intervention [18].

The recent development of medical treatment has considerably changed the management of ectopic pregnancy. Gervaise and Fernandez (2010); Gabkika, Abdessalem., *et al*. (2015); the HAS guidelines (2016); Hoover, Tao., *et al*. (2010) proposed several cytotoxic agents: methotrexate, actinomycin, prostaglandins, potassium chloride, hyperosmolar glucose [3,6,19,20]. 16% of our patients received medical treatment with methotrexate.

Gabkika, Abdessalem., *et al*. (2016) showed that laparoscopic surgery is currently the standard surgical treatment for ectopic pregnancy [6]. The only risk that appears to be higher is developing residual trophoblastic tissue.

In our series, 41 patients (82%) had laparoscopic surgery.

The indications of laparotomy are now reduced to: precarious hemodynamic state, contraindications of laparoscopic surgery, and difficulties in securing hemostasis in laparoscopy.

In our series, only one patient had a laparotomy approach. This result is different from other Tunisian series where the number of patients treated surgically by laparotomy was greater.

Conclusion

There are multiple clinical presentations of EPs, and the diagnosis is quite rarely obvious. Better knowledge of risk factors and improved diagnostic strategies for ectopic pregnancy have led to early detection of this pathology, and to the development of new therapeutic approaches, medical ones in particular. Despite the advances made in ultrasound imaging, it still has its limitations, and is one of the most operator-dependent imaging.

Ethics Approval and Consent to Participate

Ethical approval was obtained from the Ethics Committee of the Maternity and Neonatology Center of Tunis (approbations n° 6/2018), and written informed consent was obtained from all participants at the time of enrollment.

Human and Animal Rights

Not applicable due to retrospective nature of the study.

Consent for Publication

Not applicable.

Availability of Data and Materials

Not applicable.

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None.

Conflict of Interest

No conflict of interest for this study.

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