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Original Research Article

A retrospective analysis on progressive ectopic pregnancy: incidence, clinical features, diagnosis, and treatment approaches

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ABSTRACT

Background: Progressive ectopic pregnancy is a pregnancy that develops outside the uterus which progresses if not treated promptly.
Methods: A retrospective analysis of 51 patients was done in the gynecology department of Grodno State Medical university, first aid hospital.
Results: According to the analysis of the obtained data, the article shows the comparison and differences of these ectopic pregnancies in different age categories, with the parity and the complications followed due to this. The percentages are as follows; women with ectopic pregnancy of <30 years=52.9%, >30 years=47%, women with ectopic pregnancy in their 1st pregnancy =13.7%, 2nd pregnancy = 45.09%, 3rd pregnancy = 33.33%, recurrence rate = 13.72%, abortion = 15.68%, miscarriage due to ectopic pregnancy= 1.96%. Prominent complaints were pain together with the presence of spotting. Among patients undergoing culdocentesis, 25.49% presented with hemorrhagic fluid, while 43.13% showed a mixed-type fluid. Within 5 days of admission, beta-hCG levels increased in 83.34% of patients and decreased in 16.66%. All patients in our retrospective study underwent tubotubal anastomosis. Out of them, 17.64% of women had a previous history of tubectomy.
Conclusions: Women below 30 years with ectopic pregnancy had a higher incidence. Early diagnosis is the key to reduce the morbidity, mortality, to reduce the complications and to estimate the progression. Beta HCG level with transvaginal ultrasound (TVUS) is a preferred combination used nowadays for early diagnosis of the disease and complications such as rupture of a tubal pregnancy. To preserve fertility tubotubal anastomosis was the preferred mode of treatment (especially in patients with previous tubectomy surgery).

Keywords: Early diagnosis, Ectopic pregnancy, Treatment

INTRODUCTION

Progressive ectopic pregnancy (PEP) is an atypical pregnancy that occurs in extra-uterine locations such as the fallopian tube, abdomen, cervix or ovaries.

The most prevalent type of ectopic pregnancy is tubal pregnancy where the fallopian tube serves as a communication between the ovary and the uterus. It is usually detected in the first trimester with prominent symptoms and carries a life-threatening potential for pregnant women.

Due to atypical symptoms [such as bowel and bladder complaints] it can be misdiagnosed or delayed in diagnosis which can even lead to an increased risk of bleeding and mortality.[1]

However, based on clinical features, transvaginal ultrasound (TVUS) examination, serum beta-hCG and progesterone levels, diagnosis can be made early and accurately.

In this research article, the tubal type of ectopic pregnancy, its clinical presentation, strategy of diagnosis, preferred method of operation to preserve reproductive function was studied.

Incidence

The incidence of PEP is 2% with a rate of mortality of 0.5 per 100,000 live births.[2] The most typical location is the fallopian tube. Incidence of PEP in terms of location within the fallopian tube, 13% in the isthmic segment, 75% in ampullary segment and about 12% in fimbrial segment.[3] Assisted reproductive technologies (ART), such as *in vitro* fertilization (IVF), are risk factors for tubal EP. The reported rates of tEP after IVF range from 1.6-8.9%.[4]

Tubal surgery, such as tuboplasty, salpingostomy, re-anastomosis and adhesiolysis, can also increase the risk of developing a tubal ectopic pregnancy (tEP). It has been reported that tubal surgery can result in incidences of tEP of up to 40% depending on the severity of the damage; however, one study reported that tEP risk after salpingostomy and adhesiolysis was around 7.9% and after re-anastomosis it was 6.7%.[5]

Symptoms and signs

Severe abdominal pain, painful fetal movements, vaginal bleeding, abnormal presentation in placenta and fetus, failure to induce labor, abnormal cervix position. Pain during abdominal or pelvic examination is the most prominent physical finding. Patients with PEP may have non-specific symptoms like lower abdominal pain and vaginal bleeding often presenting similar to appendicitis, early pregnancy loss, trauma or urinary calculi.[6]

Complication

Short-term morbidity for ectopic pregnancy (EP) can be from hemorrhagic shock and anaemia or due to complications arising from clinical management of the EP - for example, side effects of medical management, venous thromboembolism or infection associated with surgical intervention.

Long-term morbidity for EP includes a reduction in fertility, increased chance of EP recurrence and an impact on mental health, with 23% of women meeting the criteria for post-traumatic stress disorder (PTSD).[7] Ultimately, early diagnosis and treatment for EP are key for reducing morbidity and mortality, and those presenting with symptoms of a ruptured EP should have timely emergency care.[8]

However, it is hypothesized that this increased risk may be due to other confounding factors, such as pelvic inflammatory disease associated with EP.[9]

Another study was found that the removal of a fallopian tube surgically for ectopic pregnancy decreased the incidence of ovarian cancer; however, there was no desired effect in the first years following the removal of a fallopian tube, indicating that there can be a lag-time for desired effect after the intervention.

METHODS

The study was conducted in February 2023 in the gynecological department of Grodno State Medical University. All the cases included are ectopic pregnancy.

We performed a case series of 51 patients and analysed their age, complaints, previous history of pregnancy with uncommon locations, menstrual cycle, and laboratory analysis: Beta HCG level, hemoglobin level, diagnosis, treatment, and recurrence rate.

Inclusion criteria

We compiled information on papers from 2011-2024. Pubmed and Google were the search engines. Patients who had both regular and irregular menstrual cycles, patients who had c-sections and normal deliveries, patients who had miscarriages, patients presenting without pain in ectopic pregnancy, multiparity, primigravida women, previous occurrence of ectopic pregnancy. The patient has a high level of beta-HCG, hemodynamically stable.

Exclusion criteria

Patients who had autoimmune diseases, cases which were not proven ectopic pregnancy. A patient who likely had possible errors in the case reports.

Table 1: On the fundamentals of clinic features indicating risk of EP.[2]

Level	Clinical feature	Risk evaluated
High level	Tenderness of cervix present, peritonitis	29%
Moderate	Pelvic pain, no fetal heart tones, no tissue in the cervix	7%
Low	No pain, fetal heart tones, tissue at the cervical OS	<1%

Diagnostics

On clinical examination, pelvic pain with a slightly enlarged uterus together with palpable adnexal mass was noted. Beta-hCG variations are usually used together with ultrasound to determine the diagnosis of PEP. 6,10 Patients having a beta-hCG level >2000 mIU/ml and absence of

intrauterine pregnancy (IUP) on ultrasound is highly suspected for PEP. Decrement of beta-hCG level or a slower rate is suggestive of PEP or miscarriage. If TVUS doesn't indicate an intrauterine pregnancy, beta-hCG levels can be assessed if it is >1,500mIU/ml.

Strategy for diagnosis

When a woman in reproductive age group presents with one of the following features: 1) Increased beta-hCG serum levels, 2) Pelvic/abdominal pain, 3) Vaginal bleeding.

Anamnesis should be obtained and physical examination is performed.[11] Further investigations should be performed depending upon serum beta-hCG levels.

If beta-hCG level >1,500mIU/ml -TVUS

If beta -hCG <1,500mIU/ml or decreasing -monitor the patient for any signs of miscarriage- consult for immediate surgical interventions.

If beta -hCG level <1,500 mIU/ml or rapidly increasing -repeat beta-hCG after 48 hours.[2] According to the author Markov et al, the reference value of beta-hCG levels was taken at 2000mIU/ml, however this article considers a value of 1500mIU/ml.

Treatment

Methotrexate treatment is given only in patients with low beta-hCG levels.[12,13] Patients in this case study had high levels of beta-hCG, therefore it was not the treatment of choice.[14] The effective treatment was resection of the fallopian tube with end-to-end tubotubal anastomosis.[15] It was preferred, particularly for patients who wanted to preserve reproductive function. In 17.64% patients had performed tubectomy previously, so for such patients a salpingostomy was performed.

Salpingectomy is not preferred. Such preference was usually made in order to avoid infertility. First patient will be given general anesthesia before the procedure starts.

A small incision (laparotomy), about 4 inches long, will be made on the patient's lower abdomen. The incision will be made at such a place so that the proximal part of fallopian tubes is visible and can be removed from the incision. Once the procedure is completed, the incision will be closed with staples or stitches.

Surgical intervention of PEP is either salpingotomy or salpingectomy which is the usual strategy for the management.[16] The former is preferred as it is less invasive but has substantial risk of subsequent PEP.

RESULTS

We recorded 51 patients and we determined the following.

Table 2: Demonstrating incidence and recurrence of ectopic pregnancy according to age and parity from obtained data.

Parameter	Subparameter	Percentage
Age in years	≤30	52.9
	>30	47
Ectopic pregnancy	1st pregnancy	13.7
	2nd pregnancy	45.09
	3rd pregnancy	33.33
	Pregnancy not recorded	7.88
Recurrence		13.72

The distribution of the occurrence of ectopic pregnancy with age, did not show a big value as the percentages only showed slight variations as 52.9 and 47 for women of age less than or equal to 30 and more than 30 respectively.

According to the parity, primipara women are the least at risk, whereas the risk is high for multipara. The recurrence rate is the main concern in patients with previous tubotubal anastomosis.

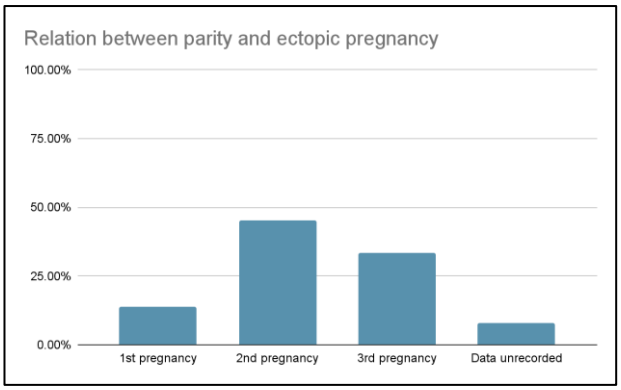

Figure 1: Demonstrates the relation of parity for the implantation of pregnancy outside the uterine cavity.

Figure 1 bar graph clearly demonstrates the relation of parity for the implantation of pregnancy outside the uterine cavity. Almost ½ of the patients were in their 2nd parity.

Almost all patients presented with pain as their major complaint, but 11.76% of women did not experience pain. Another prominent symptom was the presence of spotting in around 74.5% of these patients.

Culdocentesis showed a mixed type in most of the samples, whereas hemorrhagic type was also seen in 1/4th of the patients.

Most of these patients were diagnosed as mild anemic but only 2% showed moderate anemia and no patients were severely anemic. Moreover, 37% of patients had normal levels of hemoglobin.

A history of menstrual irregularity was presented only in less than 1/4th of these patients.

Table 3: Demonstrating various parameters such as abortion, miscarriage, culdocentesis, hemoglobin, menstrual cycle according to obtained data from this study.

Parameters		Percentage
Abortion		15.68
Miscarriage		15.68
Patients who had a miscarriage due to PEP		1.96
Complaints	With pain	88.24
	Without pain	11.76
	Spotting present	74.5
Culdocentesis	Hemorrhagic	25.49
	Mixed	43.13
	Not recorded	31.38
Hemoglobin	Normal	37.25
	Mild anemia	39
	Moderate anemia	1.96
	Not recorded	21.56
Menstrual cycle	Irregular	22.44
	Regular	77.56

Table 4: Determines the changes of beta-hCG levels after admission and the choice of treatment performed.

Beta-hCG	Increment within 5 days
	Diminution within 5 days
Tubotubal anastomosis	100%
Previous tubectomy	17.64%

Most of the patients had an hCG level between 101-500. Whereas more than 1/4th of the patients presented with a value more than 1500 (Figure 2).

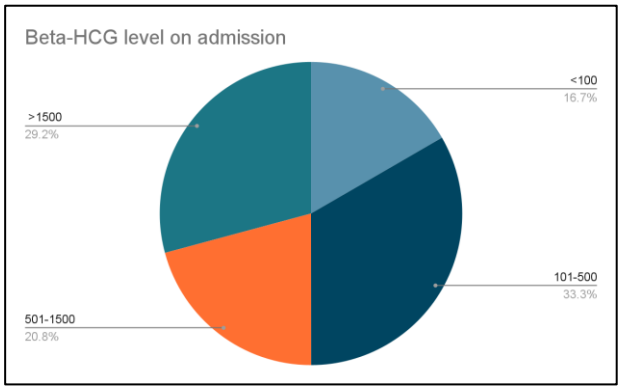

Figure 2: Beta-hCG levels on admission.

DISCUSSION

According to the other research articles women >30 years old are at a higher risk of developing progressive ectopic pregnancy, however in this case study it was proven that women <30 years are also prone to develop ectopic pregnancy. Patients who underwent IVF, had gynecological diseases like chlamyditis, gonorrhea had an increased incidence of PEP. Pregnancy-associated plasma protein A (PAPP-A), a key regulator of insulin-like growth factor bioavailability, essential for normal fetal development can be assessed. In maternal blood PAPP-A elevates with gestational age and rapidly descends after delivery. PAPP-A is less expressed in EP patients and negatively associated with inflammatory factors IL-8 and TNF-α. TVUS is the investigation of choice for extrauterine pregnancies. According to other articles, 53% of pregnancies that are detected in patients with IUDs are ectopic.[17] Patients can still present with previous ectopic pregnancies, despite regular menstrual cycles.

Some patients with ectopic pregnancy had irregular menstrual cycles and their last pregnancies were C-sections and had apoplexy of the ovary. In a patient with infertility of 4 years due to the adhesive process of pelvic organs and endometriosis undergoing ovulation stimulation, later developed PEP. In this patient, surgeons had to perform reconstructive surgery on fallopian tube-resection of fallopian tube with imposition of tubotubal anastomosis. All the patients had undergone resection of the fallopian tube with end-to-end tubotubal anastomosis to preserve fertility as the majority of our patients were young and its complications are rare. The importance of estimation of progressive ectopic pregnancy by checking serum beta HCG level every 48 hours and ultrasound was established. The prognosis is better for patients who receive early appropriate treatment.

CONCLUSION

According to 51 patient's data collected, less than 2% of them had recurrent progressive ectopic pregnancy. All patients were of fertile age group therefore tubo-tubal anastomosis was performed. None of the patients were presented with complications in ectopic pregnancy such as ruptures. An unruptured ectopic pregnancy allows nonsurgical management, but depending upon the beta-hCG levels. Combination of beta-hCG measurement together with TVUS still remains as the gold standard method for early diagnosis and estimation of progression of ectopic pregnancy. Under treatment, all patients underwent surgical approaches. Post treatment, it is needed to start psychological therapy to manage a patient's future pregnancies.

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