



## Brief Outline of Ectopic Pregnancy

Shilpy S and Praveen A\*

Department of Biotechnology & Microbiology, School of Sciences, Noida International University, India

### Abstract

Fetal tissue implanting outside of the uterus or attaching to an aberrant or scarred area of the uterus results in an ectopic pregnancy. The fallopian tube is the most frequent location for ectopic pregnancy. Without early detection and treatment, ectopic pregnancies have significant rates of morbidity and fatality. Abdominal discomfort, vaginal bleeding, or more ambiguous problems like nausea and vomiting can all be signs of ectopic pregnancy. Smoking, Chlamydia trachomatis infection, tubal surgery, endometriosis, and Pelvic Inflammatory Disease (PID) are all established risk factors that are specific to women. Progesterone measurement, Transvaginal Ultrasound Scan (TVS), and serum  $\beta$ -HCG levels are the primary diagnostic indicators of EP. Most early-detected tubal ectopic pregnancy cases can be effectively treated with either minimally invasive surgery or with methotrexate as a non-surgical option. Ectopic pregnancy in a patient who is unstable, however, is a medical emergency that necessitates quick surgical intervention. EP can be treated surgically by laparotomy or laparoscopy, medically through a systemic or local approach, or with expectant therapy. The purpose of this review on the current understanding of the etiology, examining the diagnosis, treatment and management of ectopic pregnancy that are compatible with the greatest available scientific information.

**Keywords:** Ectopic pregnancy;  $\beta$ -HCG; TVS; Methotrexate; Laparotomy; Abdominal pain; Laparoscopy

### Introduction

Phenomenon in which embedding of blastocyst/fertilized ovum occurs somewhere rather than the endometrial lining of the uterine cavity is known as Ectopic Pregnancy (EP). For lodging and growth of fetus uterus is only intended organ, however its implantation outside it results in abnormal growth leading to abortion [1]. It is a rare situation when fetus can endure its growth in peritoneal cavity during abdominal pregnancy besides tubal rupture. Fallopian tube is the utmost communal place for EP although exact reason of implantation is not clear however, past reports suggested that in majority of cases it is because of anatomical/functional tubal damage. There is a possibility that EP can occur deprived of any ostensible predisposing factor [2]. Earlier studies postulated EP is life menacing and notably serious obstacles of pregnancy. Under unruptured state symptoms of EP fairly similar to that of normal pregnancy. The definitive trio indications of EP comprise vaginal bleeding, pain in abdomen, and positive urine pregnancy test. Depending upon the condition of EP i.e., it is ruptured or not symptoms of it fluctuate [3]. Previous report confirmed that in the United States only 1% to 2% pregnancies are ectopic and death due to it are reducing. Although EP contribute in mortality and injury but there is prospect for inhibition. Risk factors associated with EP are: Endometriosis, prior gynecological/obstetrical surgery like caesarean section, and tubal sterilization, past of sponsored reproductive technology, infection of chlamydia and gonorrhoea leading to scarring and tubal inflammation. Women affected with EP suffer not only to its complications and treatment actions but also, they are at high risk of infertility and second EP in future [4]. One of the diverse forms of EP is Scar Ectopic Pregnancy (SER) which becomes life frightening all over the world. Occurrence of SEP in women is due to attachment of embryo inside the fibrous tissue of the former scar subsequent caesarean section and myometrium, dilation, and curettage, hysterotomy, abnormal placentation, uterus surgery including hysteroscopy, myomectomy, exclusion of placenta physically, and metroplasty [5]. Mortality has been reducing uninterruptedly due to EP although incidence has been rising, the reason behind this is primary diagnosis before rupturing [6]. There are several ways for early diagnosis for instance Transvaginal Ultrasound (TVS) of high resolution, and estimation of serum b-HCG (Human Chorionic Gonadotropin) quantitatively. Alteration in the amount of b-HCG can be used to envisage EP [7]. Among the total pregnancies, EP contributed to 1% in established settings.

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#### \*Correspondence:

Afsana Praveen, Department of Biotechnology & Microbiology, School of Sciences, Noida International University, Yamuna Expressway, Sector 17A, Uttar Pradesh -203201, India, Tel: 9582838729;

E-mail: afsana735@gmail.com/afsana.praveen@niu.edu.in

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## Etiology

With more than 90% of instances occurring in the fallopian tube, ectopic implantation occurs there most frequently [8]. Nevertheless, implantation in the cervix (1%), ovary (1% to 3%), abdomen (1%), and caesarean scar (1% to 3%) can happen and frequently leads to increased morbidity due to delayed detection and treatment [8,9]. The condition known as heterotopic pregnancy occurs when an ectopic pregnancy and an intrauterine pregnancy co-occur [10]. Women who become pregnant naturally are thought to be at a chance of heterotopic pregnancy of 1 in 4,000 to 1 in 30,000, but women who have undergone *in vitro* fertilization are thought to be at risk of up to 1 in 100 [11,12].

## Epidemiology

The Centers for Disease Control and Prevention estimate that 2% of all reported pregnancies are ectopic pregnancies [13]. Although many patients get care in an outpatient environment where events are not recorded and because national surveillance statistics on ectopic pregnancy have not been updated since 1992, it is impossible to assess the real current frequency of ectopic pregnancy [13]. Ruptured ectopic pregnancy continues to be a major contributor to pregnancy-related mortality and morbidity despite advances in diagnosis and treatment. Ruptured ectopic pregnancy was the primary cause of hemorrhage-related mortality from 2011 to 2013, accounting for 2.7% of all pregnancy-related deaths [14]. Up to 18% of women who arrive to an emergency room with first-trimester vaginal bleeding, stomach discomfort, or both are thought to be carrying ectopic pregnancies [15].

Ectopic pregnancy risk factors include advanced maternal age, smoking, previous ectopic pregnancies, tubal damage or tubal surgery, past pelvic infections, IUD use, DES exposure, and assisted reproductive technologies [10]. The chance of ectopic pregnancy increases with age; older fallopian tubes probably work less effectively, which makes oocyte transfer more likely to be delayed. When compared with the general population, women who have had prior ectopic pregnancies are up to 10 times more at risk. When an intrauterine pregnancy occurs concurrently with an ectopic pregnancy in women who are undergoing *in vitro* fertilization, this condition is referred to as a heterotypic pregnancy. One in one hundred women who decide to use *in vitro* fertilization is thought to be in danger. For women considering *in vitro* fertilization, the likelihood of becoming pregnant heterotopically has been calculated to be as high as 1:100 [10].

## Treatment/Management

Laparoscopic surgery or the administration of injectable methotrexate are both safe and efficient therapy options for hemodynamically stable women who have an ectopic pregnancy that has not ruptured. The clinical picture, laboratory results, radiologic imaging, and the patient's educated decision following consideration of the advantages and disadvantages of each operation all play a role in the selection of which modality to pursue. The single-dose methotrexate regimen might be advantageous for patients with comparatively low hCG levels. Two-dose regimens could be necessary for those with greater hCG levels. According to some research, methotrexate therapy has no negative impact on ovarian reserve or fertility [16]. Following methotrexate treatment, hCG levels should be trended until a non-pregnancy level is reached [17]. When the patients exhibit any of the following: an indication of intraperitoneal

hemorrhage, symptoms suggestive of a continuing ruptured ectopic mass, or hemodynamic instability, surgical therapy is required [17].

Clinical state, the degree of fallopian tube impairment, and the goal for future fertility should all be taken into consideration when choosing between surgical options such as salpingostomy or a salpingectomy. Salpingectomy includes partly or completely removing the fallopian tube in its most basic form [10]. With salpingostomy, also known as salpingotomy, the fallopian tube is left in place while the ectopic pregnancy is removed by tubal incision [10].

## Differential Diagnosis

One should begin to formulate a differential diagnosis when taking into account the patient's history and physical exam findings. Important differential diagnoses to consider with ectopic pregnancies are ovarian torsion, tuba-ovarian abscess, appendicitis, hemorrhagic corpus luteum, ovarian cyst rupture, threatened miscarriage, and ureteral calculi. The patient's history and hemodynamic status on clinical presentation will influence the order of these differentials, as well as the testing necessary to rule out said differentials.

## Prognosis

Patients with a relatively low beta hCG level will likely have a better prognosis regarding treatment success with single-dose methotrexate [17]. The further the ectopic pregnancy has advanced; the less likely single-dose methotrexate therapy will suffice. The patients that present in extremis or with hemodynamically instability have more risk of deterioration such as from hemorrhagic shock or other perioperative complications. Prognosis will thus hinge on early recognition and timely intervention. Fertility outcomes with tubal conservation surgeries remain debatable as some data suggests no significant difference in intrauterine pregnancy rates when comparing salpingectomy versus conservative tubal management [18].

## Complications

The viability of an intrauterine pregnancy would be at risk if methotrexate were administered to women who come early in pregnancy and have tests indicative of an ectopic pregnancy [19]. If the hCG level does not drop by 15% from day 4 to day 7 in women receiving the single-dose Methotrexate regimen, a second-dose regimen should be administered [17]. If the ectopic pregnancy is at the cervical os, women who report with vaginal bleeding and pelvic discomfort could be mistakenly recognized as having an abortion in process. If a dilation and curettage procedure is carried out on the patient, who may have a cervical ectopic pregnancy, there is a danger of hemorrhage and possible hemodynamic instability [19]. Treatment failure can result in complications from therapy, as women may present with or develop hemodynamic instability, which can cause mortality despite early surgical procedures.

## Enhancing Healthcare Team Outcomes

The medical team must collaborate well in order to appropriately diagnose and treat the patient who may be carrying an ectopic pregnancy. Women frequently appear with this condition to the emergency room; accurate and prompt diagnosis begins with the first contact when the patient is triaged by the nursing or provider in the triage team. All sexually active women of reproductive age should be given consideration for ectopic pregnancy as a possible differential diagnosis by the healthcare practitioner. The effectiveness of existing

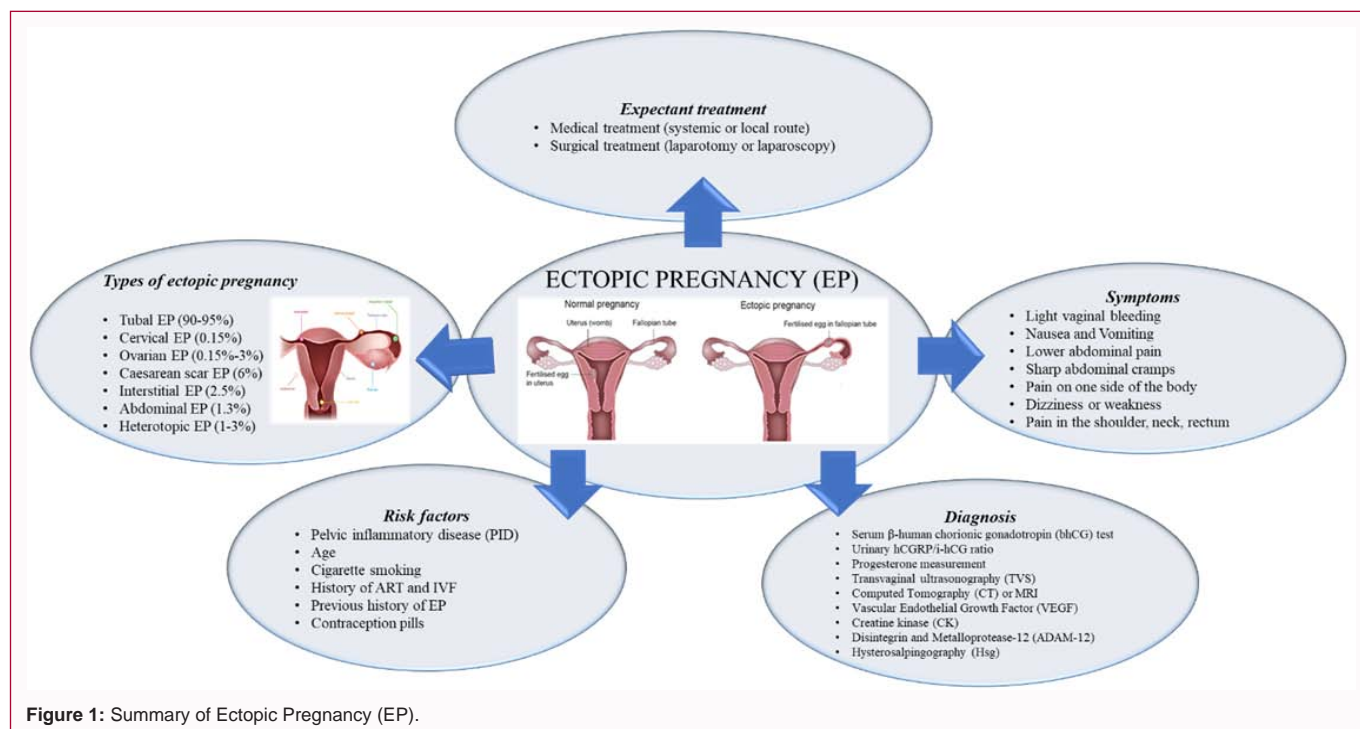


Figure 1: Summary of Ectopic Pregnancy (EP).

strategies for treating women with pregnancies in unknown locations was compared and tested using a systematic review and meta-analysis [20]. This study discovered that a logistic regression model known as the M4 model outperformed the comparative management protocols, giving doctor's advice when treating patients with pregnancy of uncertain location [20]. When taking into account pointless testing or treatment, this approach might improve effectiveness. Communication is still crucial when talking to consultants, such as obstetricians, emergency room doctors, nurses, and pharmacists. When reviewing the patient's treatment plan with the obstetrician and using treatment/management procedures, it is imperative to practice patient safety and patient-centered care.

## Conclusion

Ectopic pregnancy poses a severe hazard in underdeveloped nations, due to inadequate medical facilities, where it is common to witness high rates of morbidity and the possibility of maternal mortality. Many individuals experience the complication despite having neither physical symptoms of EP nor any known risk factors. However, due to improved diagnostic methods and more awareness of women's health in developed nations, it is no longer as dangerous as it formerly was. The clinical presentation, serum-hCG levels, and TVS results determine how to proceed with treatment. When an ectopic pregnancy is suspected, gynecologists and radiologists should be consulted. Early unruptured EP is treated with methotrexate, which is said to be both safe and efficacious. Women who are hemodynamically unstable, unlikely to comply with post-treatment monitoring, and those without rapid access to medical care should especially consider surgical therapy. After a thorough discussion regarding monitoring, result, risks, and advantages of the various treatments, the patient's preferences should be used to influence the treatment decision. The first task for the radiologists and gynecologists should have been to identify the clinical characteristics or biomarkers that are indicative of methotrexate effectiveness. The second task should have been to apply additional medical procedures or innovative adjuncts to

lessen treatment failures. According to the most recent EP research, deteriorating trends over time are to be expected. But this does not actually indicate a drop in the incidence of EP; rather, it only indicates a drop in surgical therapy. Additionally, new approaches are required to investigate early identification and medication for the EP with fewer adverse effects.

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