Types and Efficacy of Diagnostic Modalities of Ectopic Pregnancy

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ABSTRACT

BACKGROUND

Ectopic pregnancy is not only the gynaecologist's most critical emergency but also one of the major problems because of its difficulties in diagnosis, increased risks of mortality, and its profound implications with regard to future reproductive performance. We wanted to study the types and accuracy of various diagnostic modalities, and effect of various management modalities of ectopic pregnancy.

METHODS

This study was conducted at Meenakshi Medical College Hospital and Research Institute, Kanchipuram, for a period of 32 months from May 2010 to October 2012. During the same period, there were 2602 reported pregnancies.

RESULTS

The incidence of ectopic pregnancy in the study is 15.3 / 1000 reported pregnancies. The incidence of ectopic pregnancy in patients with prior abdominal surgery was 86.6 %. Only 77.5 % patients gave history of typical amenorrhea. 22.5 % patients gave history suggestive of atypical amenorrhoea. It was noted that 55 % cases presented as tubal rupture, 7.5 % as tubal abortion, 35 % cases presented with intact tubal pregnancy and 2.5 % cases presented as ovarian pregnancy. The choice of management in our study included ipsilateral partial salpingectomy in 27.5 %, ipsilateral total salpingectomy in 45 %, ipsilateral salpingectomy with contralateral salpingo-oophorectomy in 5 % and bilateral salpingectomy in 22.5 % of cases.

CONCLUSIONS

Combination of accurate history, meticulous physical examination, 'Pregcolor' urinary assay, culdocentesis and ultra-sonography will lead to early diagnosis. Transvaginal sonography is the best method of diagnosis in cases of ectopic pregnancy presenting in earlier weeks of gestation.

KEYWORDS

Culdocentesis, Ultra Sonography, Transvaginal Sonography, Ectopic Pregnancy

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BACKGROUND

Ectopic pregnancy is not only a gynaecologist's most critical emergency but also one of the major problems because of its difficulties in diagnosis, increased risks of mortality and its profound implications with regard to future reproductive performance.

Fertilization normally takes place in the distal portion of the fallopian tube, the ovum being subsequently transported by the contractions of the tube into the uterine cavity guided by the fluid current imparted from the ciliated epithelium. The journey takes almost days to reach the uterine cavity. During this period the developing ovum is nourished. The cells of the corona radiata and the secretion of the cells lining the fallopian tube shows pathological conditions. The implantation may occur anywhere outside the uterine cavity, and the subsequent gestation being ectopic. In a multicentric case control study of ectopic pregnancy in India, the incidence of ectopic pregnancies was 3.12 per 1000 pregnancies, 1 per 100 live births.[1,2]

Early diagnosis in ectopic pregnancy is most important. In fact, it is failure to make the correct diagnosis promptly that accounts for 64 % of deaths in this condition.[3] Unfortunately, there are many pitfalls in its diagnosis. A variety of diagnostic aids have been utilized. These include serum radioimmunoassay for beta-hCG, serum progesterone, sonography–abdominal and transvaginal, vaginal colour and pulsed Doppler ultrasound, combination of serial quantitative beta-hCG and sonography, culdocentesis, curettage, laparoscopy and laparotomy. Treatment of tubal pregnancy has most often been salpingectomy to remove a shattered, bleeding oviduct with or without ipsilateral oophorectomy. Recently, treatment has changed from salpingectomy to surgical and medical procedures that favour tubal conservation.[4] This is made possible by earlier diagnosis using vaginal ultrasound and serum quantitative beta-hCG determinations. In abdominal pregnancy, the management would be laparotomy with the placenta being left in-situ. Methotrexate therapy, both before and after the operation (if the fetus is known to be dead) has been employed for this extremely rare condition. Early ovarian pregnancies should be treated, when possible, by wedge resection or cystectomy, otherwise, oophorectomy is performed. Most cervical pregnancies were earlier treated with hysterectomy, but there are recent reports of successful management with chemotherapy employing methotrexate.[5]

In spite of the advanced diagnostic methods and management, ectopic pregnancy still remains a surgical emergency, demanding prompt diagnosis and timely and effective treatment to ensure maternal safety and to prevent untimely maternal death. While an accurate history and clinical examination are important, an accurate sense 'of suspicion' or "ectopic consciousness" is also essential, to arrive at a timely and correct diagnosis. For, there is a condition, in which missed or delayed diagnosis forms a decisive factor contributing to maternal morbidity and mortality and a correct diagnosis and timely intervention can ensure maternal safety.

METHODS

This study is based on the clinical diagnosis and management of ectopic pregnancy treated at Meenakshi Medical College Hospital and Research Institute, Kanchipuram, during the period of 32 months from May 2010 to October 2012. During the same period there were 2602 reported pregnancies. The incidence of ectopic pregnancy was 15.3 / 1000 reported pregnancies in our study. All patients who were admitted with history of pain abdomen and irregular bleeding per vaginum and in whom diagnosis was confirmed by clinical acumen, biochemical tests of pregnancy, culdocentesis in required cases, ultrasound or by direct observation at laparotomy were included in the study.

The incidence of ectopic pregnancy is high in our hospital because, this institution is a referral hospital and covers to a vast area. Majority of them are from villages and from suburban area. Once the patient was admitted to the institution the following things were noted; History–full name of the patient, age, address, occupation, socio-economic status, education and referral by any physician. In present history the duration of pain abdomen, whether the onset was acute or chronic, its nature with regard to radiation, character, site and association with syncopal attacks and the duration, quantity and character of bleeding per vaginum were noted. It was also enquired whether the pain preceded or followed the bleeding. The period of amenorrhea and history of spotting on the expected date of periods was noted. The patient was asked about the history pertaining to attacks of nausea / vomiting, dysuria, frequency, retention of urine, rectal tenesmus, diarrhoea, fever or shoulder pain and sudden pallor.

In the past obstetric history with regard to parity, gravidity, abortions, postabortal / puerperal sepsis, previous abdominal surgeries and contraception used was noted. The past menstrual history was enquired about the regularity, duration, quantity of flow and the history of any intermenstrual bleeding and the date of last menstrual period. History of previous illnesses suggesting pelvic inflammatory disease and sexually transmitted diseases, tuberculosis and history of surgeries such as appendicitis, caesarean section, tubal surgery (sterilization or recanalization) and treatment for previous ectopic pregnancy if any is enquired. The habits of the patients were noted as a routine. Particular attention was given to loss of appetite, bowel and micturition habits. General examination included the look of the patient and particular attention was given to increasing pallor, cold extremities, temperature, radial pulse, blood pressure, respiratory rate. Cardiovascular system and respiratory system examination was done.

A meticulous abdominal examination was carried out noting for any abdominal distention, tenderness, rebound tenderness, guarding and rigidity, any palpable lump, free fluid in abdomen and peristaltic sound on auscultation. A gentle speculum examination was performed to note the state of the cervix and any discharge from the cervical os. Bimanual examination was done to note the uterine size, position and consistency, was noted giving special attention

to severe pain on cervical movements and any pulsating mass in the fornices. Routinely the following investigations were carried out. Hb %, PCV, blood grouping and Rh typing, urine pregnancy test, serum beta-HCG, culdocentesis in particular cases, ultrasound evidence was carried out in all the patients. As soon as diagnosis was confirmed with clinical acumen, culdocentesis and ultrasound, they were prepared for emergency laparotomy. Patients were meanwhile stabilized with intravenous fluids and blood transfusion to replenish the blood loss and adequate amount of blood was cross matched and reserved and kept ready for emergency purpose. The cases studied in this period include a ruptured tubal ectopic, unruptured tubal ectopic, tubal abortion and ovarian pregnancy. Hence, the treatment of choice in these cases were as required and appropriate to the patient. All the specimens were sent for histopathology reporting to reconfirm the diagnosis.

RESULTS

The incidence of ectopic pregnancies in our study is 15.3 / 1000 reported pregnancies. During the study period the total number of pregnancies were 2602 and these included live births, still births, legally induced abortions and ectopic pregnancies. Out of these cases, 40 cases were found to be ectopic pregnancies. Out of these 40 cases, 39 cases were tubal ectopic pregnancies and only 1 case was ovarian pregnancy. Out of the 40 cases, 15 cases underwent abdominal surgery and out of these 15 cases, 13 cases were diagnosed to have ectopic pregnancies. The abdominal surgeries included caesarean section, caesarean section with sterilization and appendicectomy.

Age Groups	No. of Cases	Percentage
15 – 24 yrs.	8	20
25 – 34 yrs.	31	77.5
35 – 44 yrs.	1	2.5
Gravid		
Primi	16	40
Second	7	17.5
Third	11	27.5
Fourth	3	7.5
Fifth	1	2.5
Sixth	1	2.5
Ectopic Pregnancy		
Recurrent ectopic pregnancy	5	17.24
Non recurrent ectopic pregnancy	24	82.76
Ectopic pregnancy in sterilized patients	9	37.5
Ectopic pregnancy in unsterilized patients	15	63.5
Socio-Economic Status		
Class II	5	5 %
Class III	10	25 %
Class IV	25	70 %

Table 1. Incidence of Ectopic Pregnancies in Various Age Groups

The study included the age group of 15 to 44 years. The highest incidence was found in the age group of 25 to 34 years. The incidence of ectopic pregnancy was highest in so called primi gravida. Incidence of recurrent ectopic pregnancy was found in 5 cases (17.24 %) and non-recurrent ectopic pregnancy was found in 24 cases (82.76 %). In our study out of 40 cases, 15 cases were found in unsterilized patients i.e., in 63.5 % and 9 cases (37.5 %) were found in patients who were previously sterilized. Out of these 9 cases, 1 case underwent tubal recanalization surgery prior to the occurrence of ectopic pregnancy. Out of 40 cases incidence is found to be high in class IV.

	No. of Cases	Percentage
Amenorrhea	31	77.5
Irregular bleeding	9	22.5
Pelvic inflammatory disease	8	20

Table 2. Incidence of Ectopic Pregnancy with History of Amenorrhoea and Irregular Bleeding

Out of the 40 cases, only 31 cases (77.5 %) gave the history of typical amenorrhea and 9 cases (22.5 %) gave history of irregular bleeding per vagina. Those patients who gave the history of amenorrhoea were found to be amenorrhoeic for a period of more than 5 weeks. Out of the 40 cases, only 8 cases (20 %) gave history of chronic pelvic pain, leucorrhoea, dysmenorrhoea and dyspareunia. These features correspond to the history of pelvic inflammatory disease.

No. of Cases	Positive (% age)	Negative (% age)
Efficacy of culdocentesis		
22	9 (41)	13 (59)
Urine test for pregnancy		
13	81.8	18.2

Table 3. Efficacy of Culdocentesis as a Diagnostic Procedure of Ectopic Pregnancy

In our series, out of 40 cases, culdocentesis was performed only in 22 cases, as these patients had typical features suggestive of ruptured ectopic and pregnancy was not confirmed either by urine pregnancy test or by ultrasonography. In our series, the urine pregnancy test was done in only 13 cases as the other cases were either diagnosed by clinical findings and by ultrasound. 81.8 % cases had a positive test whereas 18.2 % had negative test which on laparotomy proved to be an ectopic pregnancy.

No. of Cases	TAS (%)	TVS (%)
40	11 (27.5)	29 (72.5)

Table 4. Efficacy of Transvaginal Sonography Versus Efficacy of Transabdominal Sonography in the Diagnosis of Ectopic Pregnancy

Incidence of Fate of Tubal Pregnancy	No. of Cases	%
Tubal rupture	22	55
Tubal abortion	3	7.5
Intact tubal pregnancy	14	35
Ovarian pregnancy	1	2.5
Operative procedure		
Ipsilateral partial salpingectomy	11	27.5
Ipsilateral total salpingectomy	18	45
Ipsilateral total salpingectomy with contralateral salpingo-oophorectomy	2	5

Table 5. Incidence of Fate of Tubal Pregnancy and Type of Active Management

In our study, out of 40 cases, 29 cases (72.5 %) were diagnosed by transvaginal sonography and only 11 cases (27.5 %) were diagnosed by transabdominal sonography. Transvaginal sonography was found to be the best method of diagnosis in cases of ectopic pregnancy presenting in earlier weeks of gestation. The incidence of tubal rupture was found to be 55 % (22 cases), intact tubal pregnancy was found in 14 cases (37.5 %), tubal abortion in 7.5 % (3

cases) and only one case (2.5 %) was found to be ovarian pregnancy. Out of 40 cases, ipsilateral total salpingectomy was done in 18 cases (45 %), ipsilateral partial salpingectomy in 11 cases (27.5 %), bilateral salpingectomy in 9 cases (22.5 %), ipsilateral total salpingectomy with contralateral salpingo-oophorectomy in 2 cases (5 %).

DISCUSSION

Ectopic pregnancy still remains a surgical emergency in spite of the advanced diagnostic methods and management, demanding prompt diagnosis, timely and effective treatment to ensure maternal safety and to prevent untimely maternal death. The incidence of ectopic pregnancy has increased in the last two decades. The incidence of ectopic pregnancy in our study is 15.3 / 1000 reported pregnancies. The average age of patients were between 15 and 44 years, ectopic pregnancy was common in 25 – 34 years age group. The incidence is increased in this age group as these patients are sexually active and prone to develop salpingitis which is the major risk factor. In the study conducted by Samal SK and co-workers found an increased incidence in age group 35 to 44 years. This could be explained by the increased of tubal microsurgeries, assisted reproductive techniques and repeat ectopic pregnancies due to salpingitis in this age group.

The incidence of ectopic pregnancy was 40 % in primi gravida. This could be due to the presence of pelvic inflammatory disease. The incidence of recurrent ectopic pregnancy was found to be 17.24 %. After an ectopic pregnancy, there is a 7 to 13 fold increase in the risk of a subsequent ectopic pregnancy. The chance that a subsequent pregnancy will be intrauterine is 50 % to 80 %, and the chance that the pregnancy will be tubal is 10 % to 25 %; the remaining patients will be infertile.[7]

The incidence of ectopic pregnancy after sterilization procedure was 37.5 %. The risk of tubal pregnancy after sterilization procedure is 5 to 16 %. But the incidence is higher in our study.[8] About one half of post electrocautery failures are ectopic, compared with 12 % after non laparoscopic, non-electrocautery procedures. Tubal pregnancy accounted for 97.5 % of ectopic gestations in our series followed by ovarian pregnancy (2.5 %).

Ectopic gestation was most commonly seen in low socio–economic group and this accounted for 70 % of patients. The incidence is high in this group due to poor personal hygiene and increased incidence of sexually transmitted diseases. The incidence of ectopic pregnancy in patients with prior abdominal surgery was 88 % and this correlates with the study done by Horne AW.[9] In our series only 77.5 % patients gave history of typical amenorrhea. 22.5 % patients gave history suggestive of atypical amenorrhoea.

History of pelvic inflammatory disease was found in 20 % of the cases. The relationship of PID (Pelvic Inflammatory Disease), tubal obstruction and ectopic pregnancy is well documented by Westrom THAT Culdocentesis was positive in 41 % patients in our study. Culdocentesis has been long considered a mainstay in the diagnosis of ectopic pregnancy. Although about 70 % to 90 % of patients with ectopic pregnancy have a haemoperitoneum demonstrated by culdocentesis, only 50 % of patients have a ruptured tube.[10] Urine pregnancy test was positive in 81.8 %. Urine pregnancy test is a latex agglutination inhibition test with sensitivities for hCG in the range of 500 to 800 mIU / ml. They are positive in 50 to 0 % of women with ectopic pregnancies as reported by Barnes and associates, 1985. Transvaginal sonography reported ectopic gestation in 72.5 % cases. Intrauterine pregnancy can be diagnosed one week earlier with transvaginal sonography than with transabdominal sonography. Evidence of an empty uterus, detection of adnexal masses and free fluid, and direct signs of ectopic pregnancy are more reliably established with a transvaginal procedure.[11]

In our series it was noted that 55 % cases presented as tubal rupture, 7.5 % as tubal abortion, 35 % cases presented with intact tubal pregnancy and 2.5 % cases presented as ovarian pregnancy. The choice of management in our study included ipsilateral partial salpingectomy in 27.5 %, ipsilateral total salpingectomy in 45 %, ipsilateral salpingectomy with contralateral salpingo-oophorectomy in 5 % and bilateral salpingectomy in 22.5 % of cases.[12]

Out of 40 cases, 2 cases were tried to manage medically with injection methotrexate. Out of these 2 cases, 1 case had sudden rupture of ectopic pregnancy with features of shock. So, this patient was taken up for emergency laparotomy with unilateral total salpingectomy, and the other case showed features of impending rupture, and unilateral salpingectomy was done in this case. Out of the 40 cases, only 2 cases had intrauterine pregnancy following surgery for ectopic pregnancy.

CONCLUSIONS

Early diagnosis and management is the mainstay in the treatment of ectopic pregnancy. An accurate history and clinical examination goes a long way in the diagnosis of ectopic pregnancy as also an accurate sense of' ectopic consciousness' which is also essential to arrive at a timely and correct diagnosis. We have observed in this series that a combination of accurate history, meticulous physical examination, 'Pregcolor' urinary assay, culdocentesis and ultra-sonography will lead to early diagnosis. Transvaginal sonography is the best method of diagnosis in cases of ectopic pregnancy presenting in earlier weeks of gestation.

Conservation of the contralateral tube is the treatment of choice in cases who have not completed the family and with normal tube on the contralateral side. Betterment of obstetric care is essential for diagnosis of ectopic gestation before a catastrophic rupture occurs.

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