

THE USE OF TRANS VAGINAL SONOGRAPHY IN THE DIAGNOSIS OF ECTOPIC PREGNANCY A PROSPECTIVE EVALUATION

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SUMMARY

From April 1991 to December 1992, a total 13 cases of Ectopic Pregnancy (EP) were diagnosed by combined use of pregnancy test and trans vaginal sonography (TVS); 11 from 45 clinically suspected EP, two diagnosed accidentally following pelvic scan. Most common finding were complex adnexal mass - with significant fluid in POD. TVS better characterize the findings in the uterus, adnexae and pelvic fluid. Understanding of co-relation of β -hCG level with gestational sac (GS) is essential for early diagnosis and management of EP. Combined serial estimation of circulatory β -hCG level alongwith serial TVS examination is an important step in predicting prognostic status of the tubal pregnancy.

INTRODUCTION

Ectopic pregnancy is a common gynaecological disorder and is difficult to diagnose early. The patients often report with variable nonspecific clinical features; diagnosed late with significant blood loss, considerable tubal damage and high maternal mortality, morbidity and poor reproductive outcome. Gupta et al (1992) observed 60 percent tubal rupture and only four percent had intact tubal gestation during surgery.

Less than 50 percent subjects conceive again and 12-18 percent report with recurrent EP (Stabile et al 1990).

Fortunately however, a dramatic improvement has taken place in the understanding of early diagnosis and management of EP. Today more patients are diagnosed early and detected with intact GS before tubal rupture. This reduces maternal mortality and morbidity, reduces hospital treatment cost; conservative treatment is possible with preservation of tubal function. The combined use of noninvasive diagnostic tools, pregnancy test and high resolution pelvic scan,

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made this possible.

Pregnancy test is a single most important diagnostic modality, it detects β -hCG in blood or urine. It is highly sensitive and specific. It identifies that the subject is pregnancy, three to four days before she misses her period. However the pregnancy test cannot locate the site of pregnancy.

Identification of site of gestation is made by USG. High resolution of female pelvis in suspected EP. It can accurately identify the intra-uterine gestational sac (GS), 7-10 days before that could be discerned by trans abdominal sonography (TAS) (Berneschek et al 1990).

MATERIAL METHOD

From April 1991 to December 1992 a total of 13 cases of EP and been diagnosed, 11 in the tube and two in the peritoneal cavity. Two cases were detected from our infertility clinic. Out of 45 cases of clinically suspected EP, in nine the diagnosis was confirmed, 18 displayed intra-uterine pregnancy, seven diagnosed as pelvic mass and in 11 no pelvic pathology could be detected. Two EP cases were diagnosed accidentally only after TVS, the first one was referred to us as "uterine perforation during DE&C" and the other reported as "persistent bleeding p/v following MTP". A case of abdominal pregnancy with living embryo in the POD at 14 weeks gestation deserves special mention. She conceived 11 years after marriage, after treatment our infertility clinic.

It is difficult to differentiate EP from pelvic pathology like adnexal mass, corpus luteum cyst, polycystic ovary etc. sonographically alone (Batra et al 1992). We have got no facilities for quick quantitative pregnancy tests sensitive to 25 MIU/ml (Visipreg card), 200 MIU/ml (Pregcolour), 800 MIU/ml (Visipreg-35) and sensitive to 3500 MIU/ml (Gravindex). If the patient is clinically unstable we hospitalize her for some invasive

procedure like culdocentesis, laparoscopy and or laparotomy. Though culdocentesis is regarded as an useful procedure today we use culdocentesis less frequently. TVS gives more accurate information. Only when the nature of the pelvic fluid remained to be confirmed we did echoguided needle aspiration in three cases. This eliminated both false positive and false negative results associated with blind culdocentesis. Laparoscopy is a 'gold standard' procedure and has immense diagnostic and therapeutic value.

If the patient is stable without any positive sonographic pelvic finding we do not admit the patient. We examine the patient by TAS first, followed by TVS. TAS occasionally provides valuable information, a 'bigger picture' and offers better orientation for subsequent TVS. Since the sonographic observations are highly variable, a systematic approach is required. We image first the :

1. uterus, look for intra-uterine finding; next
2. adnexal region, for imaging ovaries and tubes and lastly
3. POD for evidence of pelvic fluid.

All 12 cases of EP were confirmed during surgery either by laparoscopy or by laparotomy. One case was treated conservatively by observation and follow up only.

DISCUSSION

For successful early detection of EP, a strong awareness is required about the different diagnostic options. A thorough understanding of the co-relation between serum β -hCG level and GS is essential.

Serum β -hCG level depends on the number of functionally active trophoblastic cells in the body. As the GS grows in normal pregnancy, exponential rise of β -hCG level takes place; becomes double every two - three days, attains the peak by

eight menstrual week and then declines. A strong co-relation therefore, exists between GS, hCG level and gestational period.

Kadar et al (1981) made a significant contribution in the earliest possible diagnosis of EP and tried to co-related the size of GS and β -hCG level. They introduced the term "discriminatory zone" of 6500 MIU/ml (1st IRP) 0 a minimum hCG level at which a normal intra-uterine GS is invariably been discerned by trans abdominal trans vesicle sonography.

Nyberg et al (1987) using an advanced trans abdominal probe found the discriminatory level at 2400-3600 MIU/ml (1800-2000 MIU/ml 2nd IS). Nyberg (1988) further lowered down the level at 1000-2000 MIU/ml (800-1000 MIU/ml 2nd IS) using high frequency trans vaginal probe. However, the hCG level of normal and abnormal pregnancy overlap considerably as a result serial hormone assessment are helpful than a single value.

- A. If β -hCG level is above discriminatory zone-yet uterus is empty, the condition strongly suggests EP.
- B. Similarly when the hCG level is below discriminatory zone, TVS has limited role to play since it cannot identify the GS, cannot differentiate intra-uterine pregnancy from EP. They are low risk patients, requires close observation with serial scan and quantitative assay.
- C. A subnormal rise suggests non viable pregnancy, indicates less active trophoblastic tissue. EP with low plateau therefore, unlikely to rupture even can resolve spontaneously. We had one patient who conceived following tubal recanalization. Pelvic scan revealed complex adnexal mass of 2.5 cm having positive pregnancy test of more than 800 MIU/ml. A conservative expectant management was made with close observation as the patient showed

declining β -hCG level with excellent outcome.

- D. A rapidly growing β -hCG level on the other hand indicates functionally active trophoblastic tissue, likely to grow, display living embryo and may rupture. Such patients should be considered potentially dangerous.

Thus co-relation of hCG level with GS identified by TVS is most useful in non emergent situation. hCG finding along is not conclusive.

Ultrasonography and Ectopic pregnancy:

The value of TVS in the early diagnosis of EP has been well documented in recent years (Nyberg et al 1987, Rampen 1988, Timor et al 1989). Though TAS is a reliable tool in the modern obstetrical care imaging structure deep in the true pelvis is often proved disappointing.

A high frequency trans vaginal probe because of its close proximity to the target organ offers an amazingly sharp clear picture (Das et al 1991, Das 1992). TVS however, cannot identify all cases of EP; although diagnosis of tiny 2-3 mm GS embeded in the shining endometrium is possible almost immediately after missed period (Rajan 1989).

Ultrasonography of Intra-uterine finding

1. Presence of intrauterine gestational sac is the bet evidence against EP since concurrent intra-uterine and EP is rare (1 : 30000).
2. Positive β -hCG with empty uterus always suggests EP.
3. Intra-uterine findings are variable :
 - A. a thick shining endometrium indicates active trophoblast and strong hormonal support.
 - B. pseudogestational sac (PGS) : The degenerating trophoblast stops secreting hCG results in degene-

ration of decidual bed, occult bleeding in the intra-uterine cavity and cystic decidual changes. On the other hand if the trophoblast growth actively secretes β -hCG, GS grows, a living embryo could be imaged with thick decidual changes.

Differentiation between PGS and true GS may pose a problem (Berneschek et al 1990). A thin walled fusiform centrally placed sac may indicate PGS. Recently, coloured flow mapping or duplex doppler studies with prominent vascular flow can help in differentiating these two conditions (Nyberg et al 1992).

EP and Adnexal finding : Absence of positive findings in the adnexal region cannot rule out EP since GS can be imaged only when the circulatory β -hCG level remains above discriminatory zone. Positive findings indicate high risk. Adnexal finding may again vary:

- A. a living embryo with double ring with or without yolk sac indicates high level β -hCG, likely to rupture and is the surest diagnosis of EP. We have two cases in our series.
- B. presence of tubal ring without any embryo indicates intact tube seen in other two cases.
- C. a complex tubal mass is the most common finding and found in five cases in our series. It indicates local haematoma, oedema in the tubal wall and associated with unpredictable β -hCG level. Ectopic immature trophoblast in the tube may not secrete enough β -hCG to sustain normal corpus luteum. Corpus luteum insufficiency leads to the death of embryo. The growth of tubal embryo also depends on the ability of the trophoblast to invade underlying tissue for optimum blood supply. In the absence of supporting decidual bed, the trophoblast invades the

muscle tissue results in bleeding between the endosalpinx and serosal layer, bleeding through abdominal ostia and ultimately rupture of the tubal wall with considerable haemoperitoneum and may lead to exsanguination.

Ectopic pregnancy with cul-de-sac fluid: Seven cases displayed 50 cc or less blood confirmed during surgery. Only four cases had moderate to severe haemoperitoneum, two cases required blood transfusion. All the four showed echogenic particulate fluid suggesting blood clot. Absence of fluid cannot exclude EP while large amount suggests tubal rupture and high risk. Presence of fluid and adnexal mass with positive β -hCG indicates EP in all cases. Particulate echogenic fluid in POD often seen in high risk patients.

CONCLUSION

Understanding of co-relation of β -hCG level with GS is essential for early diagnosis and management of EP.

- A) A rapid quantitative test is ideal, however semi quantitative pregnancy test sensitive to discriminatory level will be useful.
- B) Early diagnosis of EP is possible but lack of costly sonographic apparatus will stand on the way of routine use in all centres.
- C) A strong awareness of different diagnostic option will help us all in detecting more number of early cases of EP in our day to day practice.

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