Original Article

Multiple Parameters in the diagnosis of Ectopic Pregnancy

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Abstract

Objective: To determine the role of emergency ultrasound examination in the diagnosis and management of ectopic pregnancy.

Methods: A descriptive study done at the Radiology Department, Aga Khan University Hospital, Karachi from January 1999 to December 2000 using observational facts by non-probability convenient sampling method. Seventy one patients who presented with acute symptoms in early pregnancy, were subjected to emergency pelvic ultrasound. Both transabdominal and transvaginal ultrasound were done in 52 patients while in 19 patients only transabdominal ultrasound was performed. Serum Beta hCG levels, of all patients were greater than 1500 iu/ml.

Results: Ultrasound correctly identified ectopic pregnancy in 71 patients. Ultrasound diagnosis included live embryo in six patients, adnexal mass with pelvic fluid in 54 patients, extrauterine gestational sac in 4 patients and pelvic fluid without adnexal mass in 7 patients. There was no indeterminate ultrasound scan, resulting in 100% specificity and sensitivity.

Conclusion: The use of multiple parameters in the diagnosis of ectopic pregnancy resulted in 100% sensitivity and specificity (JPMA 55:74;2005).

Introduction

Ectopic pregnancy is a complication of early pregnancy. The incidence of ectopic pregnancy is up to 16.9% per 1000 reported pregnancies and is increasing.[1,2] Recently decreased mortality rate is due to improvement in diagnosis by improving ultrasound equipments and ability to quantify serum Beta hCG level.[2] Ultrasound has no radiation hazards, is quick, accurate and can be repeated.[3] One of revolutionary efforts was from Kadar et al in 1981, who found Beta-hCG as an important indicator and its serial estimation in developing pregnancy.[4]

Now using transabdominal ultrasound followed by transvaginal sonography with serial Beta- hCG correlation[5,6] clinicians decide the management of patients of ectopic pregnancy. Serum Beta hCG level >1500miu/ml and absence of intrauterine pregnancy by transvaginal ultrasound is a presumptive evidence of ectopic pregnancy.[7] Majority of ectopic pregnancies (95-97%) are in fallopian tubes. Most common site is ampullary region followed by isthmus. Rarely interstitial region and very rarely fimbrial part of fallopian tube are involved. Ectopic pregnancies in ovaries and cervix occur in 0.5 and 0.1% of cases respectively.[8,9] Risk of ectopic pregnancy increases sevenfold after an attack of acute pelvic inflammatory diseases.[10]

Patients and Methods

Seventy one patients presented to Radiology Department of The Aga Khan University Hospital between January 1999 and December 2000 with probable diagnosis of ectopic pregnancy. Age range was 19-39 years (mean 29 years). Clinical signs and symptoms were vaginal bleeding, lower abdominal pain, tenderness and vomiting. Clinical suspicion of ectopic pregnancy was provided to radiologists before ultrasound examinations. Fifty two patients had transabdominal followed by transvaginal sonography. Transvaginal ultrasound was not performed in 19 patients. Ultrasound machines used during study were GE Logiq 5000 (General Electronics) and Tosbee (Toshiba). Convex 3.75 MHz, multifrequency probe (3-5 MHz) and transvaginal multifrequency probes (5.5-6.5 MHz) were used for the examination. During ultrasound examination, special note was made of presence of adnexal mass, pelvic free fluid, gestational sac and embryo with cardiac activity and extrauterine gestational sac. Sonographic diagnosis was made on the basis of established criteria in literature. Patients were also followed up and their management was classified as medical treatment with methotraxate and surgical treatment (laparoscopic and laparotomy). All patients with medical treatment were followed up to the resolution of ectopic pregnancy. In cases of surgical treatment (e.g. laparotomy and laparoscopy) histopathology confirmed the final diagnosis.

Results

Seventy one patients were included in this study. Ultrasound diagnosis included live embryos in 6 patients (8.4%), adnexal mass with pelvic fluid in 54 patients (76%),

(8.4%), adnexal mass with pelvic fluid in 54 patients (76%), extrauterine gestational sac in 4 patients (5.6%), and pelvic fluid without adnexal mass in 7 patients (9.8%). Ultrasound findings are summarized in Figure. Further management of these patients was on the basis of the clinical suspicion ultrasound diagnosis and serum Beta hCG correlation which was >1500iu/ml.

Figure. Ultrasound findings in ectopic pregnancies.

Medical treatment with methotraxate was done in two patients (2.8%), laparoscopic-guided salpingostomy in 5 patients (7.2%), laparoscopy followed by laparotomy and salpingectomy in 51 patients (73.9%), laparoscopy followed by laparotomy and salpingostomy in 12 patients (17.3%) and oophorectomy in one patient (1.4%) (Figure 2). Histopathology confirmed 48 ruptured ectopic pregnancies (69.5%) and 21 (30.4%) unruptured. Of ectopic pregnancies 37 (53.6%) were in left fallopian tube and 33 (47.8%) in right fallopian tube and 1 was ovarian. Heterotopic pregnancy was diagnosed in 6 patients (8.4%) and recurrent ectopic pregnancy in 7 patients (9.8%).

Ultrasound diagnosis of ectopic pregnancy was proved on histopathology and on follow up. There was no inconclusive scan so ultrasound provided definitive diagnosis in all 71 patients resulting in 100% sensitivity and specificity.

Discussion

Considerable number of patients presenting to emergency department in first trimester of pregnancy have complaints of amenorrhea with vaginal bleeding and lower abdominal pain. The first aim of the clinician is to determine whether the patient is pregnant or not and if it is normal viable intrauterine pregnancy or ectopic pregnancy.

Ultrasound is an effective tool to identify the gestational sac and fetal cardiac activity and to determine the normal pregnancy and suggest the diagnosis of ectopic pregnancy. In our case series, we concentrated on transabdominal and transvaginal ultradound and correlation

Transabdominal and transvaginal ultrasound provided single unequivocal diagnosis in 71 cases. Ectopic pregnancy has very high mortality and morbidity. The management of ectopic pregnancy needs emergency intervention such as diagnostic or therapeutic laparoscopy, which may be followed by laparotomy.

Braffman et al conducted a prospective study in 1994 in which efficacy of pelvic sonography was evaluated in 1427 patients as screening test for ectopic pregnancy in emergency department.[16] The study included initial transabdominal sonography followed by transvaginal sonography for the confirmation of viability of intrauterine pregnancy and characterization of adnexal mass. Ultrasound examinations performed were clearly diagnostic in 81% of patients without help of Beta hCG. The sensitivity and specificity of screening sonography for ectopic pregnancy was 99% and 84% respectively. In our study, we arrived at definitive diagnosis of ectopic pregnancy after ultrasound in all patients though the number of patients was less compared to Braffman's study and we correlated our findings with Beta hCG.

Shalev et al performed a study in 1997 in which efficacy of transvaginal sonography was evaluated for ectopic pregnancy in emergency department.[17] They evaluated 840 patients with transvaginal sonography and correlated their findings with serum Beta hCG greater than 1500 iu/ml. The sensitivity of transvaginal sonography was 87% and specificity 94%. In our cases we arrived at a definitive diagnosis after ultrasound in all patients though the number of patients was less compared to Shalev et al study. In our study, we performed both transvaginal and transabdominal ultrasound in 52 patients out of 71 for diagnosis of ectopic pregnancy as compared to Shalev et al study in which only transvaginal ultrasound was done However, considering both our and Shalev et al results, transvaginal ultrasound significantly improves the accuracy of diagnosis in patients with suspected ectopic pregnancy.

Sidney M. Dashefsky et al performed a study in 1988[18], which included 53 patients at risk for ectopic pregnancy. Basic aim of that study was to assess the predictive ability of transvesical and endovaginal ultrasound and determine whether endovaginal ultrasound could be used alone. They concluded that diagnostic accuracy of transvesical sonography for detection of ectopic pregnancy is

pregnancy is 67%. Both transvesical and endovaginal ultrasounds significantly increase the diagnostic accuracy for ectopic pregnancy (from 60-83%). Although endovaginal sonography is superior to transabdominal sonography as there is an increase in number of diagnostic studies and decrease in the number of indeterminate studies, endovaginal sonography may miss an ectopic pregnancy that is located in high location beyond the view of endovaginal transducer. The limitation of our study is that we could not compare the results of transabdominal and transvaginal ultrasound separately because we had a combined report of both ultrasound examinations. Moreover many established criteria were used for definitive diagnosis on ultrasound. This was an important factor in reaching very high definitive diagnosis without indeterminate ultrasound scans.

Mohsin H et al conducted a prospective study in 2001 in which efficacy of pelvic sonography was evaluated in 400 patients as screening test for ectopic pregnancy.[19] The study included initial transabdominal sonography followed by transvaginal sonography for the confirmation of viability of intrauterine pregnancy and characterization of adnexal mass. Ultrasound examination performed was clearly diagnostic in 96.3% patients without help of Beta hCG. In our study, we reached at definitive diagnosis of ectopic pregnancy after ultrasound in all patients though the number of patients was less compared to Mohsin's study, and we correlated our findings with Beta hCG.

Ultrasound is one of the very good diagnostic modalities; however, it has a few limitations, one of these being operator dependence. A very skillful operator can pick up subtle findings, which on the other hand can be missed. Ultrasound can miss pathology, if it is not getting an acoustic window in the presence of air, such as bowel gases. This is one of the very important factors for evaluating patients through transabdominal technique. In patients with an empty bladder, bowel loops obscure the view of pelvic structures. Transvaginal ultrasound does not require a full bladder however, sometimes, evaluation becomes difficult due to limited fields of view.

The role of transabdominal and transvaginal ultrasound and correlation with Serum Beta hCG in diagnosis of ectopic pregnancy was evaluated and use of multiple parameters resulted in 100% sensitivity and specificity.

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