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Original Article

Ultrasonographic Evaluation of Ectopic Pregnancy and Prediction of Outcome at Tertiary Level Hospital, Dhaka, Bangladesh

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ABSTRACT

Introduction: *The objective of the study was to ultrasonographic evaluation of ectopic pregnancy and prediction of outcome at tertiary level hospital.* ***Methods & Materials:*** *A hospital based cross sectional study carried out in the Department of obstetrics & gynecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, from 16th March 2017 to 15" September 2017. Sample size was 50. Detailed demographic data were collected from the informant and structured case report form. History, clinical examination was done meticulously and probable diagnosis constructed according to investigation result.* ***Result:*** *A total of 50 cases of ectopic pregnancies were recruited in the study group. In this study, the maximum incidence was seen in the 2nd decade 58.0%, next to it was the 3rd to 4 decade 30.0 %. Mean age of the patient was 24.9 ± 9.7 years. USG findings of ectopic pregnancy revealed that, empty uterine cavity and Inhomogeneous adnexal mass was most common findings, seen in (100.0 %, 94.0%) of patients. It was followed by Hyperechoic tubal ring (80.0%), Products of conception located outside of the endometrial echo, surrounded by a continuous rim of myometrium in (4.0%) of patients. Site of ectopic pregnancy revealed that, 47(94%) in Isthmo-Ampullary region, 2(4.0%) interstitial region and only single patients detected in ovarian ectopic. Out of 50, only 3 patients left against medical treatment. Methotrexate (MTX) was the drug used for conservative medical treatment. Hemodynamically unstable patients had higher levels of ß- hCG or a mass more than 3.5cm, surgical management was preferred. Surgery was performed in 43 patients as the first line of management. In 4 patients with Medical therapy failure, surgery was performed as second line of treatment. In this study at follow-up, any adverse event, complications were assessed on a prescribed questionnaire and patient's haemodynamic status was examined for further outcome. Blood transfusion was required in 14 patients, haemoperitoneum detected in 6 patients and nine patients were developed shock. Study shows that 37 (74.0 %) of the patients recovered without sequel, 8 (16.0%) remains standstill and they discharged on request or risk bond. 5 cases (10.0%) developed wound infection.* ***Conclusions:*** *Ectopic pregnancy is a life-threatening condition, major social, personal and economical burden. The importance of this finding is even clear that Ultrasonography (USG) is a standard, cheep and valuable diagnostic tool for evaluation of ectopic pregnancy.*

Keywords: *Ultrasonographic, Evaluation of Ectopic Pregnancy, Prediction, Bangladesh*

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INTRODUCTION

An ectopic pregnancy (EP) occurs when a fertilized ovum implants outside the uterine cavity. It is the most important cause of maternal mortality and morbidity in the first trimester [1]. In developing countries, a majority of hospital-based studies have reported ectopic pregnancy case-fatality rates of around 1%-3%, 10 times higher than those reported in developed countries [2]. Although women with ectopic pregnancy frequently have no identifiable risk factors, several studies have shown that increased awareness of ectopic pregnancy and a knowledge of the associated risk factors help to identify women at higher risk in order to facilitate early and more accurate diagnosis. Early diagnosis by TVS is therefore potentially lifesaving and can reduce surgical morbidity by allowing elective surgery or even non-surgical conservative treatment options [3, 4]. In an ectopic pregnancy, generally the fertilized embryo is held on to the lining of the Fallopian tube and penetrates into the nearby vessels and causes bleeding. Heavy intratubal bleeding sometimes threatens the health or life of the woman. In ectopic pregnancy, heavy bleeding occurs earlier than usual, if embryo invades into the nearby Sampson artery [5]. About 40 - 50 percent of ectopic pregnancies are misdiagnosed at the initial visit to an emergency department. Failure to identify risk factors is a common and significant reason for misdiagnosis [6, 7]. Scoring systems have been proposed to facilitate earlier diagnosis of ectopic pregnancy by indicating the level of risk as a function of weighted risk factors [8, 9]. Fallopian tube is the most common site of ectopic implantation (tubal, ampulary, isthmic, fimbrial and interstitial or cornual). Less common are ovarian, cervical and

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abdominal. Early diagnosis of EP is a difficult task but can be possible with the help of quantitative ß-human chorionic gonadotropin (B-hCG) level, transvaginal ultrasonography, and laparoscopy. Knowledge of the risk factors for EP helps in rapid diagnosis and could reduce the need for surgery and suggest actions to improve prognosis [10]. The initial sonographic examination often is performed transabdominally through a physiologically distended bladder. If a living intrauterine embryo is identified, the examination is usually complete. In an intrauterine gestational sac is not confidently identified by transabdominal imaging, a transvaginal examination should be done [11]. In Comparison to abdominal ultrasonography, transvaginal ultrasonography diagnoses intrauterine pregnancies one week earlier on an average, because it is more sensitive and has a lower discriminatory zone. An ectopic pregnancy can be suspected if the transvaginal ultrasound examination does not detect an intrauterine gestational sac when the B-hCG level is higher than 1,500 mIU per mL. The literature provides a wide range of sensitivity and specificity for transvaginal ultrasonography in the detection of ectopic pregnancy. Sensitivity ranges from 69 to 99 percent, and specificity ranges from 84 to 99.6 percent [12, 13]. Transvaginal sonography and serum B-hCG level assays have changed the course and management of ectopic pregnancy. Knowledge of the USG findings of normal early IUP, abnormal intrauterine pregnancy/spontaneous abortion, and ectopic pregnancy is essential [14]. Ultimately, ultrasonography collaborates & validated the clinical-pathological profile, improves the quality of care by facilitating rapid diagnosis. Aim of the study was to evaluation of ultrasonography findings of ectopic pregnancy in tertiary centre of Bangladesh.

METHODS & MATERIALS

Study design: Descriptive type of cross-sectional study.

Place of study: Department of obstetrics & gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

Study periods: Six months (16 March 2017 to 15th September 2017).

Study Population: Patients of ectopic pregnancy (diagnosed after a clinical examination and investigations) attended to the obstetrics & gynaecology department were included in the study, after fulfilling inclusion and exclusion criteria. Patients of Seriously ill patients, e.g. severe anaemia, shock, needs immediate surgery were excluded from the study.

Sample size: To determine the sample size the following formula followed,

$$n = \frac{z^2 pq}{d^2}$$

Actual prevalence of such event unknown and the current study duration was only 6 months; therefore 50 samples were taken in this study

Inclusion criteria:

1) All women with ectopic pregnancy (diagnosed after a clinical examination and investigations).
2) Informed consent for inclusion in the study

Exclusion criteria:

1) Seriously ill patients, e.g. severe anaemia, shock, need immediate surgery.
2) Unwilling to participate in study

Data collection procedure: This study was based on the clinical diagnosis and management of ectopic pregnancy treated at department of obstetrics & gynaecology during the period of six months. A prospective observational study, conducted in the Department of Obstetrics & Gynaecology of Bangabandhu Sheikh Mujib Medical University (BSMMU), women who presented with ectopic pregnancy were included. Ethical clearance for the study was obtained from the Ethical Review Committee of the BSMMU. All the patients were included according to selection criteria e.g. history of amenorrhea, abdominal pain and irregular bleeding per vaginum and subjected to various investigative procedures for the diagnosis of ectopic pregnancy. The diagnostic procedures include positive urine pregnancy test, serum ß-HCG levels. and available other report. Then all patients subjected to ultrasound abdomen and pelvis was performed. Result was correlated with clinical diagnosis. The treatment modalities include medical treatment with methotrexate in patients who are hemodynamically stable, unruptured ectopic pregnancy, adnexal mass <3.5 cm, and B-HCG level less than 10,000 mIU/ml. Surgical treatment includes laparoscopy or laparotomy depending on the clinical presentation and severity of the presentation. Then outcome will be observed. Patient data, clinical & laboratory findings were noted and correlated.

Data analysis: Data for socio- demographic and clinical variables were obtained from all participants by the use of a pre-designed and easily understandable questionnaire. After collection of all information, these data were checked, verified for consistency and edited for finalized result. After editing and coding, the coded data directly entered into the computer by using SPSS version 6. Data cleaning validation and analysis was performed using the SPSS/PC software and graph and chart by MS excel. The result was presented in tables in proportion. A "P" value <0.5 considered as significant.

RESULTS

Table – I: Distribution of Demographic Characteristics of the Respondents (*n*=50)

Age (years)	Number of Patients	Percentage (%)
18-30	29	58.0
31-45	15	30.0
>45	6	12.0
Mean ± SD	24.9 ± 9.7	
Residence		
Rural	15	30
Urban	29	58
Sub-urban	6	12
Income classes		
Low-income class	22	44
Lower middle class	19	38
Upper middle class	5	10
High income class	4	8

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Overall demographic features of 50 patients are shown in Table I. In the study, the maximum incidence was seen in the 2nd decade 58.0%, next to it was the 3rd to 4th decade 30.0%. Mean age of the patient was 24.9 ± 9.7 years.Large numbers of respondents came from urban area (58%), followed by rural area (30%) and sub-urban/slum area (12%). Socioeconomically patients are grouped into four classes. Among the patients the low income class (44%) comprising the major percentage of the patients, followed by lower middle class (38%) and remaining are upper middle class 5(10%), and high income class 4(8%).

Table – II: Clinical manifestation of ectopic pregnancy

Clinical manifestation	Frequency	Percentage
Pain in the abdomen	50	100.0
H/O amenorrhea	50	100.0
P/V bleeding	43	86.0
Nausea, vomiting	40	80.0
Abdominal distension	24	48.0
Fainting and syncopal attack	12	24.0
Features of shock	12	24.0
Palpitation	9	18.0

Present study shows that abdominal pain and H/O amenorrhea present in 100.0% of patient. Table II also gives impression that P/V bleeding, nausea-vomiting and abdominal distension was the other commonest presentation (86%, 80% and 48% respectively).

Table – III: Clinical sign of the patients

Clinical sign	Frequency	Percentage
Pallor	28	56.0
Shock	9	18.0
Tender abdomen	44	88.0
Abdominal distension	13	26.0
Guarding	7	14.0
Tachycardia	15	30.0
Hypotension	9	18.0

In our study group, pallor was present in 56% of the cases, 18% presented with shock, 30% were tachycardia, 18% hypotension and 82% of the patients were hemodynamically stable. On abdominal examination, the common presentation was tenderness in 44 (88%) patients, followed by distension in 13(26%) and guarding in 7 (14%) patients. No clinical abnormality was found in 5(10%) cases (Table-III).

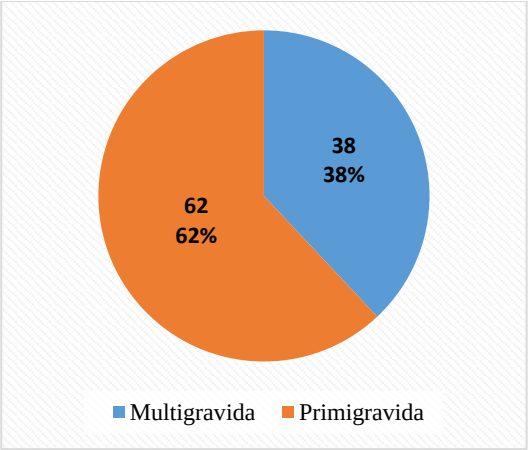

Figure – 1: Obstetrics history (Gravidity) of mothers (*n*=50)

Most of the women were primigravida (62%). It has been seen that the prevalence of EP increased with gravidity. The risk of EP in multigravida (two or more gravida) was seen in (38.0%) of mother.

Table – IV: Risk factors profile of the study subjects

Risk factors	Frequency	Percentage
Previous LSCS	13	26.0
Pelvic inflammatory disease	12	24.0
Abortion	8	16.0
History of infertility	4	8.0
History of D and C	5	10.0
H/O tubal ligation	3	6.0
Previous ectopic pregnancy	2	4.0
Unknown factors	18	36.0

Previous LSCS and Pelvic inflammatory disease was found as strong risk factor for ectopic pregnancy and significantly associated with ectopic pregnancy in this study. In our study group, 26.0% of the patients had history of Previous LSCS, history of Pelvic inflammatory disease were in 24%, Abortion in 16%, History of D and C in 10%, and H/O tubal ligation in 6% were noted (Table-IV).

Table – V: Ultrasonography findings of the ectopic pregnancy (*n*=50)

USG findings	Frequency	Percentage
Empty uterine cavity	50	100.0
Inhomogeneous adnexal mass	45	94.0
Endometrial thickening	27	54.0
Empty extra-uterine sac	2	4.0
Products of conception located outside of the endometrial echo,surrounded by a continuous rim of myometrium	2	4.0
Hyperechoic tubal ring	40	80.0
Anechoic or echogenic free fluid within the Pouch of Douglas	6	12.0

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Table V shows USG findings of ectopic pregnancy. Empty uterine cavity and Inhomogeneous adnexal mass was most common findings, seen in (100.0%,94.0%) of patients. It was followed by Hyperechoic tubal ring (80.0%), Products of conception located outside of the endometrial echo, surrounded by a continuous rim of myometrium in (4.0%) of patients.

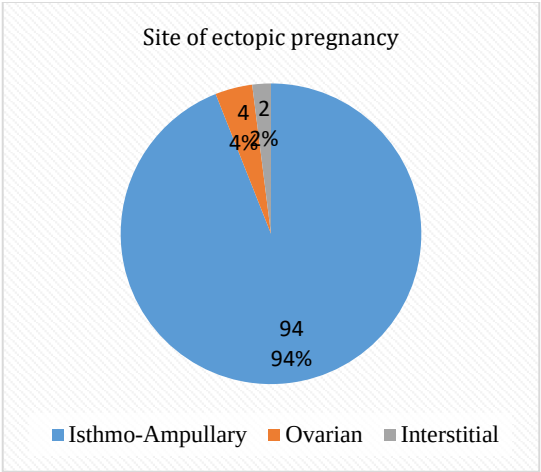

Figure – 2: Evaluation of USG findings according to site of lesion (*n*=50)

Fig-2 shows the overall USG findings according to site of lesion. Site of ectopic pregnancy revealed that, 47(94%) in Isthmo-Ampullary region, 2(4.0%) interstitial region and only single patients detected in ovarian ectopic.

Table – VI: Distribution of cases according to Treatment modality (*n*=50)

Treatment modality	Frequency	Percentage (%)
Medical management	3	6.0
Salpingectomy	45	90.0
Salpingo-Oophorectomy	2	4.0
Total	**50**	**100.0**

Out of 50, only 3 patients left against medical treatment. Methotrexate (MTX) was the drug used for conservative medical treatment. In patients who were hemodynamically unstable, had higher levels of ß-hCG or a mass more than 3.5cm surgical management was preferred. Surgery was performed in 43 patients as the first line of management. In 4 Medical therapy failure patients, surgery was performed as second line of treatment. Salpingectomy was the procedure performed in most cases (90%), as the tubes were no salvageable. Ovaries were conserved in all cases except in two patients where in one ovarian pregnancy was suspected and dense tubo-ovarian masses were found in another (Table-VI).

Table – VII: Associated any complications (*n*=50)

Complication	Number of patients	
	Present	Absent
Blood transfusion	14	36
Haemoperitoneum	6	44
Shock	9	41

At follow-up, any adverse event, complications were assessed on a prescribed questionnaire and patient's haemodynamic status was examined for further outcome. Blood transfusion was required in 14 patients, haemoperitoneum detected in 6 patients and nine patients were developed shock (Table-VII).

Table – VIII: Outcome and fate of cases during discharge (*n*=50)

Outcome & fate	Frequency	Percentage
Recovered without sequel	37	74
No improvement	8	16
Wound infection	5	10

Patient's symptoms, degree of complications and clinical outcome were measured. Study shows that 37 (74.0 %) of the patients recovered without sequel, 8 (16.0%) remains standstill and they discharged on request or risk bond. 5 cases (10.0%) developed wound infection (Table-VIII).

DISCUSSION

This is cross sectional, observational study conducted in department of obs & Gynae, BSMMU. A total of 50 cases of ectopic pregnancies were recruited in the study group. In this study, the maximum incidence was seen in the 2nd decade 58.0%, next to it was the 3rd to 4th decade 30.0%. Mean age of the patient was 24.9 ± 9.7 years, which is close to the studies done by Prasanna B, et al. [15] (74%), Samiya Mufti, et al. [16] (75.4%), Panchal D, et al. [17] (71.66%) and Rashmi A Gaddagi, et al. [18] (70.2%). In another study peak age incidence was 21-30 years (42.3%) with preponderance in the first and second pregnancies [19]. Most of the women in Bangladesh marry at an early age and completes their family at an early age. This age corresponds to the age of peak sexual activity and reproduction. Ectopic pregnancy is generally on the increase in developing countries and a major cause of maternal morbidity, mortality and fetal wastage [20]. A published report by Population Council Bangladesh, in collaboration with the Directorate General of Family Planning (DGFP) and Marie Stopes Bangladesh (MSB) shows. among women 2,976 women who visited the different health facilities centre during study periods, screened for history of ectopic pregnancy was (47%) [21]. Present study shows that Large numbers of respondents came from urban area (58%), followed by rural area (30%) and sub-urban/slum area (12%). Among the patients the low income class (44%) comprising the major percentage of the patients, followed by lower middle class (38%) and remaining are upper middle class 5(10%), and high income class 4(8%). Findings consistent with study done by Prasanna B, et al. [15] (74%), Poonam, et al. [22] (69.3%). Women belonging to low socioeconomic status will have poor personal hygiene and

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lack of immunity, predisposing them to pelvic inflammatory diseases including tuberculosis. The mechanism can be anatomic (e.g., scarring that blocks transport of the egg) or functional (e.g., impaired tubal mobility). Common risk factors for ectopic pregnancy include [23]: pelvic inflammatory disease, previous ectopic pregnancy, endometriosis. In our study group, previous LSCS and Pelvic inflammatory disease was found as a strong risk factor for ectopic pregnancy and significantly associated with ectopic pregnancy in this study. In our study group, 26.0% of the patients had history of Previous LSCS, history of Pelvic inflammatory disease were in 24%, Abortion in 16%, History of D and C in 10%, and H/O tubal ligation in 6% were noted. Unlike mixed aerobes and anaerobes, N. gonorrhoeae and C. trachomatis can produce silent infections. In women with these infections, even early treatment does not necessarily prevent tubal damage. In the present study group, H/O PID was present in 24% of the cases with ectopic pregnancy. This is correlating with the study done by Prasanna B, et al. [15] (26%), Bhavna, et al. [24] (22.7%) of the cases with ectopic pregnancy. In the present study group, 16% of patients had history of previous abortion which is close to the study done by Prasanna B, et al. [15] (16%), Khaleeque F, et al [25] (12.9%). The relationship between prior abortions and ectopic pregnancy is explained by the postabortal infections leading to tubal damage. In the past, these post-abortal infections were due to illegal abortions which were not done under aseptic precautions and lack of proper antibiotic coverage. In our study group. 8% of the women with ectopic pregnancy were infertile which is correlating with the studies done by Prasanna B, et al. [15] (10%), Panchal D, et al. [17] (11.66%) and Samiya Mufti, et al. [16] (8.77%). The association between infertility. previous pelvic infection and tubal pathology is the possible explanation. Ectopic pregnancy and miscarriage have an adverse effect on the quality of life of many women. Approximately 20% of pregnancies miscarry, and miscarriages can cause considerable distress [26]. Retrospective analysis of case of ectopic pregnancy in India shows, commonest risk factors include pelvic inflammatory disease (PID). previous tubal surgery, previous ectopic pregnancy, progestin contraceptive. assisted reproduction, ovulation induction, induced abortion [27,28]. The commonest symptoms are abdominal pain (80.6%), amenorrhea (77.4%) and abnormal vaginal bleeding (61.3%); and commonest signs were abdominal tenderness (64.5%). cervical excitation (51.6%) and adnexal tenderness (48.4%). Morbidity included anemia (41.9%), blood transfusion (54.8%) and wound infection (32.2%) [27]. Present study shows that abdominal pain and H/O amenorrhea present in 100.0% of patient. Table also gives impression that P/V bleeding, nausea-vomiting and abdominal distension was the other commonest presentation (86%, 80% and 48% respectively). This is correlating with the study done by Prasanna B, et al. [15] in which amenorrhea was present in 96%, pain abdomen in 90% and bleeding PV in 68% of the patients. In our study group, pallor was present in 56% of the cases, 18% presented with shock, 30% were tachycardia, 18% hypotension and 82% of the patients were hemodynamically stable. On abdominal examination, the common presentation was tenderness in 44 (88%) patients, followed by distension in 13(26%) and guarding in 7 (14%) patients. No clinical abnormality was found in 5(10%) cases. Preexisting anemia with superimposed acute blood loss explains the higher incidence of pallor in ectopic pregnancy. 18% of the cases presented in shock which is correlating with the study done by Panchal D, et al. [17] (18.33%). In this study Sonographic evaluation was correlated with clinical and laboratory profile. USG findings of ectopic pregnancy revealed that, empty uterine cavity and Inhomogeneous adnexal mass was most common findings, seen in (100.0 %, 94.0%) of patients. It was followed by Hyperechoic tubal ring (80.0%), Products of conception located outside of the endometrial echo, surrounded by a continuous rim of myometrium in (4.0%) of patients. Site of ectopic pregnancy revealed that, 47(94%) in Isthmo-Ampullary region, 2(4.0%) interstitial region and only single patients detected in ovarian ectopic. An empty endometrial cavity with anechoic or echogenic free fluid within the Pouch of Douglas was demonstrated in 6 patients. Ruptured ectopic pregnancy was diagnosed in 6 patients. In this study, out of 50, only 3 patients left against medical treatment. Methotrexate (MTX) was the drug used for conservative medical treatment. In patients who were hemodynamically unstable, had higher levels of ß-hCG or a mass more than 3.5cm surgical management was preferred. Surgery was performed in 43 patients as the first line of management. In 4 Medical therapy failure patients, surgery was performed as second line of treatment. Salpingectomy was the procedure performed in most cases (90%), as the tubes were non salvageable [29, 30]. Ovaries were conserved in all cases except in two patients where in one ovarian pregnancy was suspected and dense tubo-ovarian masses were found in another. In this study at follow-up, any adverse event, complications were assessed on a prescribed questionnaire and patient's haemodynamic status was examined for further outcome. Blood transfusion was required in 14 patients, haemoperitoneum detected in 6 patients and nine patients were developed shock. Study shows that 37(74.0%) of the patients recovered without sequel, 8 (16.0%) remains standstill and they discharged on request or risk bond. 5 cases (10.0%) developed wound infection.

CONCLUSIONS

Ectopic pregnancy (EP) is the major cause of maternal morbidity and mortality. Ectopic pregnancy still remains a surgical emergency in spite of the advanced diagnostic methods and management, demanding prompt diagnosis and timely and effective treatment to ensure maternal safety and to prevent untimely maternal death. Risk factors associated to ectopic pregnancy are pelvic inflammatory disease, past history of miscarriages, age, parity, infertility, previous ectopic pregnancy, induction of ovulation and intrauterine device usage. Early diagnosis and management is the mainstay in the treatment of ectopic pregnancy. The combined use of clinical, pathological data and imaging studies can provide information vital to the choice of further management approaches. Ultrasonographic imaging is an effective, easy to use, safe, and readily available noninvasive means to evaluate EP potential.

Our findings suggest that routine checkup and screening can minimize the alarming situation of ectopic pregnancy, due to manifestation is upto submerged till the progression of disease so far.

Conflict of Interest: None.
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