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EVALUATION OF ROLE OF TRANSABDOMINAL ULTRASOUND IN UTERINE AND ADNEXAL FACTORS IN INFERTILITY

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ABSTRACT

Background: The desire to procreate is universal phenomenon. Childlessness is considered as a curse in many societies and is one of the causes of marital breakups. WHO has defined infertility as 'Failure to conceive over 12 months of uninterrupted sexual practice. USG has become a well-established technique for imaging ovarian and uterine pathologies. **Methods:** This is a hospital based cross sectional, observation study,included total of 51 cases. The patients with chief complaints of infertility presenting to gynaecology OPDs were referred to the department of Radiodiagnosis,Guru Nanak Dev Hospital, Amritsar and all patients were subjected to transabdominal ultrasonography using 3.5 MHz sector transducer. **Results:** Out of 51 cases studied, 35 were of primary infertility and 16 were of secondary infertility. Duration of infertility varied from 1.75- 17 years in patients with primary infertility and 2-10 years in patients with secondary infertility,maximum cases between 2-4 years.. Nonspecific enlargement of uterus on one case, 3 with fibroid, 3 with endometrial calcification, one with infantile uterus and one bicornuate uterus. Ovaries were normal in 37 cases, abnormal in 9 cases, not visualized in 3 cases on left and 1 on right side. Left ovary enlarged in one case. Ovarian cyst in 3 cases, T.O masses in 5 cases and PCOD in one case. Fluid in POD in 4 cases.**Conclusion:** It is concluded that ultrasound is very helpful in assessment of uterus and adnexal pathologies. USG is non-invasive, cheap, acceptable, easily available modality. It can diagnose structural abnormality and helps in making diagnosis of etiologic factor in patients of infertility and also in management and follow up of patients of infertility.

Key Words: Infertility, ultrasonography, ovaries, uterus

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INTRODUCTION

Fertility depends on various factors like differences in the ages at which marriages take place and in practice of contraception. However certain conditions have predilection for certain classes like endometriosis is higher in high socioeconomic classes and PID in lower socioeconomic classes. It usually results from many factors like recurrent abortions, neonatal deaths and still births but the commonest cause is failure to conceive i.e. Infertility. The female has maximum fertility in her early 20s with gradual decline to 35 years. The reproductive problems increase after 35 years and pregnancy is very rare after 45 years. There is much greater need to understand the causes and treatment of the infertility today because of its increasing incidence. This is because there is trend to delay marriage and postponement of children. In addition to this, there is a risk of prolonged anovulation after the use of oral pills and of adnexal infections with IUCD, abortions and venereal diseases.

Ovarian factors are related to anovulation and oligoovulation. If anovulation is due to ovarian failure, it is primary and if due to pituitary and hypothalamic causes, it is secondary. Other causes include infections, dysgenesis, endometriosis, TO masses, PCOD.

Uterine factors include congenital malformations, acute retroversion, fibroid and adenomyosis. Myomas are common in nulliparus or relatively infertile women. Theycause infertility either by interfering with implantation of the ovum or causing disturbance of ovulation. Criteria for hypoplastic uterus- Subnormal menstrual cycle,uterine cavity < or =6cm. other congenital malformation include bicornuate and septate uterus.

Tubal obstruction which may be unilateral or bilateral is mostly due to previous salpingitis resulting from postabortal, puerperal, gonococcal chlamydial or tuberculous infection. Blockade may also be due to spasm at the uterotubal junction, blockade due to adhesions.

USG has become a well established technique for imaging ovaries. It can assess ovarian size and morphology which are seen as sonolucent masses lying adjacent or posterior to uterus. TO abscess can be seen multilocular mass incorporating uterus. Uterus is seen as echofree space behind the filled urinary bladder. USG is helpful in patients who are obese or those who have pelvic tenderness making the pelvic examination difficult. Uterine anomalies like hypoplastic or bicornutae uterus, other conditions like endometriosis, fluid in cavity, endometrial response to hormones, fibroids can be well visualized by USG examination. USG can demonstrate even a small amount of fluid in POD.

MATERIALS AND METHODS

This was a cross sectional, observation study carried out in the department of Radio diagnosis and Imaging in collaboration with department of Gynaecology, Government Medical College, Amritsar. Study was conducted after taking approval from Institutional Ethics Committee,Government Medical College, Amritsar. Patients with chief complaints of infertility presenting to gynaecology OPDs. All patients were subjected to transabdominal ultrasonography performed using Mindray machine with 3.5 MHz sector transducer. Uterus scanned in both transverse and longitudinal planes with fully distended bladder. adnexa studied thoroughly and abnormalities noted down.

RESULTS

In the present study, 51 patients of infertility with normal male factor were studied. After clinical examination, all the patients were subjected to transabdominal USG. Out of 51 cases studied, 35 were of primary infertility and 16 were of secondary infertility. Duration of infertility varied from 1.75- 17 years in patients with primary infertility and 2-10 years in patients with secondary infertility. Clinically, uterus was normal in 46 patients. Enlarged uterus in 4 cases and non palpable in one case. Normal adnexa in 33 patients and 9 were diagnosed having PID. Fullness in forniceswere felt on 7 cases and one case was diagnosed as bilateral T.O masses.

On USG, uterus was normal in 39 patients. Non specific enlargement on one case, 3 were diagnosed as fibroid, 3 with endometrial calcification, one was infantile uterus and one bicornuate uterus. HSG was done in 2 cases to confirmed the diagnoses on USG of which one was bicornuate uterus and other hydrosalpinx.

Ovaries were normal in 37 cases, abnormal in 9 cases, not visualized in 3 cases on left and 1 on right side. Left ovary enlarged in one case. Ovarian cyst in 3 cases, T.O masses in 5 cases and PCOD in one case. Fluid in POD in 4 cases seen.

Table 1: Showing type of infertility (Total no. of patients = 51)

Type of infertility	No. of cases	Percentage
Primary	35	68.60
Secondary	16	31.40
Total	51	100.00

Table 2 - Associated symptoms (total no. of patients = 51) Asymptomatic = 33 (64.70%)

Associated symptoms	No. of cases	Percentage
Pain lower abdomen	6	11.76
Vaginal discharge	5	9.81
Backache	5	9.81
Hirsutism	1	1.96
Dysmenorrhoea	1	1.96

Table 3: USG findings in 35 patients of primary infertility

Ultrasound findings	No. of cases	Percentage
Uterus		
oNormal		
• A/V	25	71.43
• R/V	2	5.71
oEnlarged		
• A/V	-	-
• R/V	1	2.86
o Fibroid uterus	3	8.57
o Endometrial calcification	1	2.86

oCongenital anomalies	2	5.71
oOthers	1	2.86
Adnexa		
Normal	24	68.57
Ovarian cyst	2	5.71
Unilateral TO mass	2	5.71
Bilateral TO mass	2	5.71
PCOD	1	2.86
Endometriosis	-	-
Others	4	11.43
Fluid in pouch of Douglas	2	5.71

Table 4- Ultrasound findings in 16 patients of secondary infertility

Ultrasound findings	No. of cases	Percentage
Uterus		
oNormal		
• A/V	12	75.00
• R/V	-	-
oEnlarged		
• A/V	-	-
• R/V	-	-
o Fibroid uterus	-	-
o Endometrial calcification	2	12.5
oCongenital anomalies	-	-
oOthers	2	12.5
Adnexa		
Normal	13	81.25
Ovarian cyst	1	6.25
Unilateral TO mass	1	6.25
Bilateral TO mass	-	-
PCOD	-	-
Endometriosis	-	-
Others	1	6.25
Fluid in pouch of Douglas	2	12.50

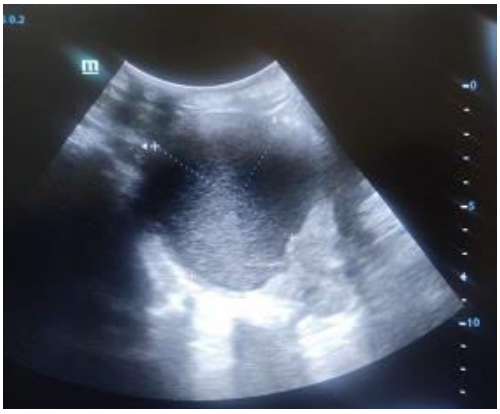
Table 5: Comparison between clinical and ultrasound findings (total = 51)

Clinical findings	No. of cases	Ultrasound findings	No. of cases
Uterus		Uterus	

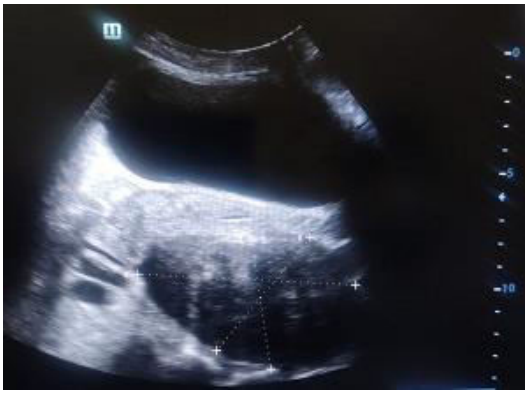
oNormal		oNormal	
• A/V	44	• A/V	37
• R/V	2	• R/V	2
oEnlarged		oEnlarged	
• A/V	3	• A/V	-
• R/V	1	• R/V	1
Uterus not palpable	1	o Fibroid uterus	3
		o Endometrial calcification	3
		o Congenital anomalies	2
		oOthers	3
Adnexa		Adnexa	
oNormal	33	Normal	37
oT.O. masses		oT.O. masses	
• Unilateral	-	• Unilateral	3
• Bilateral	1	• Bilateral	2
oPCOD	1	oPCOD	1
o Ovarian cyst	-	o Ovarian cyst	3
		Endometriosis	-
o Fullness in fornices	9		-
oPID	7		
		Others	4
		Fluid in POD	4

CASE NO 1: Transabdominal Ultrasound shows echogenic endometrial polyp.

CASE NO 2: Ultrasound pelvis shows complex heterogenoustuboovarian mass in right adenexa.



CASE NO3: Ultrasound pelvis shows bulky, enlarged ovary-s/o PCOS



DISCUSSION:

Infertility is defined as failure to conceive after one year of uninterrupted sexual practice. As we know that with increasing age, the fertility of the women decreases so the problem of infertility is increasing due to delayed marriages and subsequent postponement of having children. Study of infertility has emerged as one of the most dynamic field of medicine. The goals of infertility evaluation are two folds- to discover the etiology and to provide a prognosis for future treatment; based on the findings

Type of fertility and age of relationship:

In the present study, out of 51 patients of infertility, 35 (68.6%) were of primary infertility and 16 (31.4%) were of secondary infertility.

In cases of primary infertility, the maximum no. of cases i.e.16 (45.5%) reported were in the age group of 26-30 years, 14(40%) were in the age group of 20-25 years, 3 (8.5%) cases were in the age group of 31-35 years and 1 (2.8%) case was reported below 20 years of age and 1 (2.8%) above 35 years of age. So the age range was 18-40 years.

Similarly, in case of secondary infertility 11 (68.7%) cases presented in the age group of 26-30 years, 3 (18.7%) presented in the age group of 31-35 years, 2 (12.5%) were in the age group of 20-15 years. No case was found below 20 years and above 25 years. So the age range of the patients of secondary infertility was from 20-35 years.

Jain G and Khatuja R conducted a study on 203 women, of which 121 women presented with primary and 82 with secondary infertility. The age of the women with primary infertility ranged between 20-34 y (mean age 24.6 y) and between 26-35 y (mean age 28.4 y) with secondary infertility. In the present study of 51 patients, 35 were of primary infertility and 16 were of secondary infertility which is consistent with the above study.[1]

Duration of infertility:

In the present study of 51 patients, 35 were of primary infertility and 16 were of secondary infertility. In case of primary infertility, majority of patients i.e. 20 presented with 2-4 years of duration, 4 cases with 5-6 years, 4 cases with 7-8 years, 3 cases with less than 2 years, 1 case between 9-10 years and 3 cases more than 10 years of duration. In case of secondary infertility, majority of cases i.e. 9 presented with 2-4 years of duration, 3 cases with 7-8 years of duration, 2 cases with 5-6 years of duration, 2 cases with 9-10 years of duration, while no case of less than 2 years or more than 10 years of duration.

Duration of infertility varied from less than 2 years to 17 years in cases of primary infertility, while 2-10 years in cases of secondary infertility.

According to Lulu AI Nuaim (1998), the female has maximum fertility potential in her early twenties with gradual decline to 35 years and rapid decline therafter. The reproductive problem rises from 4% at 15-24 years to 15% at 25-34 years. In the present study, maximum patients presented in the age group of 26- 30 years i.e. 27 cases. While 16 cases presented in the age group of 20-25 years which corresponds to the above study. Ellen B. Mendelson et al (1985) reviewed 245 cases of infertile women retrospectively. Ot of 245 cases, 211 were in the age group of 22- 42 years. In the present study, the range was 18-40 years that corresponds to the above study.[2]

SudhaPrakash et al (1989) studied 50 patients of infertility. The age range was 19-35 years and the mean age of 25.5 age. The duration of infertility varied from 1-20 years.[3]

Associated symptoms:

Out of 51 patients of infertility, 33 (64.7%) were asymptomatic. Rest of the 18(35.4%) patients presented with some associated symptoms like pain lower abdomen in 6 (11.7 %) cases, vaginal discharge in 5 (9.8%), backache in 5 (9.8%), hirsutism in 1 (1.96%) and dysmenorrhoea in 1(1.96%).

Milingos S, Protopapas A in a study in 1584 patients complaining of infertility of more than 1 year duration evaluated the laparoscopic findings in relation to the presence or not of chronic pelvic pain (CPP). Infertile patients with CPP are much more frequently found with an abnormal pelvis in comparison with cases without CPP. Dysmenorrhoea was the most frequent type of CPP.[6]Another study conducted by Obuna JA, Ndukwe EO on 295 subjects and concluded that the predominant symptoms in the females were insomnia, inadequate coital exposure, galatorrhoe and vaginal discharge.[7]Beverly G.Coleman et al studied 13 patients of low parity. The most frequent presenting complaint in addition to infertility was pelvic pain. The findings in above study are in agreement with the findings of the present study.[8]

Uterus:

On ultrasound examination, uterus was anteverted normal in 37 cases out of 51 cases studied. 2 cases were of normal retroverted uterus. 3 cases were diagnosed as fibroid uterus. 3 cases showed endometrial calcification. 2 cases were of congenital abnormalities. One of these was infantile uterus and the other was bicornuate uterus which was confirmed by hysterosalpingography. 1 case was of endometrial hyperplasia, 2 cases were of pyometra which was confirmed on drainage. During a 20-year period, 19 (9.1%) of 208 patients with uterine anomalies had primary infertility. Women with unicornuate uteri had the highest (15%) incidence of primary

infertility, which was found in the other groups of uterine anomalies in 7% to 13% of the patients. Malformation of the uterus was considered the sole reason for infertility.[9]

Nasari et al I ,found 8 (3 %) cases of uterine malformations out of 300 patients. 6 of them had partially septate uterus and 2 had uterus didelphys. This incidence of 3% of uterine malformations corresponds with the present study in which the incidence of uterine malformations was about 4%[10].Thomas Lawson et al, studied 251 cases of proven gynaecological masses retrospectively. Out of these 251 cases, 19 were fibroid uterus[11]. Rajan et al, studied 443 subjects in whom a female factor responsible for infertility had been identified by ultrasonography. 85 were diagnosed as fibroid, 70 endometriosis,10 uterine anomalies, 20 PID and 10 were diagnosed as ovarian mass.[12]

Visualization of ovaries:

In the present study, out of 51 cases normal ovaries could be visualized on both sides in 37 cases, ovarian abnormalities were detected in 9 cases and ovaries could not be visualized in 3 cases on left side and in 1 case on right side. In 1 case ovary was enlarged on left side.

A study conducted by Abdel Jabbar E, M Al-Wazzan R on 1233 patients complaining of infertility of which 919 patients had primary infertility and 314 patients had secondary infertility. ovarian factor was the most common (66.83%) followed by tubal factor (22.03%), endometriosis (4.46%), pelvic inflammatory disease (2.85%), pelvic adhesion (2.10%) and uterine fibroid (1.73%). Ovarian factor was highly significant in primary infertility of which PCOD was the most common cause.[13]Fakhr M, Abou-Salem AM conducted a study on 40 patients with infertility and studied ovarian structure. Polycystic ovary was present in 71.4% of PI cases and in 58.3% of SI cases and was considered the most common ovarian abnormality in both groups, followed by sclerotic ovary, which was detected in 14.3% of PI cases and no SI cases. Other findings in both groups included tubo-ovarian abscess, ovarian fibroma and a serous cystadenoma.[14]

Normal ovary: In the present study, out of 51 cases, ovaries were normal in 37 cases.

SudhaPrakash et al (1989) studied 50 patients of infertility. Out of these 50 cases, ovaries were visualized in 37 cases. In 32 cases, ovaries were visualized on both sides whereas in 5 cases ovaries could be visualized on one side only, i.e on right side in 2 cases and on left side in 3 cases. 25 cases out these 37 cases were reported to have normal ovaries i.e. 67 %.

PCOD:

PCOD is thought to represent a self perpetuating cycle of endocrine imbalance in which the hypothalamus, pituitary, adrenal and ovary all play a role. Ultrasound plays and important

role as non- invasive assessment of ovaries in patients who are difficult to diagnose clinically and to distinguish PCOD from other causes of infertility.

In the present study, one out 51 case was presented with obesity, hirsutism and menstrual irregularity with primary infertility. On clinical examination, both ovaries were palpable. On USH, right ovary was to be 29ml and left ovary was 17ml in volume.

Multiple small follicles were seen in left ovary. Hull MG conducted an epidemiological study and the population studies revealed, first, that overt and occult PCOD accounted for 90% of patients with oligomenorrhea and 37% with amenorrhea, or 73% with oligo- or amenorrhea. Oligo- or amenorrhea accounted for 21% of couples with infertility and the annual incidence was 247 patients per million of the general population. The annual incidence of infertility due to PCOD per million was 41 with overt PCOD and 139 with occult PCOD (total 180).[15]

Endometriosis:

In the present study, no case of endometroiosis was found. Endometriosis is a consition that affects women in their thirties, who are infertile. Presentation may be occult except infertility or there may be dyspareunia, metromenorrhagia or dysmenorrhoea. Friedman et al (1985) studied 85 cases of infertility. Endometriosis was detected only in 4 cases by ultrasound while laparoscopy detected 37 cases of endometriosis. It was concluded that relatively very small amount of endometriosis can lead to infertility.[16]

Tuboovarian mass:

In the present study, 5 were diagnosed as T.O.masses- 3 unilateral and 2 bilateral T.O. masses and 4patient had only fluid in POD. SwarajBatra et al , studied 90 patients to evaluate the role of ultrasound in adnexal masses. Out of 90 cases, 24 were T.O.masses, rest were ovarian tumors, ectopic pregnancies and endometriosis etc. in the present study, 5 cases were diagnoses.[17]

Ovarian cyst: in the present study, ovarian cyst was diagnosed in 3 cases. In one case, cyst was seen on the right side and in 2 cases on left side. SudhaPrakash et al , studied 50 infertile patients with ultrasound. 2 cases were of ovarian cyst out of 50 cases. This corresponds well with the present study.

CONCLUSION

It is concluded that ultrasound is very helpful in assessment of size and position of uterus. It helps in diagnosis of endometrial abnormalities like endometrial hyperplasia, calcification, pyometra and congenital abnormalities. It is also helpful in diagnosing myometrial abnormalities like fibroids.

It is useful to visualize adnexa to see ovaries, their size, structural abnormalities in adnexa like T.O. mass, hydrosalpinx, ovarian cyst and PCOD. So USG is non-invasive, cheap, acceptable, easily available modality. It can diagnose structural abnormality and helps in making diagnosis of etiologic factor in patients of infertility and also in management and follow up of patients of infertility.

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