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ROLE OF TRANSVAGINAL ULTRASOUND(TVS), HYSTEROSALPINGOGRAHY(HSG) AND HYSTEROSCOPY(HYS) IN DIAGNOSING UTERINE CAUSES OF INFERTILITY

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ABSTRACT

OBJECTIVE:- To establish the role of TVS,HSG and hysteroscopy in diagnosing uterine causes of infertility.

METHOD:- Fifty Infertile women aged between 18-35years with primary or secondary infertility were assessed by TVS,HSG, and hysteroscopy for detecting the uterine causes of infertility. Other factors of infertility such as male factors, ovarian factors, tubal factors, infertility due to hormonal factors, and acute PID by clinical examination were excluded.

RESULTS:- TVS was found to be a simple, non-invasive, screening modality with Sensitivity 40%,Specificity 100%,PPV 100%,NPV 52.6%.HSG was found to be a simple, safe, minimally invasive radiologic procedure with Sensitivity 56.5%, specificity 96.1% ,PPV 92.8%, NPV 71.5%.Hysteroscopy can be recommended the gold standard for evaluating the uterine cavity.

KEYWORDS : TVS(Transvaginal ultrasound),HSG(hysterosaligography),PID(Pelvic inflammatory disease),Infertility

INTRODUCTION:-

World Health Organization (WHO) 2010 defines infertility as, "a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected intercourse"(1). Primary infertility is the failure to conceive at all, whereas secondary infertility is the failure to conceive after having borne a child or abortion. (2). Uterine abnormalities, congenital or acquired, are implicated as one of the crucial factor of infertility which is estimated to be the causal factor in as many as 10% to 15% of couples seeking treatment. Moreover, abnormal uterine findings have been found in 34% to 62% of infertile women. (3)

Structural abnormalities of the uterine cavity may affect the reproductive outcome adversely, by interfering with implantation or causing spontaneous abortion. Therefore exclusion of any intrauterine pathology becomes an important step in infertility work-up. Intrauterine abnormalities may be visualized using a variety of techniques, including hysterosalpingography(HSG), transvaginal sonography (TVS), sonohysterography (SHG), and hysteroscopy. A direct view of the uterine cavity offers a significant advantage over other blind or indirect diagnostic methods. The role of hysteroscopy in infertility investigation is to detect and treat intrauterine pathologies such as intrauterine adhesions, endometrial polyp, submucous fibroid or uterine malformations that could interfere with normal implantation and growth of conceptus, and hence, the benefit of different treatment modalities in restoring a normal endometrial environment.(5) Therefore, main objective of this study was to establish the role of TVS,HSG and hysteroscopy in diagnosing uterine factor of infertility

MATERIAL AND METHODS:-

50 women of the age group of 18-35years who were suffering from primary or secondary infertility attending the outpatient department were asked to participate in the study. After proper counseling women who were fulfilling the inclusion criteria were enrolled in the study. *INCLUSION CRITERIA*: women aged between 18-35yrs with primary or secondary infertility i.e. failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. Primary infertility is infertility in a couple who have never had a child. Secondary infertility is the failure to conceive following a previous pregnancy. *EXCLUSION CRITERIA*: The patient with infertility with another factor of infertility ruled out by following methods(1) Male factor infertility by husband semen analysis.(2) Ovarian causes like PCOD and poor ovarian reserve should be ruled out either by ,the follicular study on transvaginal ultrasound. (3) A tubal factors should be ruled out by HSG.(4) Infertility due to Hormonal factors by LH, FSH, PROLACTIN and thyroid (T3, T4,TSH) levels (5) Acute PID by clinical examination.

RESULTS:-

Table 1:- Uterine Findings on TVS in the study group

TVS findings	Primary infertility N=38		Secondary Infertility N=12	
	No.	%	No	%
Normal	28	73.7%	10	83.3%
intracavitary lesions(intrauterine polyp/fibroid)	5	13.2%	2	16.7%
endometrial polyp	1	2.6%	0	.0%
cervical polyp	2	5.3%	0	.0%
Bicornuate uterus	1	2.6%	0	.0%
Small cavity	1	2.6%	0	.0%

Table 2 :- HSG findings in study subjects with infertility

HSG findings	Primary infertility N=38		Secondary Infertility N=12	
	No.	%	No.	%
Normal cavity	29	76.3%	6	50.0%
Homogenous filing defect(polyp/fibroid)	6	15.8%	0	.0%
Irregular filing defect(intrauterine synechia)	0	.0%	5	41.7%
Banana shaped cavity(unicornuate uterus)	1	2.6%	0	.0%
Widely separated uterus horns(septate uterus)	1	2.6%	1	8.3%
Could not be done	1	2.6%	0	.0%

Table 3:- Uterine Cavity Abnormalities On Hysteroscopy

Uterine cavity abnormality	**Primary infertility N=38**		**Secondary Infertility N=12**	
	No.	%	No.	%
Normal (25)	23	60.5%	2	16.7%
Intrauterine polyp(3)	1	2.6%	2	16.7%
Fibroid(5)	4	10.5%	1	8.3%
Intrauterine synchiae(6)	1	2.6%	5	41.7%
Flimpsy adhesions(6)	5	13.2%	1	8.3%

Multiple tubercles on fundus(1)	1	2.6%	0	0.0
Congenital anomaly				
Septate uterus with polyp(1)	0	0.0	1	8.3
Unicornuate uterus(1)	1	2.6	0	0.0
Bicornuate uterus(1)	1	2.6	0	0.0
Subseptate uterus(1)	1	2.6	0	0.0

DISCUSSION:-

An infertility evaluation is usually initiated after one year of regular unprotected intercourse and after six months of unprotected intercourse in women age 35 years and older (6). Causes of female infertility include ovulation dysfunction, uterine factors, tubal factors, cervical factors, and hormonal factors. Intrauterine pathology such as polyps, sub-mucosal myoma, intrauterine adhesions, and congenital anomalies are common pathologies that impair fertility, the modalities to assess uterine cavity abnormalities usually include transvaginal sonography (TVS), hysterosalpingography (HSG), and hysteroscopy (HSC)(7)

The mean age of the patients in this study was 26.60±3.17 years The majority of patients were between 26-30yrs.(48%). The mean age of women (in years) in other studies like Maheshwari et al 2008 (8), the mean female age was 31.2 (5.2 SD) years, Kaur et al 2016 (9) was 31.88±7.67 years, Sharma V et al 2016 (10) the mean age 29.5±3.17 years which is comparable to our study.

In our study 38 (76%) cases were normal on TVS while 20 (40%) cases were confirmed as normal on hysteroscopy. 18 cases which were labeled as normal by TVS were later found to have abnormal findings on hysteroscopy. The reason for this, TVS had a limited role in diagnosing intrauterine adhesions which were found to be the most common finding on hysteroscopy. Moreover, endometrial polyps located in the cervico-isthmic and cornual regions were missed during routine sonographic examinations, as in our study 3 cases of endometrial polyp were missed by TVS. 7 cases of the intracavitary lesion were detected on transvaginal ultrasound and then these findings were confirmed on hysteroscopy, with 4 cases of submucous fibroid and 3 cases of polyp on hysteroscopy. 1 case on TVS had a small cavity which on hysteroscopy was confirmed to be a case of a unicornuate uterus. The cervical polyp was diagnosed in 2 cases on TVS and findings were confirmed on hysteroscopy. A statistically significant difference with P value 0.001(<0.05) indicates that hysteroscopy is superior to TVS in diagnosing intrauterine causes of infertility. In this current study, direct visualization of the uterine cavity by hysteroscopy was superior in detecting intrauterine adhesions, endometrial polyp, submucous fibroids, and congenital anomalies as well. These entities represent a unique condition where a hysteroscopic diagnosis can be clearly established. The sensitivity, specificity, positive predictive and negative predictive value of TVS in evaluating uterine cavity abnormalities were 40%, 100%,100%, 52.6% respectively.

On HSG examination, out of 50 cases, no intrauterine pathology was detected in 35 cases while of that 23 cases were found to be normal on hysteroscopy, while rest 12 cases were found to have some pathology on hysteroscopy,1 case had fibroid,3 cases had endometrial polyp ,6 cases had flimsy intrauterine adhesions,1 had multiple white tubercles on fundus,1 septate uterus with endometrial polyp.6 cases on HSG had homogenous filling defect in the cavity, out of which on hysteroscopy 2 had normal cavity,3 had fibroid,1 with fibroid polyp. 5 cases on HSG had irregular filing defects which were confirmed on hysteroscopy with intrauterine synechiae. The banana-shaped cavity was seen in 1 case which confirmed on hysteroscopy as a unicornuate uterus. HSG could not be done in 1 case which on hysteroscopy was found to have a normal uterine cavity. A statistically significant difference with a p-value of 0.001(<0.05) was calculated indicating that hysteroscopy is a better modality than HSG to diagnose uterine pathology in cases of infertility. However, while too much contrast material may obscure mass lesions, air bubbles or clots may mimic them, suggestive of lower diagnostic value of HSG, as in our study HSG missed 5 cases of fibroid/polyp, and moreover, it could not able to differentiate between fibroid, endometrial polyp, and even intrauterine adhesions. The sensitivity, specificity, positive predictive and negative predictive value of HSG in evaluating uterine cavity abnormalities were 56.5%, 96.1%, 92.8%, 71.5% respectively. Disadvantages of HSG were exposure to ionizing radiation, use of iodinated contrast material.

CONCLUSION:-

This study concludes that Transvaginal ultrasound was found to be a simple, noninvasive screening modality for uterine factors for infertility. TVS should be the first diagnostic method for evaluating every infertile couple for evaluation of the uterine cavity.

HSG was found to be a simple, safe, and minimally invasive radiologic procedure to visualize the uterine cavity, HSG can detect uterine abnormalities, but findings have to be confirmed by hysteroscopy or other modality. Hysteroscopy should be performed in all infertile women with abnormal HSG and those who fail to conceive after normal HSG findings. Hysteroscopy has the obvious advantage of avoiding ionizing radiation and iodine-containing contrast material, as well as having a lower false-positive rate than a hysterosalpingogram. Hysteroscopy can be recommended the gold standard for evaluating the uterine cavity, and due to improved endoscopic developments, it can be performed reliably and safely as an office procedure. A direct view of the uterine cavity offers a significant advantage over other blind or indirect diagnostic methods. The ability of hysteroscopy to reliably detect and potentially treat intrauterine pathologies such as intrauterine adhesions, endometrial polyp, submucous fibroid, or uterine malformations that could interfere with implantation and growth of conceptus.Patient tolerance, safety and feasibility of simultaneous operative correction make hysteroscopy an ideal and gold standard procedure.

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