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Hysterosalpingographic Pattern of Primary Sub-fertility and Secondary Sub-fertility in Women of Reproductive Age

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ABSTRACT

Objective: To evaluate the structural abnormalities of uterus and fallopian tubes in women diagnosed with primary and Secondary Sub-fertility using hysterosalpingogram.
Study Design: Cross-sectional study.
Place and Duration of Study: Armed Forces Institute of Radiology and Imaging, Rawalpindi Pakistan, from Jul to Nov 2019.
Methodology: This study investigated potential anatomical causes of primary and secondary subfertility in women of reproductive age. A total of 500 participants, referred from Gynecology and Obstetrics Departments, underwent hysterosalpingography during the pre-proliferative phase following comprehensive medical history assessment.
Results: Out 500 women, 340(68.0%) had Primary Sub-fertility while 160(32%) had Secondary Sub-fertility. Mean age of presentation was 31.5±3.5 years. Bilateral free peritoneal spill was recorded in 340(68%) patients. Unilateral tubal blockage was present in 50(10%) patients while bilateral tubal blockage was observed in 40(8.0%) patients. Bilateral hydrosalpinx was present in 15(3 %) women. Patients with uterine congenital anomalies were also examined, and bicornuate uterus was seen in 25(5%) women and unicornuate uterus was noted in the same number, that is, 25(5%) women.
Conclusion: Hysterosalpingography is a baseline assessment test done for evaluation of patency of uterus and uterine tubes. Positive hysterosalpingography cases were more prevalent in Secondary Sub-fertility. Tubal abnormalities were more commonly observed as compared to uterine cavity pathologies. Secondary Sub-fertility was found to be more associated with older age groups.

Keywords: Hysterosalpingography, Laparoscopy, Pelvic Inflammatory Disease, Sub-Fertility, Tubal Blockage.

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INTRODUCTION

The World Health Organization (WHO) estimates that 48.5 million couples worldwide are unable to have children, with 1.9% of women aged 20 years, failing to have their first live birth (Primary Sub-fertility), and 10.5% of women who had previously given birth, were unable to conceive another child (Secondary Sub-fertility).[1] Primary Sub-fertility refers to delay in conception in a couple with no previous pregnancies, while Secondary Sub-fertility refers to delay in conception in a couple who have conceived previously, even if the pregnancy did not have a successful outcome.[2] Sub-fertility is a major medical concern for considerable number of young women in Pakistan, where the 22% of young women of reproductive age suffer from this condition.[3,4] The main causes of sub-fertility are sexually transmitted diseases, tuberculosis, and uterine abnormalities along with stress, male-sub-fertility, and unexplained idiopathic infertility or sub-fertility. Increasing prevalence of hypothyroidism, diabetes, autoimmune disease, hypertension, obesity, and addictions to various drugs in the young individuals has also shown to contribute to the problem. As sub-fertility is a multi-factorial disease, it needs to be investigated in our country, where tuberculosis is a leading cause of tubal blockage due to strictures. Moreover, fertility is not only a medical disorder it is also influenced by psychological and financial status of the couple.[5]

Though, there are many advanced and efficient methods of evaluating the uterine cavity and fallopian tubes in women presenting with Primary and Secondary Sub-fertility, hysterosalpingogram is still commonly used because it is cheap, readily available, and easy to interpret. It discloses the abnormalities in the cervix, uterus, and fallopian tubes at a lower cost and non-invasively, unlike laparoscopy, which is considered gold standard but is a more invasive procedure. However, hysterosalpingography is usually the first line of imaging evaluation, especially in developing countries such as ours.[5,6] The aim of this

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study was to investigate the anatomical abnormalities detected by hysterosalpingography as a cause of sub-fertility in women of reproductive age group being a curable cause of sub-fertility.

METHODOLOGY

The cross-sectional study was conducted at Radiology Department of Armed Forces Institute of Radiology and Imaging, Military Hospital, Rawalpindi Pakistan, from Jul to Nov 2019. Ethics Review Committee approval was taken before commencement of the study (IERB approval certificate no. 0020). Patients were enrolled after taking informed consent by non-probability sampling. Sample size was calculated by using OpenEpi software.[6]

Inclusion Criteria: Women, at 7-12th day of menstrual cycle, aged between 18 to 45 years, referred from Gynecology and Obstetrics Department for workup of infertility, were included.

Exclusion criteria: Patients who were pregnant or diagnosed with acute pelvic infection were not eligible. Additionally, women were also excluded if they had a known bleeding disorder, a history of allergic reaction or known endocrine abnormalities. The procedure was not performed during menstruation or active bleeding.

Data was recorded on a pre-designed proforma regarding previous pregnancy, years since marriage and any history of menstrual cycle irregularity. Risk factors for sub-fertility like fibroid, use of methods of contraception and previous Dilatation and Curettage (D&C), Lower Segment Caesarian Surgery (LSCS) and ectopic pregnancy rupture were also asked. Antispasmodics was given before Hysterosalpingography was performed. A plain frontal film of pelvis was taken. Films were assessed by consultant radiologist. In case of non-visualization of the peritoneal spill or abnormal endometrial contour, suspicion of anatomical cause of sub-fertility was given. Patient with positive HSG report were asked to report back regarding their further workup.

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25.0. Quantitative variables with normal distribution were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages.

RESULTS

Data from 500 women between 18 to 45 years of age group was analyzed, with a mean age of 31.5±3.5 years, out of which 340(68%) suffered from Primary Sub-fertility and 160(32%) had Secondary Sub-fertility. 144(28.8%) women suffered from sub-fertility in 20 to 29 years age group and 100(20.0%) had sub-fertility between 30 to 39 years age group. Hysterosalpingographic findings are shown in Figure-1.

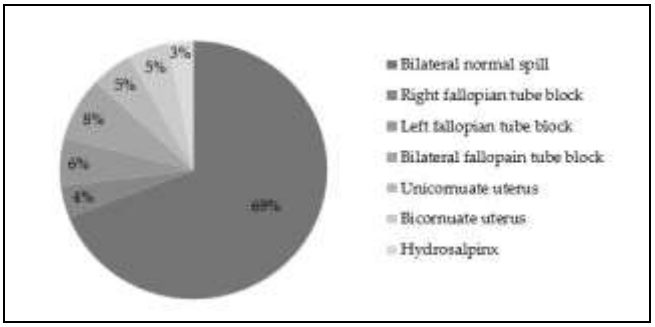

Figure-1: Hysterosalpingographic Findings of the Study Partcipants (n=500)

As shown in Table-I, fallopian tube blockage was consistent with previous history of surgery or Intra Uterine Contraceptive Device (IUCD) placement in about 28 cases (70%), raising suspicion of Pelvic Inflammatory Disease as a possible cause of stricture or blockage. Out of 500 cases, 20 were confirmed on laparoscopic examination as blocked fallopian tubes and tubal patency was restored by tubal surgery while remaining patient data was not collected due to loss to follow up. History of surgery was asked from patients, and it was noted that increase incidence of tubal blockage was associated with previous surgeries as shown in Table-I.

Table-I: History of Surgery with Hysterosalpingography Findings (n=500)

Hysterosalpingography Findings	Dilatation and curettage	Lower segment cesarian section	Myomectomy	Tubal surgery	No history of surgery	Total
Bilateral normal spill	13(2.6%)	19(3.8%)	3(0.6%)	-	310(62%)	345(69%)
Right tubal blockage	-	1(0.2%)	2(0.4%)	5(1%)	22(4.4)	30(6%)
Left tubal blockage	4(0.8%)	-	-	-	16(3.2%)	20(4%)
Bilateral block tubes	1(0.2%)	10(2%)	6(1.2%)	-	23(4.6%)	40(8%)
Unicornate uterus	-	-	4(0.8%)	-	21(4.2%)	25(5%)
Bicornuate uterus	-	-	-	-	25(5%)	25(5%)
Hydrosalpinx	-	-	-	-	15(3%)	15(3%)
Total	18(3.6%)	30(6%)	15(3%)	5(1%)	432(86.4%)	500

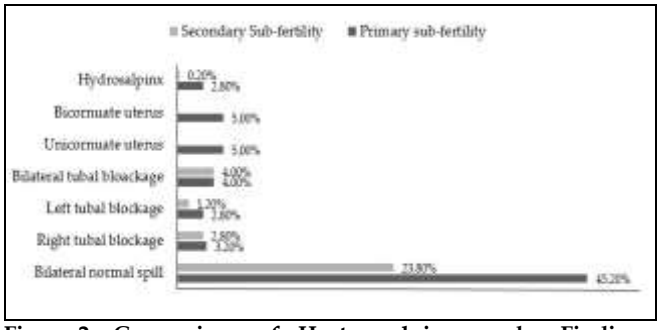

Figure-2: Comparison of Hysterosalpingography Findings with Primary and Secondary Sub-fertility (n=500)

In Figure-2, comparison of hysterosalpingography findings with primary and Secondary Sub-fertility is shown.

our surroundings got married between the ages of 24 and 30 years. If conception is not accomplished after marriage, there is delay at presenting for medical evaluation.[7,8] Our study confirms Primary Sub-fertility being more common than Secondary Sub-fertility (68.0% vs. 32%) as a similar pattern was also seen in a study conducted in India, however another study was conducted in Pakistan showed more prevalence of Secondary Sub-fertility then Primary Sub-fertility.[3,4] Secondary Sub-fertility has also been found to be more prevalent than Primary Sub-fertility in other studies done in Pakistan.[9,10] Male sub-fertility workup is often not done due to various social reasons including sub-fertility being considered as a female problem. This has also been noted in currently available literature.[11]

Table-II: History of use of Contraceptive Method with Hysterosalpingography Findings (n=500)

Comparison between History of any Contraception used with Blocked Fallopian Tubes								Total
History	**Bilateral normal spill**	**Right tubal block**	**Left tubal block.**	**Bilateral tubal block**	**Bi cornuate uterus**	**Unicornuate uterus**	**Hydrosalpinx**	
Intrauterine contraceptive device	1(0.2%)	-	-	10(2%)	-	9(1.8%)	-	20(4%)
Oral contraceptive pills	14(2.8%)	-	-	1(0.2%)	-	-	-	15(3%)
No contraception used	330(66%)	30(6%)	20(4%)	29(5.8%)	25(5%)	16(3.2%)	15(3%)	465(93%)
Total	345(69%)	30(6%)	20(0.2%)	29(5.8%)	25(5%)	25(5%)	15(3%)	500

There was predominance of normal study in all the three major age groups. The leading anatomical cause of Primary Sub-fertility in age group between 30 to 39 years was right tubal blockage (16, 3.2%) while in age group 40 to 49 years, the leading anatomical cause was bilateral tubal blockage (20, 4%). Table-II shows that 465 women (93%) had not used any contraceptive method, 35(7%) had used OCPs, 15(3%) or IUCD 20(4%) as contraception in the past. 10(50%) out of the 20 women with history of use of IUCD had bilateral tubal blockage.

DISCUSSION

Hysterosalpingography is a baseline assessment test done for evaluation of patency of uterus and uterine tubes. Positive hysterosalpingography cases were more prevalent in Secondary Sub-fertility. Tubal abnormalities were more commonly observed as compared to uterine cavity pathologies. Secondary Sub-fertility was found to be more associated with older age groups. The mean age of presentation in our study was 31.5±3.5 years SD years and is higher than a previously reported.[3] This is not shocking because this is the peak of the female reproduction stage. Similar mean age was observed in another study where ages ranged from 17 to 48 years mean 32.5±5.5 years SD.[6] Due to increased female education, most females in

Chlamydia and Tuberculosis screening in first year of sub-fertility has been recommended, due to their high prevalence even in asymptomatic patients.[10]

Tubal abnormality (blockage unilateral/ bilateral) was found to be the most common cause of sub-fertility in our study, similar to other studies which showed tubal blockage as a major cause of sub-fertility.[3,12] Tubal pathologies have been noted to be the major cause of sub-fertility in previous studies conducted in Pakistan.[4,13] Differentiation of spasm from tubal blockage is an important factor to be considered where a smooth margin versus irregular is a useful indicator to differentiate tubal spasm from tubal blockage.[14] However, antispasmodics were used to prevent spasm in our study. Increased incidence of hydrosalpinx on right side was observed in literature and showed its association with appendicitis.[15] Uterine synechiae was found as the most common acquired uterine abnormality due to previous history of pelvic surgery and pelvic inflammatory disease by other researchers,[16] again suggesting lack of care during previous uterine surgeries and uterine manipulation[17] but we did not observe this during our study. Congenital anomalies seen in our study were higher than reported by other authors.[4] Arcuate uterus being a normal variant was not considered in our study, similar to a previous study.[18]

LIMITATION OF STUDY

Our study was limited due to lack of history of menstrual cycle abnormities and absence of results of semen analysis being normal or abnormal. A broader study that includes male partner investigation is needed for more accurate correlation of these factors with imaging findings. Loss of patient follow up in terms of laparoscopy, as data for only 20 cases was available, due to social, economic, and personal reasons.

CONCLUSION

Hysterosalpingography is baseline diagnostic tool for assessment of uterine cavity and fallopian tubes. Tubal abnormalities were more numerous as compared to pathologies of the uterine cavity with increase associated with previous history of surgery and use of IUCD as a contraception method.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

AK & RK: Data acquisition, data analysis, critical review, approval of the final version to be published.

TSS & AUR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

RA & YK: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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