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Original Article

Can hysterolaparoscopic mediated chromopertubation obviate the need for hysterosalpingography for proximal tubal blockage?: An experience at a single tertiary care center

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ABSTRACT

Objectives. – To compare the diagnostic performance for tubal patency by chromopertubation and hysterosalpingography in the female infertile patients.
Methods. – We prospectively evaluated 103 female patients (age range 19–35 years; mean age 27.60 years) diagnosed as infertile, underwent hysterosalpingography (HSG) for tubal patency and uterine pathology during initial diagnostic work-up. All the enlisted patients fulfilled the criteria of infertility and these also underwent hysterolaparoscopic chromopertubation (CPT). The results of HSG were compared with the reference standard using CPT.
Results. – Out of 103 female infertile patients, 60 (58.2%) were of primary and rest of them 43 (41.8%) secondary infertile patients. HSG showed abnormalities in tubal patency in 69/103 (~67%) patients. The detected abnormalities were distributed in 40/60 (66.6%) primary and 29/43 (67.4%) secondary infertile patients. On comparison to HSG with CPT (reference standard) for tubal blockage detection, it was found that HSG was true positive (TP) in 38 patients, true negative in 34 patients, false positive in 31 patients and FN in 0 patients. We found that for detection of tubal blockage, the sensitivity, specificity, PPV, NPV and accuracy of HSG was 100.00%, 52.31%, 36.89%, 57.07% and 67% respectively. Tubal occlusion detected on HSG and CPT showed a moderate agreement (weighted kappa – 0.447; 95% CI −0.312 to 0.583). In present study, no patient shows tubal blockage in CPT while HSG was normal.
Conclusion. – We concluded that hysterolaparoscopic mediated chromopertubation not only diagnostic but also therapeutic, so it can obviate the need of hysterosalpingography.

Introduction

Infertility is a medical condition with important psychological, economical, demographic, and medical implications [1,2]. This is one of the major problems of human reproduction that haunts not only the affected couple but also this whole society. This condition affects the couple, family, society rather than a single individual [3]. Infertility also affects the healthcare services and social environment. The common causes of female infertility are ovulation dysfunction (21–25%) and tubal factors (14–20%) [4]. The commonest tubular cause is the tubal damage by pelvic inflammatory disease, which affects the tubal patency [5]. The hysterosalpingography is an older modality for detection of tubal patency. This modality is performed in the initial workup of the female infertile patients. HSG is a relatively cheap and outpatient procedure but there is presence of the radiation exposure to the female in this procedure. In comparison hysterolaparoscopy is a relatively latest modality that provides the better real time abdomino-pelvic view in infertile female patients [6,7]. When we compare these two procedures, while hysterolaparoscopy is the relatively costlier and invasive procedure [8]. There is no radiation exposure in the hysterolaparoscopy [6]. Additionally hysterolaparoscopy not only detects the abdomino-pelvic pathologies but treat them at the same time also [9,10].

So aim of present study was to compare the diagnostic performance of hysterosalpingography with chromopertubation in infertile female patients for detection of tubal patency.

Material and methods

The present study was prospective experimental study and carried out between March 2016 and May 2017 at the Department of Obstetrics and Gynaecology at Santokba Durlabhji Memorial Hospital, Jaipur (Tertiary Care Centre).

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Inclusion criteria

- Infertile female patients with age 19–35 years
- Regular menstrual cycle
- Normal seminogram
- Investigations
  Hemoglobin, complete blood count (CBC), erythrocyte sedimentation rate (ESR), random blood sugar – within normal limit
  Ovulatory function, husband semen analysis, hormonal profile (TSH/FSH/LH/Prolactin) and APLA (anti phosphor lipid antibody) levels (if available and only in secondary infertility) – within normal limit

Exclusion criteria

- Age <19 year; >35 year
- Abnormal husband semen analysis
- Abnormal hormonal profile
- Active genitourinary infection
- Any treatment, chronic illness and MPA (Medroxy progesterone acetate) contraception that imparts a negative effect on fertility.

Infertile female patients, age between 19 and 33 years were registered to participate in the study after taking the informed written consent. After detailed history and clinical examination (general, systemic & gynecological examination), routine investigations were performed. HSG were performed with help of iodinated contrast in all enlisted patients. After considering the exclusion criteria and contraindications of the operative procedure, hysteroscopy and laparoscopy were concurrently performed at Santokba Durlabhji Memorial Hospital (SDMH), Jaipur, Rajasthan. Chromopertubation (CPT) was performed in all cases in following manner. Under all aseptic precaution, a 5 mm laparoscope is inserted through umbilicus or palmer's point (in some patients). After visualizing the abdominopelvic cavity and internal reproductive organ, methylene blue dye was instilled transcervically through Leech Wilkins cannula. Simultaneously flow of dye through the fimbrial end was visualized by laparoscope. Approval of the institutional ethical committee was obtained for this prospective study. In view of the prospective study design, written informed consent was obtained from the patients.

Statistical analysis

All enlisted patients were divided into two subgroups, primary and secondary infertility groups. The continuous variables were summarized as mean & standard deviation, whereas nominal/categorical variables were summarized as proportion. Parametric tests [Student *t* test] were used for analysis of continuous variables while Chi-square was used for nominal/categorical variables. In present study, we also measured the agreement between two modalities (CPT and HSG) by using the kappa statistic (or kappa coefficient). '*p*' value <0.05 was considered as significant. IBM-SPSS version 22.0 software was used for all statistical analysis

Results

103 female patients with the complaint of infertility were included in the present study. The mean age of patients was 27.6 years (range of 19–35 years). All enlisted patients fulfilled the inclusion criteria of the present study. On the basis of obstetric history, patients were divided between primary and secondary infertile patients. Of 103 female infertile patients, of them 60 (58.2%) were primary and remaining 43 (41.8%) patients were secondary infertile patients. The characteristics of all patients are shown in Table 1.

Table 1
Characteristics of the infertile patients (age).

Infertility (no. of patients)		103
Age (years)	Mean ± standard deviation	27.60 ± 3.57
	Range	19–35
Primary infertility (no. of patients)		60/103 (58.2%)
Age (years)	Mean ± standard deviation	26.59 ± 3.14
	Range	19–34
Secondary infertility (no. of patients)		43/103(41.8%)
Age (years)	Mean ± standard deviation	29.04 ± 3.57
	Range	23–35

Hysterosalpingography findings

After the initial evaluation, all patients underwent hysterosalpingography (HSG). Out of 103 patients, HSG showed abnormalities in tubal patency in 69/103 (66.9%) patients. The detected abnormalities were distributed in 40/60 (66.7%) primary and 29/43 (67.4%) secondary infertile patients. There was no statistically significant difference between primary and secondary infertile patients for the tubal patency in HSG as summarized in Table 2.

Hysterolaparoscopic findings

All enlisted 103 patients were underwent CPT examination during hysterolaparoscopy. CPT showed abnormalities in tubal patency in 38/103 (36.8%) patients. The detected CPT abnormalities were distributed in 23/60 (38.3%) primary and 15/43 (34.9%) secondary infertile patients. There was no statistically significant difference between primary and secondary infertile patients for detection of tubal patency during CPT examination as summarized in Table 3.

In CPT, 31 patients with abnormal HSG findings had not shown any tubal blockage. Out of these 31 patients, 18 showed bilateral tubal blockages in the HSG and remaining 13 patients with unilateral tubal blockage in HSG (Fig. 1).

In comparison to HSG with CPT (reference standard) for tubal blockage detection, it was found that HSG was true positive (TP) in

Table 2
Summary of the HSG findings in female infertile patients.

Infertility	Abnormal HSG findings (patient's number)	Unilateral blockage (patient's number)	Bilateral blockage (patient's number)
Combined	69/103 (66.9%)	25/103 (24.3%)	44/103 (42.6%)
Primary	40/60 (66.7%)	12/60 (20.0%)	28/60 (46.7%)
Secondary	29/43 (67.4%)	13/43 (30.2%)	16/43 (37.2%)
p value	~0.940	~0.244	~0.364

Table 3
Summary of the CPT findings from hysterolaparoscopic examination.

Infertility	Abnormal CPT findings (patient's number)	Unilateral blockage (patient's number)	Bilateral blockage (patient's number)
Combined	38/103 (36.8%)	19/103 (18.4%)	19/103 (18.4%)
Primary	23/60 (38.3%)	11/60 (18.3%)	12/60 (20.0%)
Secondary	15/43 (34.9%)	8/43 (18.6%)	7/43 (16.3%)
p value	~0.678	~1.00	~0.606

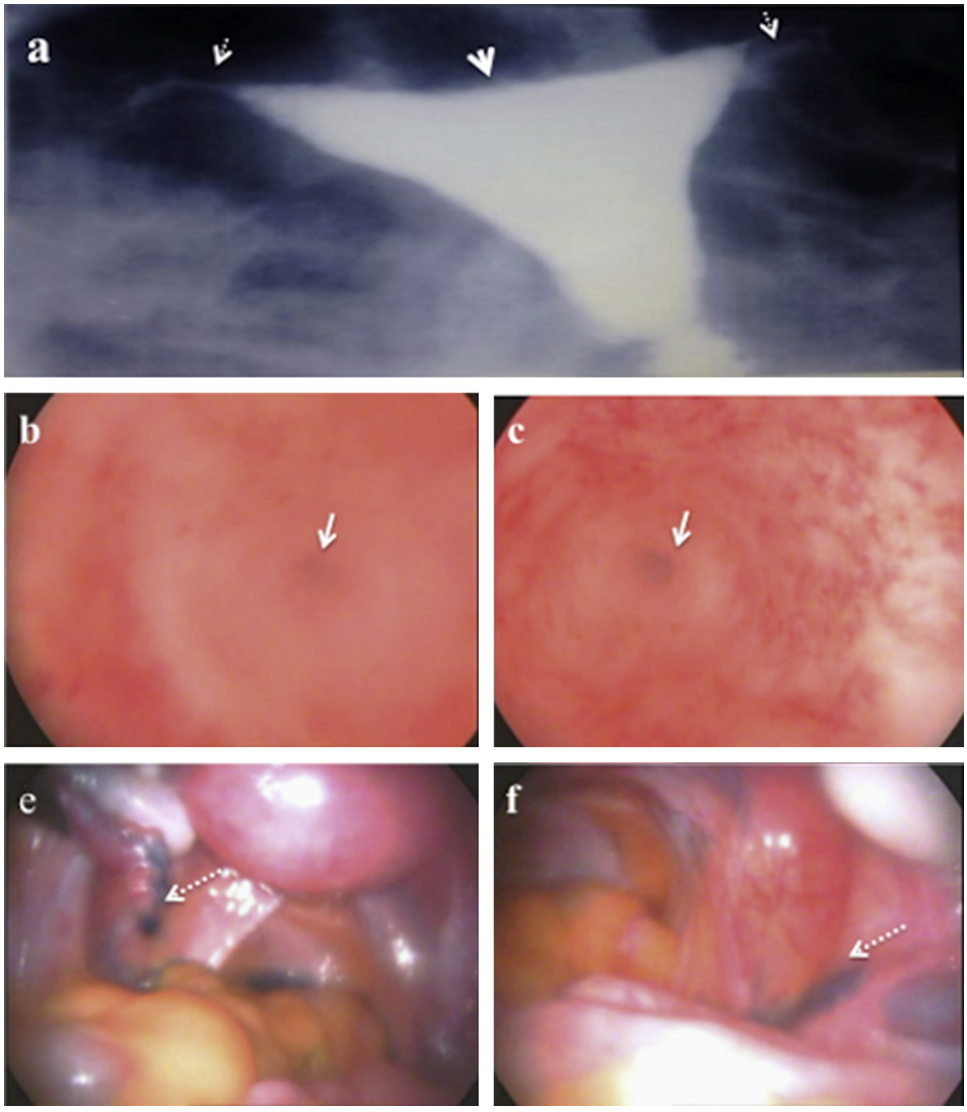

Fig. 1. A 26-year-old primary infertility female underwent for infertility work up. She has complained of inability to conceive since three years. She has a past history of the successfully treated pulmonary tuberculosis. The husband seminogram was within normal limits. (a) She underwent for hysterosalpingography, which shows normal uterine cavity (arrow) and absent of the bilateral spillage of the contrast agent (dashed arrow). (b–e) During hysterolaparoscopy, we performed the chromo-perturbation (CPT) and found patency of bilateral ostea (arrows b and c) and bilateral spillage of blue dye in the pelvis (dashed arrows d and e). There was the discordance between the HSG and hysterolaparoscopy.

38 patients, true negative in 34 patients, false positive in 31 patients and FN in 0 patients. We found that for detection of tubal blockage, the sensitivity, specificity, PPV, NPV and accuracy of HSG was 100.00%, 52.31%, 36.89%, 57.07% and 67% respectively.

Proximal tubal occlusion detected on HSG and CPT showed a moderate agreement (weighted kappa – 0.447; 95% CI −0.312 to 0.583). Also when analyzed independently tubal occlusion detection on HSG and CPT, it showed moderate agreement for primary infertile patients (weighted kappa – 0.474; 95% CI −0.294 to 0.654) and secondary infertile patients (weighted kappa – 0.411; 95% CI −0.206 to 0.616). In present study, no patient showed proximal tubal blockage in CPT when HSG was normal.

In addition to this we also detected additional ovarian, uterine, peritoneal and pouch of Douglas abnormalities during hysterolaparoscopy examination. Pathology such as adhesions, ovarian cyst, fimbrial agglutination, uterine white patches (Fig. 2) and endometriosis were dealt with hysterolaparoscopy in 52.5% patients.

Discussion

Hysterolaparoscopy is used for both diagnostic and therapeutic purpose in various abdominopelvic pathologies including the tubal pathologies. In the present study, we assessed the role of hysterolaparoscopy in detection of tubal patency in the female infertile patients. We also compared the HSG with hysterolaparoscopy as the reference standard.

We found that for detection of tubal blockage, the sensitivity, specificity, PPV, NPV and accuracy of HSG was 100.00%, 52.31%, 36.89%, 57.07% and 67% respectively. Tubal occlusion detected on HSG and CPT showed a moderate agreement (weighted kappa – 0.447; 95% CI −0.312 to 0.583). Vaid et al. also compared the tubal patency on HSG and laparoscopy; the sensitivity of HSG in detecting bilateral tubal block was 80.6% and specificity of 81.5%. They found the agreement between two modalities was 74% [11]. The cause of lower agreement between these two modalities in present study may be due to resolution of loose adhesions

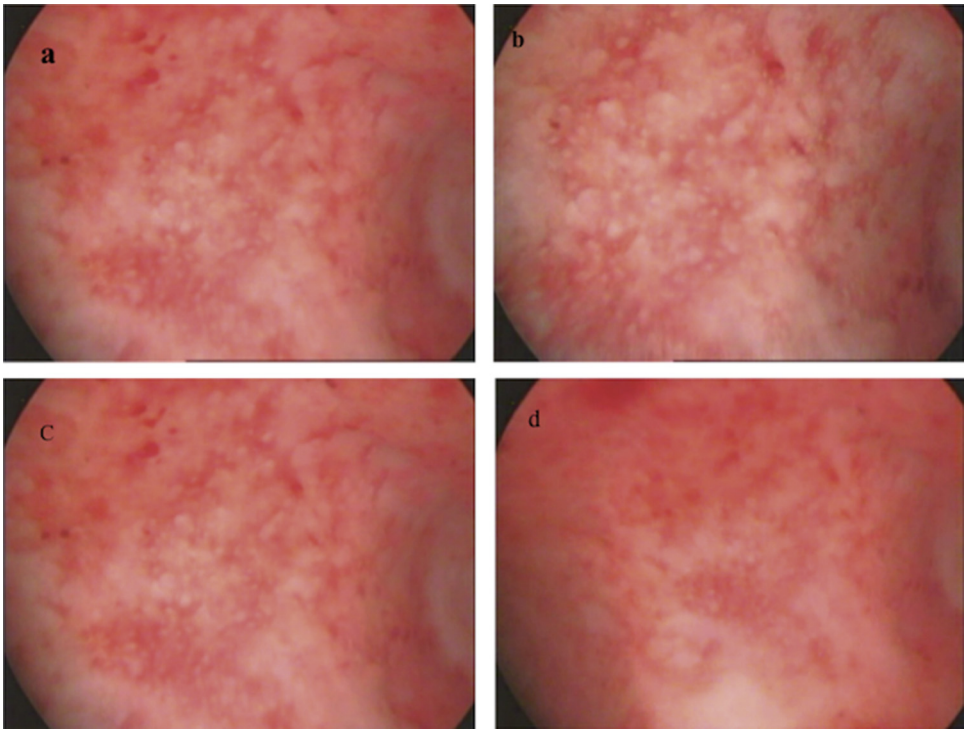

Fig. 2. (a–d) Additionally, the multiple white patches are detected in the endometrial surface of the uterus during the hysteroscopy. We performed the endometrial sampling and histopathological evaluation revealed tubercular endometritis. Patient was treated with six months ATT and in follow-up patient was conceived after 8 months of the hysterolaparoscopy.

during CPT. The other reason may be, the radiocontrast used in the HSG examination is not a physiological solution, hence behavior of the female genital system is not harmonious (causes tubal spasm) for this HSG test [12,13].

Tognil et al. found the probability of tubal occlusion on hysterolaparoscopy was very low while HSG was normal [14] Similar results were found in present study that no patient showed tubal blockage in CPT when HSG was normal.

In present study we did not include the findings of the uterine cavity since endoscopic methods (hystero-laparoscopy) provide the real time external as well as internal views of the uterus while HSG dominantly deliver the details of the uterine cavity therefore endoscopic methods obviously would be better for the uterine details [13,15–19].

The major limitation of present study was that we did not interpret our results in form of pregnancy outcome. The other limitation is, this was a single center study so inter-operator variability can lead to discrepancy in outcomes.

Conclusion

We concluded that hysterolaparoscopic mediated detection of tubal blockage obviates the requirement of HSG. Hysterolaparoscopy additionally provide the details of other abdomino-pelvic pathologies and help to treat them at the same time therefore hysterolaparoscopy should be recommended in the initiating phases of the work-up in female infertile patients.

Conflict of interest

None.

Ethical statement

This research included the Human Participants after taking the written informed consent.

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