Evaluation of place of early diagnostic laparoscopy and hysteroscopy in female infertility - right approach at right time for improved outcome

Authors

1) **Shuchi Agrawal, Associate Professor, Department of Obstetrics & Gynaecology, King George Medical University, Lucknow, UP, India.**
2) **Prof Urmila Singh, Professor, Department of Obstetrics & Gynaecology, King George Medical University, Lucknow, UP, India.**
3) **Amrita Shankar, Senior Resident, Department of Obstetrics & Gynaecology, King George Medical University, Lucknow, UP, India.**

Corresponding Author : Dr. Shuchi Agrawal, Associate Professor, Department of Obstetrics & Gynaecology, King George Medical University, Lucknow, UP, India; Email : obgexpert@gmail.com

Manuscript submitted – 19th November 2021
Peer review completed – 28th March 2022
Accepted for Epub – 10th April 2023

Abstract:

Aim: To assess impact of early diagnostic laparoscopy and hysteroscopy in cases of primary and secondary infertility on fertility outcome. **Methodology**: This was a prospective study conducted in the Department of Obstetrics & Gynaecology at KGMU, 175 cases of primary and secondary infertility evaluated by hysteroscopy and laparoscopy, from January 2018 to December 2018 were enrolled. Thorough history and examination was done. Any positive findings per laparoscopy and hysteroscopy and any therapeutic intervention done noted. **Results:** Out of the total 175 cases of infertility 110 (62.8%) were of primary infertility, 65 (37.14%) were of secondary infertility. Majority patients of primary infertility were of age 25-30 years and secondary infertility were of age 30-35 years. In primary infertility group abnormal findings during laparoscopy seen in 71 cases out of 110 cases whereas 9 had abnormal findings per hysteroscopy. In secondary infertility group out of 65 patients 29 patients had abnormal findings per laparoscopy and 15 patients had abnormal hysteroscopic findings. Ovarian drilling done in 4 cases of primary infertility others required cystectomy, adhesiolysis, tubal clipping for hydrosalpinx. In secondary infertility group 5 had ovarian cystectomy and 4 underwent adhesiolysis whereas only one case required ovarian drilling. Hysteroscopic procedures done in cases of primary infertility, polypectomy in 6 cases followed by septal resection, adhesiolysis and tubal cannulation whereas in secondary infertility majority required adhesiolysis followed by other procedures. Post laparoscopy and hysteroscopy 87 patients given ovulation induction with IUI, 80 cases were explained for timed intercourse and 8 patients were taken up for IVF. Follow-up of these cases in first six months showed 4 cases of primary infertility had spontaneous conception, 2 conceived on IUI whereas in cases with secondary infertility 5 cases conceived on ovulation induction and IUI. **Conclusion:** Laparoscopy and hysteroscopy integrated together are beneficial technique for complete evaluation of female factors of infertility patient and should be used initial work up in cases of infertility without delay.

Keywords: Female infertility, diagnostic laparoscopy, hysteroscopy.

Infertility is a growing concern; 10-15% of married population in India are infertile. Identifying the cause of infertility is difficult, 20-30% of couples will have no clearly discernible cause [1,2]. Laparoscopy is important to find out the presence of peritubal adhesions, endometriosis thus aids in planning treatment of long-term infertility. Laparoscopy and hysteroscopy provides a better opportunity to assess pelvic pathology which cannot be assessed well by any other modality. The additional advantage of laparoscopy and hysteroscopy is curative procedures can be done in the same sitting.[3,4]

Agrawal S, Singh U, Shankar A. Evaluation of place of early diagnostic laparoscopy and hysteroscopy in female infertility - right approach at right time for improved outcome. The New Indian Journal of OBGYN. 10th April 2023. Epub Ahead of Print.

Often in routine practice it is seen that female undergoes a variety and battery of test. Majority of such women are referred after being exhaustively investigated and treated by gynaecologist not trained in infertility, with no facility or expertise to do IUI, laparoscopy, hysteroscopy. Patients often undergo multiple cycle of ovulation induction without any positive outcome, this negatively and adversely affect the ovarian reserve of the patient and tests the patience of the patient due to unnecessary expenses and increases the future risk of malignancy and laparoscopy and hysteroscopy come much later in the battery of the tests. So the present study was doneto study the impact of early laparoscopy and hysteroscopy so as to optimize the outcome.

Aim of the study -

1. To assess impact of early diagnostic laparoscopy and hysteroscopy in cases of primary and secondary infertility on fertility outcome.
2. To evaluate varied causes of female infertility with diagnostic laparoscopy and compare its frequency in primary and secondary infertility.

Methodology

The present study was a prospective study done in the Department of Obstetrics and Gynaecology at KGMU, 175 cases of primary and secondary infertility were enrolled over a period of one year from January 2018 to December 2018. Thorough history and examination was done. Duration of infertility, any prior HSG done, h/o prior infertility treatment were noted. Premenstrual endometrial biopsy, hormonal study, husband's semen analysis, USG was done in every case. Any positive findings present per laparoscopy and hysteroscopy and any therapeutic intervention done noted. Data collected on preformed proforma and analysed. Statistical analysis was done using SPSS software version 20. The results were expressed as mean ± SD and percentages.

Procedure: Patient laid down in lithotomy position, anterior lip of the cervix after painting and draping held with vulsellum and uterine length and direction assessed by uterine sound, hysteroscope introduced, fundus, ostia, uterine walls and cervical canal evaluated. For laparoscopy infraumbilical incision given, veress needle inserted, pneumoperitoneum created and 10 mm trocar with cannula and telescope inserted. Pelvic organs visualised, any pathology detected was noted down. Accessory port made for therapeutic interventions as and when required. Tubal patency test done with the help of methylene blue.

Results

Out of the total 175 cases of infertility 110 (62.8%) were of primary infertility and rest 65 (37.14%) belongs to secondary infertility. Maximum number of patients of primary infertility belonged to the age group of 25-30 years and in secondary infertility maximum belonged to 30-35 years of age group. Average age of patients of primary infertility was 25.4 years and that of secondary infertility 29.3 years. The average duration of infertility was 44 months in primary infertility and 63 months in secondary infertility group.

Abnormal findings during laparoscopy were noted in 71 cases out of 110 cases of primary infertility whereas 9 had abnormal findings per hysteroscopy. Similarly out of 65 cases of secondary infertility 29 patients had abnormal findings per laparoscopy and 15 patients had abnormal hysteroscopic findings. In patients of primary infertility polycystic ovaries was found in 20 cases (18.8%), 9 (8.1%) cases had fibroid, 9(8.1%) had peritubal adhesions, 8(7.2%) had endometriotic deposits, 4(3.63%) had ovarian cyst. Second most common pathology was bilateral tubal blockage in 14 patients (12.7%) whereas unilateral blockage was found in 7(6.3%). Similarly in the group of secondary infertility 8(7.2%) had ovarian cyst whereas bilateral blockage found in 7(6.36%) and unilateral tubal blockage in 7(6.3%) of patients (table 1).

On evaluating hysteroscopic findings amongst primary infertility 6 cases had endometrial polyp, 4 had septum and 4 had endometritis and 1 case had submucosal fibroid. Amongst secondary infertility endometrial polyp seen in 3 patients, 2 patients had septum, 4 had features of endometritis, 4 had ashermans, scarred endometrial cavity seen in 5, cervical stenosis was present in 3 cases and endometrial polyp was present in 3 cases (table 2).

Table 1: Laparoscopic findings in the study population		
Pathology	**Primary infertility**	**Secondary infertility**
PCOD	20(18.18%)	0
Endometriotic deposit	8(7.27%)	0
Ovarian cyst	4(3.63%)	8(7.27%)
Fibroid	9(8.18%)	5(7.69%)
Peritubal adhesion	9(8.18%)	4 (3.63%)
Periovarian adhesion	0	0
Unilateral tubal blockage	7(6.36%)	7 (6.36%)
Bilateral tubal blockage	14(12.72%)	7(6.36%)
Hydrosalpinx	1(.9%)	2(3.07%)
Bicornuate uterus	0	2(3.07%)
Septate uterus	0	1(1.53%)
Tubercles	0	2(3.07%)

Table 2: Hysteroscopic findings in the study population		
Hysteroscopic finding	**Primary infertility**	**Secondary infertility**
Normal	86	41
Endometrial polyp	6	3
Submucosal fibroid	1	0
Septum	4	2
Ashermans	2	4
Scarred cavity	1	5
Cervical stenosis	2	3
Endometritis	4	4

We did ovarian drilling in 4 cases of primary infertility with polycystic ovaries as these cases were not responding to clomiphene. Others required cystectomy, adhesiolysis, tubal clipping for hydrosalpinx. In secondary infertility group 5 had ovarian cystectomy and 4 underwent adhesiolysis whereas only one case required ovarian drilling (table 3).

Table 3: Therapeutic interventions done during laparoscopy		
Procedure done	**Primary infertility**	**Secondary infertility**
Ovarian drilling	4	1
Ovarian cystectomy	3	5
Adhesiolysis	3	4
Tubal cannulation	2	3
Hydrotubation	3	2
Tubal Clipping	1	0

Hysteroscopic procedures done in the group of primary infertility were polypectomy in 6 cases followed by septal resection, adhesiolysis and tubal cannulation whereas in the cases with secondary infertility majority required adhesiolysis followed by other procedures (table 4).

Table 4: Hysteroscopic procedures done in the study population		
Hysteroscopic procedure	**Primary infertility**	**Secondary infertility**
Septum resection	4	2
Adhesiolysis	2	4
Polypectomy	6	3
Hysteroscopic myomectomy	1	0
Hysteroscopic tubal cannulation	2	3

Post laparoscopy and hysteroscopy 87 subjects were given ovulation induction with IUI, 80 cases were explained for timed intercourse and 8 patients were taken up for IVF. Follow-up of these cases in first six months showed 4 cases Post laparoscopy and hysteroscopy 87 subjects were given ovulation induction with IUI, 80 cases were explained for timed intercourse and 8 patients were taken up for IVF. Follow-up of these cases in first six months showed 4 cases of primary infertility had spontaneous conception, 2 conceived on IUI whereas in cases with secondary infertility 5 cases conceived on ovulation induction and IUI. Due to unprecedented Covid pandemic in 2020 and 2021 infertility services were disrupted and many patients were lost to follow up.

Discussion

Diagnostic laparoscopy is the well accepted technique to diagnose especially the tubal factors, peritoneal causes as endometriosis and adhesions in cases with unexplained causes of infertility. In our study abnormal findings during laparoscopy were noted in 64.5% cases of primary infertility whereas 8.1% had abnormal findings per hysteroscopy. Similarly 44% cases of secondary infertility had abnormal findings per laparoscopy and 23.07% had abnormal hysteroscopic findings. In our study laparoscopy revealed evidence of pelvic disease in 61.14% of patients in whom all other baseline infertility workup was within normal limits. Hence, laparoscopy is mandatory in patients to diagnose tubal or pelvic cause of infertility as endometriosis, pelvic &peri adnexal adhesions that are difficult to diagnose on routine test and imaging.

In our study, out of the total 175 cases of infertility 62.8% were of primary infertility, 37.14% were of secondary infertility which are similar to study by Boricha YG et al[5] who reported in their study primary infertility were 35 (70%) and secondary infertility were 15 (30%) of 50 patients .While in the study by Nayak PK[6] 69% cases were of primary and 31 % of secondary infertility.

World Health Organization (WHO) conducted a large multicentric study across the globe to look for causes of infertility. In the study it was found that in 37% of infertile couples, female infertility was the cause; in 35% of couples, both male and female causes were identified; in 8%, there was male factor infertility.[7] In cases of female infertility ovulatory disorders accounts for 25%, endometriosis seen in 15%, pelvic adhesions in 12%, tubal blockage reported in 11%, other tubal/uterine abnormalities in 11% and hyperprolactinemia seen in 7%.

It is seen with advancing age chances of infertility rises, woman has 12% of her ovarian reserve at age 30 and has only 3% at age 40.[8] 81% of decline in ovarian reserve is related to advancing age thus making age an important factor in female infertility. Infertility rates are reported from 7.3 to 9.1% in women 15 to 34 years of age, infertility rates rises to 25% women ages 35 to 39 years and in women 40 to 44 years there is further rise in rate of infertility to 30%.[9] In our study, average age of patients of primary infertility was found to be 25.4 years and that of secondary infertility 29.3 years which shows relatively younger age group the reason might be that women are more aware to seek medical consultation early or might be the effect of increasing environmental factors which have adverse effect on female infertility and ovarian reserve as environmental toxins, increasing pollution, disordered lifestyle and increasing stress. The results of our study are similar to study by Wallace WHB et al. [8]

PCOS contribute to 80 to 85% of all anovulatory patients and is found in 8% of all reproductive aged females.[10] In our study ovarian factors were present in 29.7 % of cases PCOD was found in 20 cases (18.8%), ovarian cyst seen in 4(3.63%) of primary infertility and 7.27% of cases of secondary infertility, our results are similar to the study by Talib W et al [11] (28%) and Aziz N et al[12](15.6 %).

Tubal and peritoneal pathology are found to be contributing factor in approximately 30 to 35% of cases of infertility.[13] Pelvic inflammatory disease (PID) infection of female genital organs that most often occurs through sexually transmitted organism and is leading cause of pelvic and tubal adhesions, tubal disease like hydrosalpinxwhich leads to female infertility. Weström L in their study reported that the pregnancy rates following PID were 89% after one episode, 77% after two episodes, and 46% after three episodes.[14] Lepine LA et al[15] in their study reported PID severity of mild, moderate, and severe, the live births rates were 90%, 82%, and 57% respectively.

Laparoscopy is an accepted gold standard technique to diagnose tubal and peritoneal pathology in couples where no cause could be found out for infertility.[16] Jayakrishnan et al[17] in their study found pelvic pathology in 26.8% cases of infertile patients by laparoscopy. In our study we found pelvic pathology 61.14%, endometriosis and adnexal adhesions were the two major abnormalities detected. Endometriosis affects 10% to 15% of reproductive age women[18] 40 to 50% of women with endometriosis will present with infertility[19]. In our study we found pelvic endometriosis in 7.27 %, pelvic adhesions in 11.81% which are comparable to study by Godinjak Z et al[20] (14%) and Parveen S et al[16](8%). In a similar study, Poncelet et al [21] found that laparoscopy revealed pelvic pathology in 95 out of 114 patients. Of those, 72 had endometriosis, 46 pelvic adhesions, and 24 tubal diseases. peritubal adhesions13 and endometriosis was found only in 8 cases. Lessey et al[22] also found a high prevalence of endometriosis in patients with unexplained infertility.

Tubal disease is an important factor for infertility and diagnostic laparoscopy is crucial for complete evaluation of female infertility and serves as invaluable aid to tailor treatment according to the cause identified.[23] In our study, we found bilateral tubal block in 21 (12%) and unilateral tubal block in 14 (8%). In this study, tubal factor were present in 20 % of the infertility. Tubal hydrosalpinx are sequala of acute and chronic inflammation. It has been postulated that hydrosalpinges hinders fertility through reflux of toxins and prostaglandins into the endometrium thus creating an unfavourable environment for implantation.[24] Studies have shown that patients undergoing in-vitro fertilization have a 50% decrease in pregnancy if a hydrosalpinx is present.[25] In our study, we found hydrosalpinx in one out of 110 cases of primary infertility and in two cases out of 65 in cases of secondary infertility.

In our study 68.8 % had normal hysteroscopy which are in concordance to the study by Shakya et al[26] (88%). Studies have reported that congenital uterine anomaly are seen in approximately 8% of the female causes of Infertility.[27] Septate uterus was the most common intrauterine abnormality found in the study by Homer HA et al[28]. It is often not diagnosed on ultrasound. Similarly in our study we found septate uterus in (3.42%) 4 cases of primary infertility and in 2 cases of secondary infertility. Nayak PK et al[29]reported septate uterus/ uterine anomaliesin 10%. In present times operative hysteroscopic procedures are relatively easy and brief day care procedure with minimal morbidity and quick recovery and good outcome. Hence, septal resection is recommended. Operative hysteroscopy has led to significant decrease in pregnancy loss for women both in cases with synechiae and septa.[30] In our study, septal resection was done in all the cases. Out of six cases of septal resection 2 conceived. Myomas and polyps are another major hysteroscopic abnormalities found in various studies. Asymptomatic polyps have been reported to cause infertility. The incidence of asymptomatic endometrial polyps in women with infertility range from 10% to 32%.[31,32] One study showed a polypectomy on asymptomatic infertile women before IUI increased pregnancy rates from 28% to 63%[33]. Study by Chan YY et al [34] who underwent hysteroscopy observed a 50% pregnancy rate after polypectomy.

In our study 2.85% had cervical stenosis which wasin accordance with study by Lasmar et al who reported incidence of cervical stenosis in 2.2%[35]. Fibroids that indents on the endometrium and deform the uterine cavity inhibits implantation.[36] With the removal of these fibroids, pregnancy and live birth rates increase.[37] In our study we found submucosal myoma in one case which underwent hysteroscopic myomectomy.

Novy et al[38] did cannulation of 38 tubes in 28 patients which led to seven intrauterine pregnancies and no ectopic pregnancies. Allahbadia et al [39] in their study did cannulation of 30 tubes in 15 patients resulted in four intrauterine pregnancies and no ectopic pregnancies. We in our study did hysteroscopic cannulation in 2 cases of primary infertility and in 3 cases of secondary infertility. Hysteroscopy is nowa days an accepted method to diagnose, treat patients with Asherman's syndrome [40]. Roy et al [41] did study on patients with Asherman's syndrome who underwent hysteroscopic adhesiolysis with concomitant laparoscopy and studied its outcome. In our study we did hysteroscopic adhesiolysis in 2 cases of primary and 4 cases of secondary infertility.

Conclusion

Laparoscopy and hysteroscopy remains a gold standard to diagnose pelvic conditions which cannot be detected by imaging modalities and gives direct view and assessment of diseases as endometriosis, polycystic ovaries, pelvic and periadenexal adhesions and to assess tubo-ovarian relation for effective ovum pickup and importantly therapeutic intervention can be done simultaneously which optimizes the fertility outcome. Laparoscopy and hysteroscopy performed together are valuable technique for complete evaluation of female infertility patient and should be used without delay in the diagnostic work up in cases of infertility. It is a feasible, acceptable procedure

and saves time that is unnecessarily lost in exhaustive workup in cases with unexplained infertility thus saving important reproductive years of women life thus right approach at right time optimizes fertility outcome and saves couple from undue prolonged agony and gives directions on further treatment that need to be planned.

References

1. Fatum M, Laufer N, Simon A. Investigation of the infertile couple: should diagnostic laparoscopy be performed after normal hysterosalpigography in treating infertility suspected to be of unknown origin? Human. Reprod. 2002;17(1):1-3.

2. Hucke J, De Bruyme T, Balan P. Hysteroscopy in infertility - diagnosis and treatment including falloscopy. Contrib Gynecol Obstet. 2000; 20:13-20.

3. Brusco GF, Arena S, Angelini A. The role of diagnostic hysteroscopy in infertile women. Minerva Gynecol. 2001; 53(5): 313-19.

4. Yahia AW. Laparoscopic evaluation of apparently normal infertile women. Aus NZ J. Obstet Gynecol. 1994; 34: 440-42.

5. Boricha YG, Sharma RK. Laparoscopy in 50 infertile couples: Prospective study. International Journal of Medical and Clinical Research. 2011; 2(2): 63-6.

6. Nayak P, Mahapatra P, Mallick J, Swain S, Mitra S, Sahoo J. Role of diagnostic hystero-laparoscopy in the evaluation of infertility: A retrospective study of 300 patients. J Hum Reprod Sci. 2013; 6(1): 32-6.

7. Recent advances in medically assisted conception. Report of a WHO Scientific Group. World Health Organ Tech Rep Ser. 1992; 820: 1-111.

8. Wallace WH, Kelsey TW. Human ovarian reserve from conception to the menopause. PLoS One. 2010; 5(1): e8772.

9. Chandra A, Copen CE, Stephen EH. Infertility and impaired fecundity in the United States, 1982-2010: data from the National Survey of Family Growth. Natl Health Stat Report. 2013 Aug 14; (67): 1-18.

10. Hull MG. Epidemiology of infertility and polycystic ovarian disease: endocrinological and demographic studies. Gynecol Endocrinol. 1987 Sep; 1(3): 235-45.

11. Talib W. Infertile female: laparoscopic evaluation. Professional Med J. 2007; 14(4): 562-6.

12. Aziz N. Laparoscopic Evaluation of Female Factors in Infertility. Journal of the College of Physicians and Surgeons Pakistan. 2010; 20(10): 649-52.

13. Miller JH, Weinberg RK, Canino NL, Klein NA, Soules MR. The pattern of infertility diagnoses in women of advanced reproductive age. Am J Obstet Gynecol 1999; 181: 952-7.

14. Wikström L. Incidence, prevalence, and trends of acute pelvic inflammatory disease and its consequences in industrialized countries. Am J Obstet Gynecol. 1980 Dec 01; 138(7 Pt 2): 880-92.

15. Lepine LA, Hillis SD, Marchbanks PA, Joesoef MR, Peterson HB, Westrom L. Severity of pelvic inflammatory disease as a predictor of the probability of live birth. Am J Obstet Gynecol. 1998 May; 178(5): 977-81.

16. Parveen S, Khanam M. Role of combined diagnostic laparoscopy and simultaneous diagnostic hysteroscopy for evaluation of female subfertility factors. Journal of surgery Pakistan (International). 2010; 15(1): 44-7.

17. Jayakrishnan K, Koshy AK, Raju R. Role of laparohysteroscopy in women with normal pelvic imaging and failed ovulation stimulation with intrauterine insemination. J Hum Reprod Sci. 2010; 3: 20-4.

18. Olive DL, Pritts EA. Treatment of endometriosis. N Engl J Med. 2001 Jul 26; 345(4): 266-75.

19. Prescott J, Farland LV, Tobias DK, Gaskins AJ, Spiegelman D, Chavarro JE, et al. A prospective cohort study of endometriosis and subsequent risk of infertility. Hum Reprod. 2016 Jul; 31(7):1475-82.

20. Godinjak Z, Idrizbegovic E. Should diagnostic hysteroscopy is a routine procedure during diagnostic laparoscopy in infertile women. Bosn J Basic Med Sci. 2008; 8: 44-7.

21. Poncelet C, Bonneau C. Sifer C, Chanelles O. Interest of laparoscopy for "Unexplained Infertility". Fertil Steril. 2011; 96: S148-9.

22. Lessey BA, Forstein DA, Miller PB, Egbuniwe MN, Dodds R. Laparoscopic surgery improves outcome and diagnostic accuracy in unexplained infertility. Fertil Steril. 2010; 94: S38.

23. Goynume G, Yetim G, Gokcen O, Karaaslan I, Wetherilt L, Durukan B. Hysterosalpingography, Laparoscopy or both in the diagnosis of tubal disease In infertility. World Journal of Laproscopic Surgery. 2008; 1(2): 23-6.

24. Meyer WR, Castelbaum AJ, Somkuti S, Sagoskin AW, Doyle M, Harris JE, et al. Hydrosalpinges adversely affect markers of endometrial receptivity. Hum Reprod. 1997 Jul; 12(7): 1393-8.

25. Van Voorhis BJ, Mejia RB, Schlaff WD, Hurst BS. Is removal of hydrosalpinges prior to in vitro fertilization the standard of care? Fertil Steril. 2019 Apr; 111(4): 652-56.

26. Shakya B. Hysterosalpingography Vs Hysteroscopy in the Detection of Intrauterine Pathology in Infertility. Journal of Nepal Health Research Council. 2009; 7(1): 6-9.

27. Chan YY, Jayaprakasan K, Zamora J, Thornton JG, Raine-Fenning N, Coomarasamy A. The prevalence of congenital uterine anomalies in unselected and high-risk populations: a systematic review. Hum Reprod Update. 2011 Nov-Dec; 17(6): 761-71.

28. Homer HA, Li TC, Cooke ID. The septate uterus: A review of management and reproductive outcome. Fertil Steril. 2000; 73:1-14.

29. Nayak P, Mahapatra P, Mallick J, Swain S, Mitra S, Sahoo J. Role of diagnostic hystero-laparoscopy in the evaluation of infertility: A retrospective study of 300 patients. J Hum Reprod Sci. 2013; 6(1): 32-4.

30. March CM, Israel R. Gestational outcome following hysteroscopic lysis of adhesions. Fertil Steril. 1981 Oct; 36(4): 455-9.

31. Hinckley MD, Milki AA. 1000 office-based hysteroscopies prior to in vitro fertilization: Feasibility and findings. JSLS. 2004; 8:103-7.

32. Pérez-Medina T, Bajo-Arenas J, Salazar F, Redondo T, Sanfrutos L, Alvarez P, et al. Endometrial polyps and their implication in the pregnancy rates of patients undergoing intrauterine insemination: a prospective, randomized study. Hum Reprod. 2005 Jun; 20(6):1632-5.

33. Shokeir TA, Shalan HM, EI-Shafei MM. Significance of endometrial polyps detected hysteroscopically in eumenorrheic infertile women. J Obstet Gynaecol Res. 2004; 30: 84-9.

34. Chan YY, Jayaprakasan K, Zamora J, Thornton JG, Raine-Fenning N, Coomarasamy A. The prevalence of congenital uterine anomalies in unselected and high-risk populations: a systematic review. Hum Reprod Update. 2011 Nov-Dec; 17(6): 761-71.

35. Lasmar RB, Barrozo PR, Parente RC, Lasmar BP, da Rosa DB, Penna IA, et al. Hysteroscopic evaluation in patients with infertility. Rev Bras Ginecol Obstet. 2010; 32(8): 393-7.

36. Pritts EA, Parker WH, Olive DL. Fibroids and infertility: an updated systematic review of the evidence. Fertil Steril. 2009 Apr; 91(4):1215-23.

37. Casini ML, Rossi F, Agostini R, Unfer V. Effects of the position of fibroids on fertility. Gynecol Endocrinol. 2006 Feb; 22(2):106-9.

38. Novy MJ, Thurmond AS, Patton P, Uchida BT, Rosch J. Diagnosis of cornual obstruction by transcervical fallopian tube cannulation. Fertil Steril. 1988; 50: 434-40.

39. Allahbadia GN, Mangeshikar P, Dhungat PBP, Desai SK, Gudi AA, Arya A. Hysteroscopic fallopian tube recanalization using a flexible guide cannula and hydrophilic guide wire. Gynecol Endoscopy. 2000; 9: 31-5.

40. Roge P, D'Ercole C, Cravello L, Boubli L, Blanc B. Hysteroscopic management of uterine synechiae: a series of 102 observations. Eur J ObstetGynecolReprod Biol. 1996; 65(2): 189-93.

41. Roy KK. Reproductive outcome following hysteroscopic adhesiolysis in patients with infertility due to Asherman's syndrome. Arch Gynecol Obstet. 2010; 281: 355-61.

Conflict of interest: None. **Disclaimer:** Nil.