

Laparoscopy Guided Hysteroscopic Tubal Cannulation: A Study on Fertility Outcome

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Abstract

Study Objective: Purpose of the study was to determine the fertility outcome with laparoscopy guided hysteroscopic cannulation in infertile patients having proximal tubal obstruction.

Study Design And Setting: This prospective interventional crossover trial was carried out in the Department of Infertility and Reproductive Medicine, Anwer Khan Modern Medical College Hospital in between November 2017 to September 2019.

Materials And Methods: A total of 126 infertile patients were recruited initially with unilateral or bilateral proximal tubal obstruction on hysterosalpingography (HSG). At first, laparoscopy was performed under G/A and methylene blue dye was used to access the tubal patency. Tubes were found patent in a total of 68 patients in laparoscopy only and they were excluded from the study. The remaining 58 patients were then finally recruited for laparoscopy guided hysteroscopic cannulation in unilateral or bilateral proximal tubal blocks found on laparoscopy. Following cannulation, methylene blue dye was reapplied on patients to assess the successful recanalization rate. Finally, all the patients with successful recanalization were followed up for at least 1 year for assessment of fertility outcome. Successful recanalization rate, any complications, ectopic and pregnancy rates were documented in all cases.

Results: 126 patients were initially recruited, but finally 58 patients made the inclusion criteria. 39 patients had bilateral and 19 patients had unilateral proximal tubal obstruction following laparoscopy. We could not complete the cannulation procedure in 4 patients due to dense adhesions and poor visualization and identification of ostium. Of the remaining 54 patients, successful recanalization rate was 85% per tube and 88% per patient. We did not experience any intraoperative complication in the whole study. A total of 16 successful pregnancies (29.62%) were reported. Unfortunately, 3 of them were ectopic and the remaining 13 pregnancies were intrauterine.

Conclusion: Laparoscopy assisted hysteroscopic tubal cannulation for proximal tubal obstruction can be a suitable alternative for infertile couples with tubal factor infertility who cannot afford or do not wish to proceed for In-vitro fertilization (IVF).

Keywords: Tubal block, Laparoscopy, Hysteroscopic cannulation.

Introduction:

The Fallopian tube is not only a passive conduit for gametes and early embryos, but also plays an important role in many reproductive functions such

as sperm transport and capacitating, ova retrieval and transport, fertilization and embryo storage. Functional competencies of fallopian tubes depend not only on tubal patency but also on the integrity of the mucosal lining and tubo-ovarian relationship. The tubal factor

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is reported to account for 25-35% of subfertility in the western medical literature, but the prevalence appears to be higher in Bangladesh situation due to the higher rates of unrecognized pelvic inflammatory disease (PID) and tuberculosis. Hysterosalpingography (HSG) is a convenient investigation in infertility evaluation to detect the actual site of tubal involvement. However, proximal tubal block or cornual obstruction on HSG include different reasons such as tubal spasm, presence of debris or mucous plugs or a true cornual blockage^{1,2}. Different diagnostic modalities such as saline infusion sonography and laparoscopy with dye test have been applied by clinicians to distinguish between a true cornual obstruction and other causes. Laparoscopy with tubal patency test obviously has other advantages to assess the whole pelvis and other pelvic peritoneal factors³.

Many of the tubal obstruction on HSG were found not as a case of true obstruction during laparoscopy. When dye is injected, usually the pressure clears out the mucous plugs or debris and the tubes are found patent. Laparoscopy with dye test is generally considered as a gold standard method for assessing tubal factor infertility. Patients with tubal block on laparoscopies are generally advised to proceed for assisted reproductive technology (ART). However, many patients cannot afford to proceed for ART due to their financial problem in a developing country like Bangladesh. Furthermore, ART is considered as a terminal treatment for those patients with a poor success rate. Many of our patients experience one or two failed IVF cycles and gradually become emotionally and economically devastated.

Laparoscopy guided hysteroscopic tubal cannulation is a suitable alternative for patients with proximal tubal obstruction found on laparoscopies. It is a relatively simple and convenient method that can be carried out along with laparoscopy. In addition, laparoscopic findings help us to proceed for detection of any other pelvic adhesions and treat accordingly in the same time. Therefore, laparoscopy guided hysteroscopic tubal cannulation remains a good alternative for tubal

factor infertility specially for those patients who cannot afford to proceed for IVF. The procedure can also be a last resort for patients with failed IVF cycles for proximal tubal block and are unable to proceed for repeated IVF trials due to their economic condition. Therefore, this prospective interventional study of laparoscopy guided tubal cannulation for proximal tubal obstruction was carried out to find a suitable alternative to IVF in the study group.

Materials and Methods:

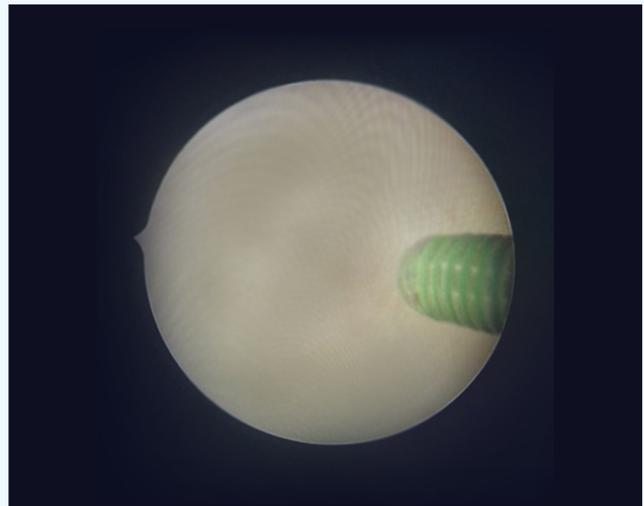
This prospective interventional study was carried out in the Department of Infertility and Reproductive Medicine, Anwer Khan Modern Medical College Hospital in between November 2017 to September 2019. All patients were counselled about the risk and benefits of the procedure and possible hospital stay. Informed written consent was taken from all the patients.

A total of 126 infertile patients were recruited initially with unilateral or bilateral proximal tubal obstruction on hysterosalpingography (HSG). At first, laparoscopy was performed under G/A and methylene blue dye was used to access the tubal patency. Tubes were found patent in a total of 68 patients in laparoscopy only and they were excluded from the study. The remaining 58 patients were then finally recruited for laparoscopy guided hysteroscopic cannulation in unilateral or bilateral proximal tubal blocks found on laparoscopy. A 2.9-mm 30° telescope (Karl Storz) with a 5-mm continuous flow operative sheath was used in all the cases. We used basic tubal cannulation sets containing a ureteric catheter with a guide wire within it. The catheter was introduced through the operative channel up to the tubal ostium of block tubes under hysteroscopic guidance. The guidewire provides strength and rigidity so that the catheter can be controlled for the procedure.

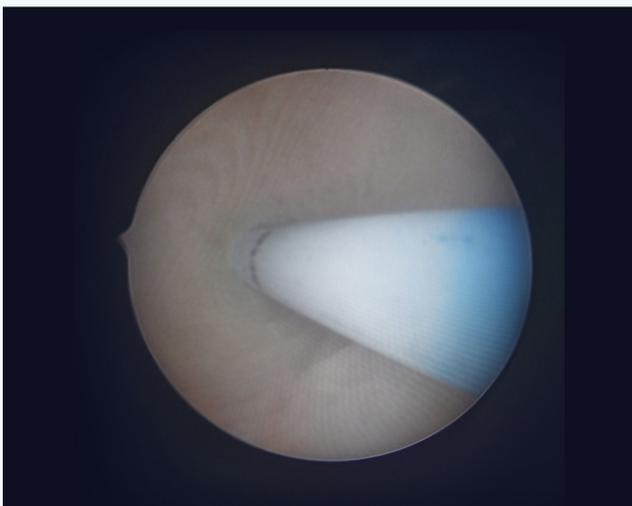
Sequential pictures of the cannulation procedure:



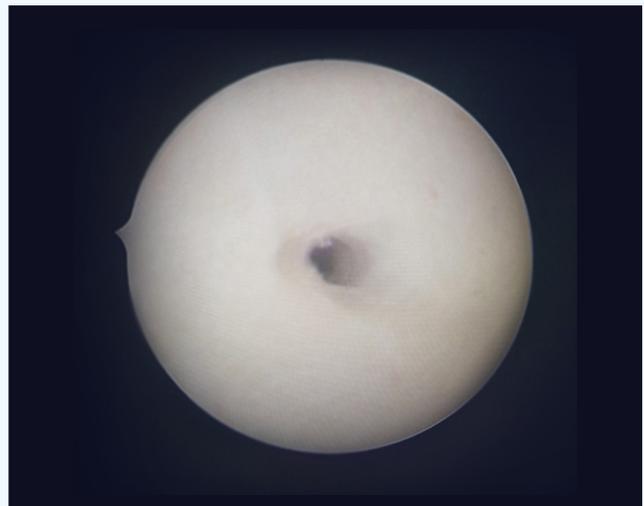
Pic 1. The closed ostium in Hysteroscopic view



Pic 2. The inner wire of the Cannula targeting the closed ostium (Hysteroscopic view)



Pic 3. The guide wire inside the ostium



Pic 4. The successfully opened ostium following the procedure

The catheter with the guidewire was then introduced for 1-2 cm to overcome the proximal tubal obstruction. The methylene blue dye was then reapplied this time through the side channel of the hysteroscope and the tubal patency was observed under laparoscopic guidance. Failure to identify the ostium due to adhesions in spite of repeated trials was labeled as an incomplete procedure. We documented the percentage of spillage into the peritoneal cavity following

cannulation procedure. In some cases, laparoscopy showed that the dye has passed beyond the cornual region with no spillage due to ampullary or fimbrial block and were documented as a failed procedure through the proximal tubal obstruction could be overcome. Patients with evidence of tuberculosis or any other genital infections, hydrosalpinx in HSG or patients with distal tubal blockage in HSG or found during laparoscopy were excluded from the study.

Finally, all the patients with successful recanalization were followed up for at least 1 year for assessment of fertility outcome. Successful recanalization rate, any complications, ectopic and pregnancy rates were documented in all cases. Successful recanalization rate was measured in success rate per woman and per tube. The pregnancy rate was obviously the best outcome that was assessed.

Results:

Initially 126 patients with proximal tubal block were selected on the basis of hysterosalpingography. Tubes were found patent or were made patent during laparoscopy and dye test in 68 patients. The remaining 58 patients finally made the inclusion criteria. We could not complete the cannulation procedure in 4 patients due to lack of definite identification of ostium and were documented as an incomplete procedure. As a result, the final target population included 54 patients. Bilateral tubal block was found in 41 cases (75.9%) and unilateral block in 13 cases (24.1%) after laparoscopy. Successful recanalization rate was 85% (80/95) per tube and was 88% (47/54) per patient. We did not experience any intraoperative complication in the whole study. There were 16 cases (29.62%) of reported pregnancies following the cannulation procedure. Unfortunately, 3 cases resulted in ectopic pregnancies and the remaining 13 cases were intrauterine. All the pregnancies were single tone pregnancies.

Discussion:

In our final target population of 54 patients, successful recanalization rate was 85% (80/95) per tube and was 88% (47/54) per patient. The findings are more or less similar with a study by Joseph I., Ikechebelu et al⁴. Jacqueline P W Chung reported a successful recanalization rate of 71% per woman and 67% per tube in her study of 70 women⁵. The successful recanalization rate was 54% per tube and 62% per patient as reported by Hou et al¹. However, both the studies were conducted 8-10 years back. We had a

The results of the study are summarised on Table 1

Table 1. Results of the study

Criteria of patients	Patient number(n)
Proximal tubal block in HSG	126
Tubes patent in laparoscopy	68
Patients recruited for Hysteroscopic Cannulation	58
Failed procedure due to adhesions	04
Successful recanalization rate following Hysteroscopic Cannulation	(80/95)85% per tube (47/54)88% per patient
Pregnancy within one year of successful recanalization	16(29.62%)

much better recanalization rate compared to these studies. The better success rates in recanalization may be attributed to the recent instruments and technological advancements in hysteroscopy.

In our study, there were 16 cases (29.62%) of reported pregnancies following the cannulation procedure. Ikechebelu et al⁴ reported a pregnancy rate of 25% in their study. The clinical pregnancy rate was 27% as reported by Silva et al⁶. So, our study result was comparable to both of these studies. Unfortunately, we had 3 ectopic pregnancies in our study which is slightly higher than the contemporary studies.

We did not experience any intraoperative complication during the study period. Several other studies of similar type also did not report any complication. So, laparoscopy guided hysteroscopic tubal cannulation can be considered as a reasonably safe procedure.

Conclusion and Recommendations:

Laparoscopy is an effective tool in assessing tubal patency if HSG shows unilateral or bilateral tubal blocks. Unfortunately, tubes are found not patent sometimes even after laparoscopy. Patients are generally referred to the IVF clinics following tubal obstructions found on laparoscopies. However, IVF doesn't have an impressive success rate worldwide resulting in many failures. Majority of these patients cannot afford to proceed for repeated IVF cycles in a developing country like Bangladesh due to their financial strain and ultimately remain childless. Laparoscopic guided hysteroscopic cannulation sometimes can offer them an alternative modality in cases of proximal tubal obstructions. It has got an additional advantage that patient gets the opportunity to conceive in each and every cycle. Furthermore, opportunities for ovulation induction and intrauterine insemination open up following a successful cannulation procedure. IVF on the contrary is expensive and sometimes need repeated trials. Laparoscopy assisted hysteroscopic tubal cannulation for proximal tubal obstruction can therefore be a suitable alternative for infertile couples of developing countries with tubal factor infertility who cannot afford or do not wish to proceed for In-vitro fertilization (IVF).

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Conflict of Interest: None

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