



COMPARATIVE EFFICACY OF HYSTEROSCOPIC RE-CANALIZATION AND MICROSURGICAL CANALIZATION IN PROXIMAL TUBAL OBSTRUCTION

Obstetrics & Gynaecology

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ABSTRACT

Background: Fallopian tubal disease is responsible for 20-30% of female infertility worldwide. Its importance as a major cause of infertility was recognized by Burns (1809). Patent fallopian tubes are prerequisite for normal human fertility. It has a crucial role in picking up eggs, also in sperm and ovum transport. It is the site of fertilization and important in nutrition of ovum. Such a highly specialized organ is vulnerable to infection and surgical damage that impair function by affecting the delicate fimbriae or the endosalpinx. The causes of tubal obstruction are pelvic inflammatory disease, endometriosis or history of previous surgery. This study deals with proximal tubal obstruction.

Aim of the Study: 1. Comparing the efficacy of Hysteroscopic cannulation and Microsurgical tubal anastomosis as a method of tubal recanalization in proximal tubal obstruction. 2. To assess the safety and relative complications between these two methods.

Materials And Methods: This study was conducted in Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar. Study sample : 50 infertile women with bilateral tubal occlusion. Study period : December 2020-November 2021 From women attending the Obst. And Gyane Department of DMCH, Laheriasarai, Bihar, based on the inclusion and exclusion criteria, HSG was performed in 186 women with infertility. Of the 186 women in whom HSG was performed, 99 patients had normal tubal spill, 13 cases had unilateral tubal block and 74 cases had bilateral tubal block. Of these, 38 patients had cornual block and 20 patients had suspicious finding of either tubal block or spill and they were subjected to laparoscopy for confirmation of tubal pathology. 16 patients had block in various parts of the tube other than cornua and hence were excluded from the study.

Results: Among the 50 infertile women after confirming proximal tubal obstruction. The various observations are: 1. In this study, the significant number of women with primary and secondary infertility, belonged to the age group 26 to 28 years. 2. In this study longer the duration of marriage, more severe is the tubal disease, as there is increase number of sexual exposures. This showed statistical significance. 3. Type of infertility did not significantly alter the result of cannulation. 4. The tubal patency achieved by cannulation is 94% and the tubal patency achieved by microsurgical anastomosis was only 64%. 5. Tubal patency with both techniques achieved shows significant P value of 0.0331 by Fisher exact test. 6. Proximal tubal cannulation is the better option as mostly the obstruction is due to mucus plug or amorphous debris and is not due to true occlusion.

Conclusion: This study is on the comparative efficacy of Hysteroscopic recanalization and Microsurgical tubal canalization in the management of proximal tubal obstruction. This study reveals proximal tubal obstruction, as a frequent cause for infertility. The incidence is higher with increasing age and also the duration of marriage. Hysteroscopic recanalization appears to be a better option for a successful outcome. The main drawback with this technique is that it can be performed only when the obstruction is without fibrosis or other associated complications. Microsurgical canalization, on the other hand, can be performed even in those severely affected cases. But the success rate is comparatively low and the procedure has a higher incidence of ectopic pregnancy. Hence both the methods can be used for a successful outcome if they are used in the appropriate patient and the appropriate technique is followed.

KEYWORDS

INTRODUCTION

Fallopian tubal disease is responsible for 20-30% of female infertility worldwide⁽¹⁾. Its importance as a major cause of infertility was recognized by Burns (1809)⁽²⁾. Patent fallopian tubes are prerequisite for normal human fertility. It has a crucial role in picking up eggs, also in sperm and ovum transport. It is the site of fertilization and important in nutrition of ovum. Such a highly specialized organ is vulnerable to infection and surgical damage that impair function by affecting the delicate fimbriae or the endosalpinx.

The causes of tubal obstruction are pelvic inflammatory disease, endometriosis or history of previous surgery. This study deals with proximal tubal obstruction.

Proximal tubal obstruction occurs in 12-33% of infertile couples (Decherney 1990)⁽¹⁾. The conventional treatment for this condition was utero-tubal implantation. Earlier attempts on the surgical repair of the fallopian tube were met with very poor pregnancy outcome.

In 1980s, there was a transition from macro-surgical to microsurgical tubal anastomosis which was first described in 1977 by Gomel and Winston⁽³⁾. However this was technically difficult and there was increased incidence of ectopic pregnancy, surgical and anesthetic risks.

The development of minimally invasive techniques for correction of proximal tubal block began with tubal cannulation⁽⁴⁾. This procedure is popular with the recent development of tubal endoscopy techniques that have led to better assessment of tubal disease and successful patency.

The tubal cannulation can be done using hysteroscopy, fluoroscopy or sonar. Tubal cannulation by hysteroscopic control offers a number of advantages over the other techniques in that guidance of the tubal catheter into tubal ostia is simple, because it is done under direct vision. Secondly it is done along with laparoscopy, the presence of distal tubal disease or other factors can be diagnosed and treated simultaneously⁽⁴⁾.

So it offers a one step evaluation and treatment in infertile patients with proximal tubal obstruction.

AIM OF THE STUDY

- Comparing the efficacy of Hysteroscopic cannulation and Microsurgical tubal anastomosis as a method of tubal recanalization in proximal tubal obstruction.
- To assess the safety and relative complications between these two methods.

MATERIALS AND METHODS

This Prospective analytical study was conducted in the Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from December 2020 to November 2021. Total 50 infertile women with bilateral tubal occlusion included in this study.

From women attending the Obstetrics and Gynaecology Department of DMCH, Laheriasarai, Bihar based on the inclusion and exclusion criteria, HSG was performed in 186 women with infertility.

Of the 186 women in whom HSG was performed, 99 patients had normal tubal spill, 13 cases had unilateral tubal block and 74 cases had

bilateral tubal block. Of these, 38 patients had cornual block and 20 patients had suspicious finding of either tubal block or spill and they were subjected to laparoscopy for confirmation of tubal pathology.¹⁶ patients had block in various parts of the tube other than cornua and hence were excluded from the study.

Procedure Of Hysteroscopic Cannulation:

All the patients were explained about their tubal pathology and the available procedures for correcting them. Hysteroscopic canalization was also explained to them and 50 patients were willing to undergo the procedure. These patients were further explained about the procedure, complications involved, and the success and failure rate of the procedure. After getting informed consent from them, they were prepared for the surgery.

Instruments:

"Versa scope" was used in this study. The telescope is 1.8mm in diameter with an outer sheath of 3.5mm which has 3 channels, inflow and outflow channels and one for instrumentation.

Distending medium used was normal saline with inflow rate of 100 ml/minute.

Timing of the procedure:

Sixth or seventh day of the menstrual cycle (after the period completely ceases).

Anesthesia:

General anesthesia

Position – Lithotomy position

Procedure:

After anesthesia and placing the patient in the lithotomy position, the external genitalia and the area around is cleaned and draped. Bladder is catheterized. Bimanual pelvic examination is done. The anterior lip of the cervix is caught with a volsellum and then the hysteroscope is introduced into the uterine cavity under vision and with the saline running all the time at a rate of 75mm pressure or 100 ml per minute. Using gentle manipulation, hysteroscope is advanced slowly, following the contour of endocervical canal. Once the internal os is passed, the uterine cavity is visualized thoroughly and through the distal tip both the ostia were visualized. The two way angulations of the distal tip allows for close observation of the uterine cavity in particular UTJ.

Cook's novis tubal cannulation set is used, and the guide wire is pushed into the ostia for 2-3 cms beyond the obstruction and the procedure is repeated on the other side. The hysteroscope is then withdrawn and chromopertubation by laparoscopy is done to confirm the result of cannulation by looking at the tubal spill on both the sides.

Complications of hysteroscopy include perforation of the tube, fluid overload due to the distending media used and hemorrhage.

Postoperative Care:

Patients were treated with antibiotics and antispasmodics.

Microsurgical Tubal Anastomosis:

Routine fish mouth technique of tubocornual anastomosis is done in our institution.

Instruments:

- 1) Zeiss operating microscope
- 2) Microsurgical instruments
- 3) Bipolar diathermy and forceps
- 4) Irrigation set

Procedure:

- 1) Site of blockage is confirmed by injecting methylene blue dye through the cervix.
- 2) Preparing the fallopian tube: Using magnification, fine slices of tissues are carefully removed from the cornua from the point where the tube joins the uterine muscle.
- 3) The anastomosis: Broad ligament stay sutures are then placed to approximate the two prepared areas, tube and the uterine cornua. This avoids tension on the anastomotic suture and also easier to perform. A fine splint with 1-0 Prolene is used to assist the correct alignment of the tubal lumen. Anastomosis is carried out in 2 layers with 6-0 Ethilon suture.

- 4) Railroading of the tube: Four cardinal sutures are placed through the muscle of both prepared ends and then the distal portion of the tube is railroaded down the cornua over the intra-operative splint. At the end of anastomosis, splint is removed via the fimbrial end. The first layer is then tied. The Serosal layer is closed using 6-0 Ethilon suture.
- 5) Hemostasis is achieved by continuous irrigation with Heparinated saline.
- 6) Tubal patency is checked at the end of surgery. Methylene blue dye is injected into the uterus to check tubal spill.

Complications:

Early complications: Wound infection, Fever. Late complications: Re-occlusion, Ectopic pregnancy 14% (AORN J, 2017).

RESULTS

Table 1: HSG Results

No of Infertile Women subjected to HSG	No. of cases with Normal findings	No of Cases with Bilateral Block	No Of cases with unilateral block
186	99	74	13

Table 2: HSG Results

No of Cases with Tubal Block	With Cornual Block	Suspicious Lesion	Tubal Block other than Cornua
74	38	20	16

Table 3: Confirmation Of Proximal Tubal Block

No of cases with tubal block confirmed by HSG	No of cases confirmed by preliminary laparoscopy
38	12

Table 4: Age Distribution

n = 50

Sl. No	Age Group (yrs)	Number of Patients	% of Patients
1.	25 and less	6	12
2.	26-30	34	68
3.	31-35	10	20
Total		50	100

Distribution Of Cases According To The Age:

N	Mean	SD	SE	LCL %	UCL %
50	27.4	2.75	0.3898	26.65	28.23

Table 5 : Distribution Of Cases According To Marital Age

Sl. No	Duration of Marriage (Yrs)	No of cases	Percentage %
1.	1 - 3	6	12
2.	4 - 7	29	58
3.	8 - 11	11	22
4.	> 11	4	8
Total		50	100

Distribution Of Cases According To The Marital Age:

N	Mean	SD	SE	LCL%	UCL%
50	6.66	2.7598	0.39030	5.875661	7.444339

Table 6: Distribution Of Cases According To Infertility

Infertility	No of cases	% of Cases
Primary	24	48
Secondary	26	52
Total	50	100

Table 7: No Of Cases With Successful Cannulation

Cases subjected to cannulation	Successful	Unsuccessful
50	37	13

Table 8: Result Of Cannulation

No. of cases under went Cannulation	Tubal Patency		Blocked Tubes
	Bilateral	Unilateral	
39	13	24	2

Table 10: Comparative Data Of Patency Between Tubal Cannulation & Microsurgery (n = 44)

No of cases with tubal patency	Hysteroscopic cannulation		Microsurgical Anastomosis	
	Success	Failure	Success	Failure
44	37	2	7	4
% of Achievement	94%		64%	

Table 9: Results Of Microsurgical Tubal Anastomosis

No. of cases	Success	Percentage	Failure	Percentage
11	7	64%	4	36%

Table – 11A : Tubal Patency According To Age Group (n = 44)

Age group (Yrs)	Cannulation	Percentage	Microsurgical Anastomosis	Percentage
25& less	5	13%	0	0%
26 - 30	24	65%	6	86%
31 – 35	8	22%	1	14%

Table 11 B : Distribution Of Tubal Patency According To Marital Age n = 44

Marital age (Yrs)	Cannulation	Percentage	Microsurgical Anastomosis	Percentage
1 – 3	5	13%	0	0%
4 – 7	23	63%	2	28%
8 – 11	6	16%	4	58%
> 11	3	8%	1	14%

Table 12: Duration Of The Procedure

Technique	Duration
Hysteroscopic Cannulation	20 – 30 minutes
Microsurgical Anastomosis	65 – 90 minutes

Table 13: Duration Of Hospital Stay

Technique	No. of Days
Hysteroscopic Cannulation	3
Microsurgical Anastomosis	7

Table 14: Complications In Each Technique

Complications	Micro surgical Anastomosis	Cannulation
Wound sepsis	1	0
UTI	1	1
Vaginal bleeding	0	5

DISCUSSION

In a study by Siegler A – 2018⁽⁷⁾ showed proximal tubal obstruction by HSG in 10-25% of cases.

In this study the confirmed cases of tubal block by HSG in total infertile women was 20.45%. And remaining cases with suspicious lesions, laparoscopy confirmed proximal tubal obstruction.

Distribution Of Cases According To The Age:

In the study by Rosch J, 2018⁽⁸⁾ patients who were included in the study ranged from 26-40 years with mean age of 32.8 years.

Incidence of tubal occlusion increases with number of exposures to sexually transmitted disease⁽³⁵⁾.

One single exposure - 10-12% of cases with tubal occlusion 2 Episodes -25-35%
3 Episodes -54-75%.

In this study mean age was 28.5 years, ranging from 23 years to 35 years.

Distribution Of Cases According To The Marital Age:

Mean duration of infertility was 3.3 years (range from 1-7 years) in a study by Rosch J. Thurmond – 2018⁽⁸⁾.

In this study duration of marriage was 6.66 years ranging from 1-12 years.

Distribution Of Cases According To Type Of Infertility:

In the study conducted by Segars JH Herbert CM, Moore DE – 2010⁽¹⁰⁾, 5 patients with primary infertility and 17 patients with secondary infertility were included in the study and these patients underwent hysteroscopic cannulation. 5 patients with secondary infertility had a single previous pregnancy, while 12 other patients had a total of 34 previous pregnancies. Mean gravida – 2.3% Mean parity -0.88%

In this study out of 50 cases, 24 cases of primary infertility and 26 cases of secondary infertility were selected. Of 26 cases, ten patients had previous full term normal deliveries and 12 patients had previous miscarriages; 4 patients had IUD.

In this study significant number of cases with primary and secondary

infertility was in the age group between 26 to 28 Years. Longer the duration, chances of infertility are more.

Cases of successful cannulation :

In 80 to 90% of the cases, tubal cannulation is successful in restoring patency of at least one fallopian tube. About 30% of patients got pregnant in the first 3 to 6 months after the procedure. This is the study performed by Woolcot R 2015⁽¹¹⁾.

Gomel et al in the year 2012, advocated that in all cases of proximal tubal obstruction, selective tubal cannulation should be attempted first with microsurgical tubocornual anastomosis reserved for failures.

Letterie and Sakar evaluated Histologic findings in 15 Patients at laparotomy after failed tubal cannulation. They found that 93% of the patient had severe disease suggesting that tubal cannulation might distinguish functional obstruction from occlusion.

In this study all 50 cases were posted for cannulation, 37 patients had easy cannulation. In the remaining 11 cases cannulation was technically difficult and 2 cases of cannulation failure were planned for microsurgical anastomosis.

Result Of Cannulation:

In a study of hysteroscopic cannulation by Rosch J. Thurmond – 2018⁽⁸⁾ of the 22 patients who underwent the procedure, bilateral tubal spill was obtained in 8 cases, 7 cases had unilateral tubal spill. Radiologically abnormal but patent tubal spill were 2 cases, and 5 cases showed abnormal tubes with no tubal spill. In this series at least 1 patent tube existed after catheterization in 17 of 22 patients.

61% of bilateral tubal spill and 77% of unilateral tubal spill were found in the study by Sulak P⁽³⁾.

Hysteroscopic tubal cannulation to repair intramural or interstitial obstruction can result in a patency rate of up to 90% in at least 1 tube and a pregnancy rate in the range of 50-60%. (Fayez. JA 2013)⁽¹²⁾

In this study out of 37 cases, tubal patency in both the tubes were achieved in 13 cases and one side spill in 24 cases, confirmed by laparoscopic chromopertubation. (35.5% of bilateral tubal spill and 64% of unilateral tubal spill). Thus in this study, tubal patency by hysteroscopic cannulation was achieved in 94% of operated women.

Results Of Microsurgical Anastomosis :

Winston and Gomel⁽¹⁴⁾ in their study in patients who underwent microsurgical anastomosis showed success rate of 70%.

This study shows tubal patency with microsurgical tubal anastomosis is 64%.

Mean duration of the procedure (Hysteroscopic cannulation); 25 minutes. Mean duration of microsurgical tubal anastomosis 90 minutes.

Duration of the hospital stay following hysteroscopic Cannulation.

In this study the mean duration of hospital stay-3 days.

Duration of the hospital stay following microsurgical anastomosis is 7 days.

Complications of hysteroscopy cannulation/ microsurgical anastomosis:

Incidence of postoperative complications following microsurgical anastomosis in a study by Shakti E J⁽¹⁵⁾

Complications	Percentage
Fever	13 %
Paralytic	3 %
Urinary Tract Infection	6 %

In a study by Thurmond et al⁽⁴⁾ perforation occurred in 5% of cases. No treatment was required in these cases. 2 patients developed vaso-vagal reaction, which was treated with IV fluids. Extravasation of the contrast agent was noted in nine cases.

In this study two patients had extended convalescent period as one developed wound sepsis and the other suffered from urinary tract infection following micro surgical anastomosis. One patient who

underwent hysteroscopic cannulation suffered from urinary tract infection and 5 patients with moderate vaginal bleeding were treated with anti inflammatory drugs and hemostatic drugs.

CONCLUSION

This study is on the comparative efficacy of Hysteroscopic recanalization and Microsurgical tubal canalization in the management of proximal tubal obstruction.

This study reveals proximal tubal obstruction, as a frequent cause for infertility.

The incidence is higher with increasing age and also the duration of marriage.

Hysteroscopic recanalization appears to be a better option for a successful outcome.

The main drawback with this technique is that it can be performed only when the obstruction is without fibrosis or other associated complications.

Microsurgical canalization, on the other hand, can be performed even in those severely affected cases.

But the success rate is comparatively low and the procedure has a higher incidence of ectopic pregnancy.

Hence both the methods can be used for a successful outcome if they are used in the appropriate patient and the appropriate technique is followed.

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