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Original Research Article

Reproductive outcome after laparoscopy for stage I and stage II endometriosis

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ABSTRACT

Background: Endometriosis is a chronic and recurrent disease commonly afflicting women of reproductive age, contributing to 30-50% cases of infertility. 30% cumulative probability of achieving pregnancy is reported following surgical management of minimal and mild endometriosis.
Methods: Prospective observational study was conducted at Apollo Women's hospital, Chennai between July 2020 and June 2021. 82 eligible women who satisfied the study criteria took part in it. During surgery, diagnosis of Stage I (Minimal endometriosis, few superficial implants, score 1-5) or Stage II endometriosis (Mild endometriosis, more deeper implants, score 6-15) made and lesions excised completely. Patients followed up for 6 months for outcome. Time taken, mode of conception and improvement in pain score were documented. Collected data was analysed.
Results: 41.5% had successful pregnancy outcome, which is higher than that reported in literature. 43.9% had stage I endometriosis of which 38.2% conceived and 56.1% had stage II endometriosis of which 61.8% conceived. 82.4% conceived spontaneously, 32.4% within 3 months and 67.6% in 3-6 months with mean duration of 4 months. 58.5% women were treated for periadnexial adhesions altering tubo-ovarian relationship, of which 41.2% women conceived which is statistically significant.
Conclusions: Large proportion of women undergoing laparoscopy surgical management of stage I and stage II endometriosis in successfully achieved a conception, spontaneously and within a short span after surgery. Pain due to endometriosis was also relieved. Favourable factors to achieve pregnancy were younger age, optimal BMI and good AMH level. Laparoscopy is an attractive and effective option for women with minimal or mild endometriosis with infertility.

Keywords: Endometriosis, Infertility, Laparoscopy, Reproductive Outcome

INTRODUCTION

Endometriosis is characterised by the presence of tissue that structurally and functionally resembles endometrial glands, situated outside the uterine cavity. The most common sites of implantation include pelvic viscera and peritoneum, and infrequently, pleura, pericardium, lung and brain. The appearance can range from few superficial pelvic lesions to deep infiltrating nodules and massive ovarian cysts with extensive adhesions.[1] It is encountered in 10-20% of women and significantly contributes to infertility, accounting for almost 30-50% of cases.[2] The risk of infertility is twice higher in women less than 35 years of age with endometriosis as opposed to not having it. Endometriosis is consequently a frequent cause of infertility both on its own and in conjunction with other fertility-reducing factors. Medical management of endometriosis largely alleviates pain, but its role in enhancing fertility is limited. Surgical management is preferred for both diagnosis and treatment of endometriosis. Endometriosis surgery should be considered as a reproductive surgery as defined by the World Health Organization (WHO) as "surgical procedure carried out to diagnose, conserve, correct or improve

reproductive function". The least invasive and least expensive approach that is effective with the least long-term risks should be chosen. The goal of surgery is to excise all visible endometriotic lesions and adhesions and restore normal anatomy.[3] Laparoscopy is preferred over laparotomy because of quicker recovery, better cosmesis, less postoperative pain, less expensive, lower morbidity and fewer postoperative adhesions and complications. If surgery is performed and spontaneous pregnancy does not occur within 2 years of surgery, there is limited chance of subsequent natural conception. Based on the amount of endometriosis and adhesions present, the American Society of Reproductive Medicine (ASRM) classifies endometriosis into four stages: Minimal (stage 1), Mild (stage 2), Moderate (stage 3) and Severe (stage 4).[4] (Figure 1, 2) This is the most commonly used, universally accepted and regularly appraised classification system among several others. The European Society of Human Reproduction and Embryology in its guidelines for endometriosis management in 2013, recommends operative laparoscopy for improving on going pregnancy rates.[5] Surgical management of infertile women with minimal to mild endometriosis remains controversial. While some studies suggest a beneficial fertility outcome following resection of minimal and mild endometriosis, robust evidence to encourage the same, particularly in an Indian setting, remains unavailable. A 30% cumulative probability of achieving pregnancy is reported in literature following surgical management of minimal and mild endometriosis.[6] Though In vitro fertilisation without undergoing surgery is an attractive option, success rate of both are similar. A recent study also concluded that pregnancy rate was lower in infertile patients with minimal to mild endometriosis who underwent controlled ovarian stimulation followed by IUI. Although the exact pathogenesis to explain the occurrence of infertility in women with minimal to mild endometriosis remains unclear, it is suggested that an alteration in the levels of VEGF, Prostaglandins, proteases and cytokines in peritoneal fluid adversely affects ovum pick up, sperm motility, embryo quality and tubal function. Surgical excision or electrocoagulation of minimal and mild endometriosis restores the peritoneal milieu and theoretically, must improve fertility outcome. Evidence also suggests better pregnancy outcome with assisted reproductive treatment when it follows surgical management. The purpose of this study is to evaluate the pregnancy outcome following surgical excision or electrocoagulation of minimal and mild endometriosis in women with infertility. Thus far, studies have been conducted in various centres in the world but a study on Indian women is largely lacking. The aim of this study is to determine the ability to achieve a successful pregnancy following Laparoscopic surgical management for Stage I and Stage II Endometriosis according to ASRM guidelines, to assess the time taken to conceive on a six month follow up following primary surgery, to evaluate the method adopted to achieve pregnancy as either spontaneous conception following timed intercourse or with additional intervention such as ovulation induction, IUI or IVF, to detect any change in pain score before and after surgery. The findings of this study can serve as evidence for the future on whether surgical excision of minimal and mild endometriosis should be recommended or not to improve reproductive outcome.

METHODS

The study design was prospective observational. The study site was Apollo women's hospital, Chennai. Women of age 20-39 years presenting to the outpatient department for evaluation of infertility and diagnosed with Stage I or Stage II endometriosis.

Sample size

Marcoux et al have mentioned that the overall pregnancy outcome after laparoscopic surgery was 30.7%.

Applying the following formula,

$$n = Z^2pq \div d^2$$

Where Z= Standard normal variate value (95% CI) =1.96,

p = Outcome after lap surgery=30.7%

q = 1-p =69.3%

d = Clinical allowable error =10%

Required sample size is 82.

Time period

The study was conducted from July 2020 to June 2021 (1 year).

Inclusion criteria

Women of age 20-39 years with a diagnosis of Stage I or Stage II endometriosis at laparoscopy. Infertility defined as at least 12 consecutive months of unprotected intercourse resulting in unsuccessful attempts to become pregnant. No previous surgical or medical treatment for endometriosis in the previous 9 months.

Exclusion criteria

Women with anovulatory cycles. Women with other causes of infertility like tubal factor. Abnormal husband semen analysis. Women with previous surgery for endometriosis.

Study protocol was approved by scientific committee and institutional ethics committee. Women who presented with infertility and scheduled for diagnostic laparoscopy were recruited for the study based on inclusion and exclusion criteria. Informed consent was obtained for participating in

the study. Written informed consent was obtained separately for the surgery. Laparoscopy was performed under General anaesthesia using standard three port technique. On Laparoscopy, a diagnosis of Stage I (Minimal endometriosis, few superficial implants, score 1-5) or Stage II endometriosis (Mild endometriosis, more deeper implants, score 6-15) was made based on presence of typical bluish or black lesions on the peritoneum or surface of ovary. These visible lesions were scored according to depth and diameter. Peri-adnexial adhesions were scored based on density and degree of enclosure. The lesions were excised in toto or fulguration done using bipolar electrocautery. Adhesiolysis was done using Monopolar electrocautery or harmonic scalpel. Patients were monitored in the immediate post-operative period for complications. No hormonal treatment was prescribed in the post-operative period. Some women were given ovulation induction drugs like Letrozole or clomiphene citrate after individualisation. Patients were called back for follow up at 3 months and 6 months and the primary outcome of whether pregnancy has occurred was determined. Time taken for regular menstrual cycle to resume, mode of conception such as spontaneous after timed intercourse or after using ovulation induction agents or intrauterine insemination or IVF and time taken to conceive were also recorded. Pre-operative and post-operative Pain Score were also documented.

The collected data was entered into Microsoft Excel 2010 and analysed with IBM SPSS Statistics for Windows, Version 23.0. (Armonk, NY: IBM Corp). Data was subjected to descriptive statistics and frequency analysis. Tests of significance were used and the probability value of 0.05 was taken as significant.

RESULTS

The mean age of women participating in the study was 28.6 years. (Table 1) The relationship between age and pregnancy outcome using unpaired t-test gave a t-value=2.067, p=0.042 (<0.05) showing statistical significance. (Table 2) This means that younger women have better reproductive outcome. 40.2% women had ideal BMI while 47.6% women were overweight and 12.2% were obese (Figure 3).

Though the difference in pregnancy rates among women of optimal BMI and high BMI were not statistically significant, an optimal BMI appeared to be a favourable factor. Chronic pelvic pain and dyspareunia were noted in 20.7% women and dysmenorrhea in 80.5% women. When comparison of pain score before and after surgery was done, Z-value=6.605, p=0.0005 (<0.01) with Mann-Whitney U test showed a highly statistically significant difference implying lesser pain after surgery (Table 3).

Table 1: Baseline characteristics.

	N	Mean	SD	Min	Max
Age	82	28.6	4.3	21.0	39.0
Time since marriage	82	4.7	2.5	2.0	14.0
Duration of infertility	82	3.0	2.0	1.0	10.5
BMI	82	26.3	2.3	21.4	31.6
Coital frequency	82	2.9	0.7	2.0	4.0
AMH value	82	2.8	1.5	0.10	7.10
ASRM Score	82	6.9	3.6	2.0	14.0
Return of regular cycle (months)	82	0.9	0.5	0.3	3.0
Return of regular intercourse (months)	82	1.4	0.5	1.0	3.0
Time taken (months)	34	4.0	1.3	1.5	6.0

Table 2: Comparison of age with pregnancy by unpaired t-test.

Variable	Pregnancy	N	Mean	SD	T	P
Age	Yes	34	27	4	2.067	0.042*
	No	48	29	4		

*Statistical significance at p<0.05 level

Table 3: Comparison of pre-operative and post-operative pain score - Mann-Whitney U test.

Pain Score	N	Mean	S.D	Z value	P value
Pre-op	82	1.2	1.0	6.605	0.0005 **
Post-op	82	0.1	0.3		

** Highly Statistically Significant at p < 0.01 level

Coital frequency of more than 3 per week was taken as optimum when trying to conceive and 74.4% of women satisfied this criterion. 85.4% women had primary infertility. Mean duration since marriage was 4.677 years and mean duration of infertility was 3.043 years. 41.5% women had taken treatment for infertility prior, either in

the form of ovulation induction, intrauterine insemination or in vitro fertilisation, which had failed to result in a successful pregnancy. 41.5% (n=34) women had a successful pregnancy outcome following laparoscopic surgery for Stage I and Stage II endometriosis. (Figure 4a and 4b) Return of regular menstrual cycles occurred within 1 month in most women (Mean 0.899, median 1, SD 0.48) with earliest occurring within 10 days and latest being 3 months. Return of onset of timed intercourse to achieve pregnancy was 1.5 months in most women (Mean 1.372, median 1, SD 0.55).

Table 4: Comparison between spontaneous conception and need for additional intervention with pregnancy.

Additional intervention		Pregnancy		Total	Chi ^{2} – value	P value
		Yes	No			
OI	Count	6	13	19	0.995	0.318 #
	%	17.6%	27.1%	23.2%		
No	Count	28	35	63		
	%	82.4%	72.9%	76.8%		
Total	Count	34	48	82		
	%	100.0%	100.0%	100.0%		

No statistical significant at p>0.05 level

Table 5: Comparison between Intra-operative findings and pregnancy outcome.

Intra-operative findings		Pregnancy		Total	Chi ^{2} - value	P value
		Yes	No			
Bilateral tubo-ovarian relationship altered by adhesions	Count	14	10	24	3.979	0.046 *
	%	41.2%	20.8%	29.3%		
Endometriotic spots	Count	20	38	58		
	%	58.8%	79.2%	70.7%		
Total	Count	34	48	82		
	%	100.0%	100.0%	100.0%		

* Statistical significance at p<0.05 level

Table 6: Comparison of AMH value with pregnancy by unpaired t-test.

Variable	Pregnancy	N	Mean	S.D	t-value	P value
AMH value	Yes	34	3.5	1.2	3.323	0.001 **
	No	48	2.4	1.5		

** Highly statistical significant at p<0.01 level

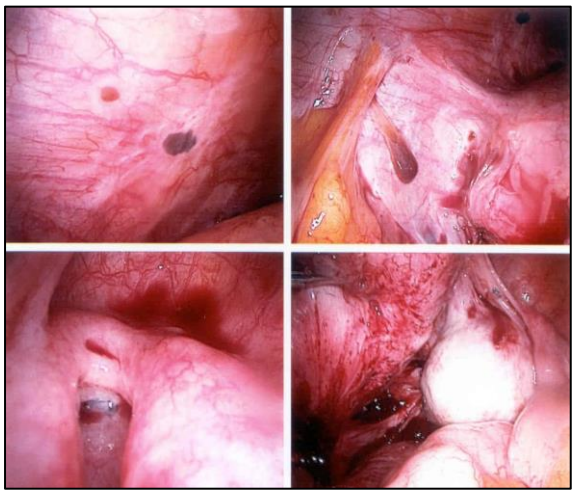

Figure 1: Typical endometriotic lesions seen over various organs.[1]

32.4% women took only 3 Months to conceive while 67.6% took 3 to 6 Months for the same. 76.8% women conceived spontaneously after surgery while 23.2% women took ovulation induction agent Letrozole to aid in achieving a pregnancy (Table 4).

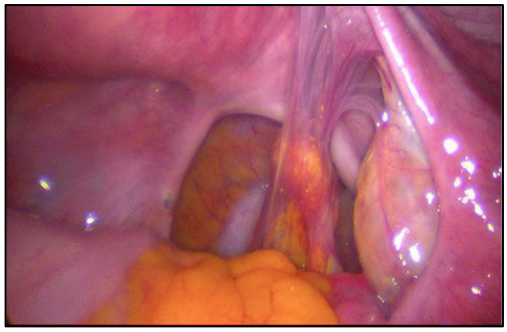

Figure 2: Endometriosis with adhesion formation.[1]

By Pearson's chi-squared test were Chi square=3.979, p=0.046 (<0.05), statistical significance is seen between adhesiolysis and restoration of bilateral tubo-ovarian relationship and favourable reproductive outcome. Pregnancy rate was higher in such women when paralleled to those who had fulguration or excision of endometriotic spots alone. (Table 5 and Figure 5) When a comparison between AMH value and reproductive outcome was done and statistically analysed using Unpaired t-test, t-value=3.323, p=0.001 (<0.01) showed a highly statistically significant difference, projecting AMH as an important contributing factor (Table 6 and Figure 6).

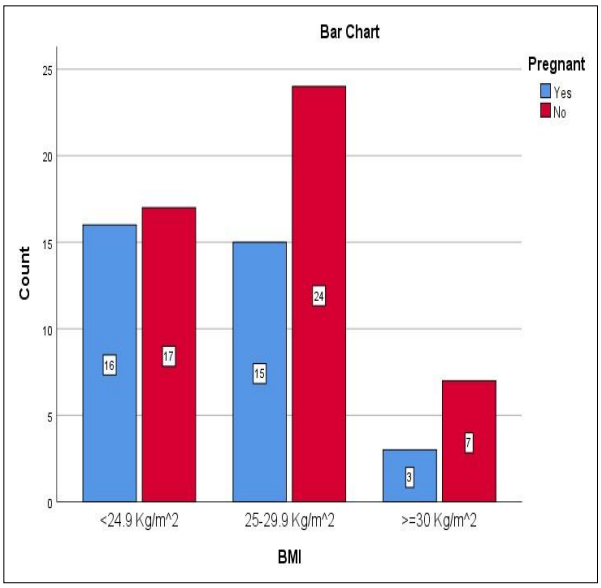

Figure 3: BMI and its in impact on reproductive outcome.

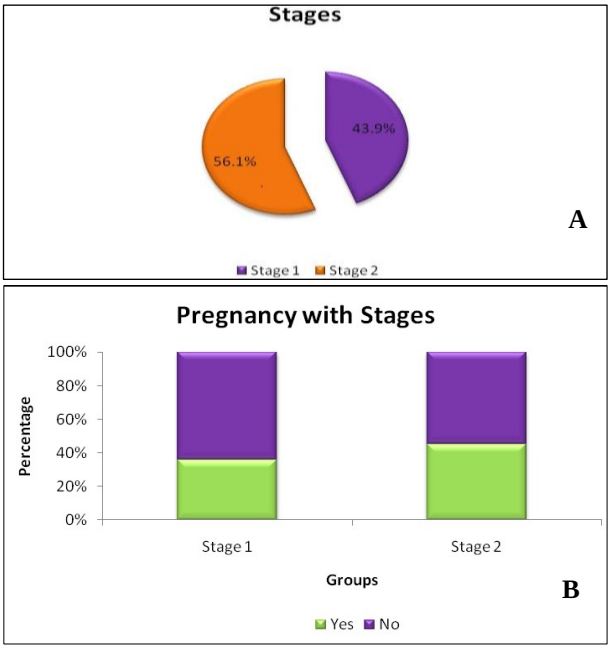

Figure 4: (A) Stage I and stage II endometriosis and (B) pregnancy in each stage.

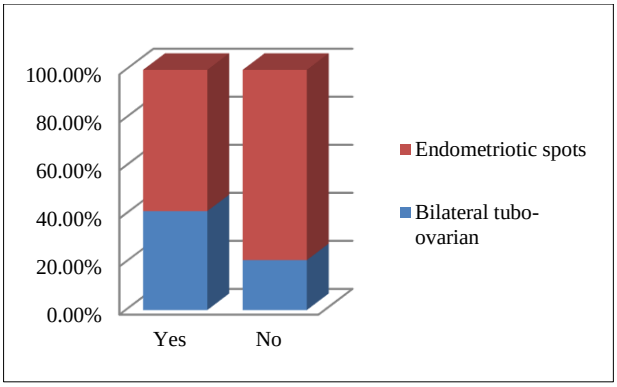

Figure 5: Comparison between intraoperative findings and reproductive outcome.

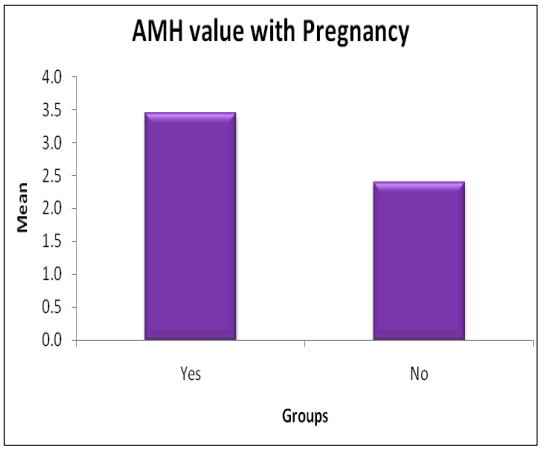

Figure 6: Mean AMH value and pregnancy outcome.

DISCUSSION

Infertility is a prevailing problem in the present scenario. According to statistics published by the World health organisation in 2016, 15% of women are affected by infertility globally. In India it ranges from 3.9 to 16.8% as reported by the National Health Portal of India.[7] Indian Society of Assisted Reproduction says that at least 1 in every 6 women is affected by infertility in urban India. When endometriosis is taken as the reason for infertility, 20-50% of women with infertility have endometriosis worldwide and in India it is in the higher side of the limit at 34-48%. This makes it a raging problem and has urged FOGSI and ISAR to come up with multiple recommendations for Indian population in the recent past. This study was conducted in a tertiary health care referral centre catering to urban women in South India where over 150-200 patients seek fertility treatment every month and 80-100 of them undergo diagnostic laparoscopy for evaluation of infertility and 20-40 cases of endometriosis in various stages are discovered at surgery every month.

The primary outcome of the study was to determine the number of women conceiving successfully after laparoscopy surgery for Stage I and Stage II endometriosis. Based on the pregnancy outcome achieved

in the Canadian Collaborative trial 30.7% was taken as predictive outcome following surgery and a sample size of 82 was calculated. Among the 82 women, 34 women had a successful pregnancy outcome which accounts for 41.5% of the sample size. Maroux et al in their Canadian Collaborative trial reported 30.7% as the positive pregnancy outcome.[6] In the Italian trial, although a contradictory study, Parazzini et al reported a pregnancy outcome of 24%.[8] The pregnancy outcome of the present study betters that of the two largest randomised controlled trials conducted on this subject. A more recent trial undertaken in Iran by Ashraf et al reported a pregnancy outcome of 24%.[9] Porpora et al reported an overall pregnancy rate of 64.4%, with almost 80% for stage I and 16% for stage II endometriosis after surgery. The major drawback of this study was that the sample size included only 45 women in various stages of endometriosis and only 10 women had stage I or II endometriosis, out of which 5 conceived.[10] Hence, this result cannot be likened to the present study. In the present study, 43.9% (n=36) had stage I endometriosis and 56.1% (n=46) had stage II endometriosis. Of the 34 women who achieved a conception, 38.2% had stage I endometriosis and 61.8% had stage II endometriosis. No statistical significance was obtained when the stage of endometriosis and probability of achieving a pregnancy were analysed (p=0.384). Nowroozi et al published a pregnancy outcome of 60.8% in women with mild or stage II endometriosis which closely resembles the results of present study. Ratio of minimal endometriosis is to mild endometriosis is 1:1.8 in the Canadian trial.[6,11] The ratio between minimal and mild endometriosis in the present study is 1:1.3. In the Canadian trial, 30% women belonged to stage I and 70% to stage II, while in the Italian trial, 39% women had stage I endometriosis and 61% had stage II.[6,12] The pregnancy rates between stage I and stage II endometriosis were not significantly different in both the studies akin to that reported in present study. Marcoux et al. in their study followed up the pregnancy up to 20 weeks and reported a fetal loss of 20.6%.[6] Though this is beyond the scope of the present study, on 6 months follow up, one woman had a molar pregnancy while all others had viable intrauterine gestation. No multiple pregnancies were reported.

During surgery, it was noted that endometriotic implants alone were present in 41.5% of candidates. These implants were located in the cul de sac, peritoneum or over the uterosacral ligaments. Periadnexial adhesions were found in 58.5% of women. Out of these, 50% women had bilateral tubo-ovarian adhesions altering their relationship. Porpora et al reported in their study that lower pregnancy outcome was possible if periadnexial adhesions are present.[10] In the present study, 41.2% women who had bilateral tubo-ovarian relationship altered by adhesions became pregnant. This is statistically significant finding (p=0.046). Hence, presence of periadnexial adhesions is a confounding factor for achieving pregnancy and the treatment of the same ensures a favourable outcome and should be routinely recommended. Among the women who conceived, 82.4% (n=28) did not require any additional intervention. They conceived spontaneously after timed intercourse. 17.6% (n=6) women needed ovulation induction to achieve pregnancy. Other interventions such as intrauterine insemination or IVF were not needed. Zeng et al suggested based on their study outcome that ovulation induction may be considered as a viable option to improve fecundity after laparoscopy surgery.[13] ESHRE recommends controlled ovulation induction with intrauterine insemination within 6 months post-surgery to improve reproductive outcome.[5] ASRM also recommends superovulation with clomiphene citrate or Gonadotrophin with or without intrauterine insemination after surgery particularly in women greater than 35 years.[14] In the present study, no statistical significance (p=0.318) was obtained on intervening with ovulation induction agents. The milieu is conducive for spontaneous conception after surgery. Further, although only six women over 35 years of age participated in this study, one of them who previously had a failed IVF achieved a spontaneous conception after surgery. Despite existing literature which recommends ovulation induction right after surgery, the rate of spontaneous conception is naturally better following surgery as testified in the present study. Women should be encouraged to attempt a natural conception soon after surgery before considering alternate treatments such as ovulation induction. Among the women who had positive pregnancy outcome, thirteen women had previously received infertility treatment such as ovulation induction, IUI or IVF. Three women after IUI and three women after IVF who failed to conceive, achieved it spontaneously after laparoscopy surgery. Though this is not statistically significant, it is reported in literature by Opoien et al and reaffirmed by societies such as ESHRE and ASRM that complete surgical treatment of stage I and stage II endometriosis is conducive for pregnancy and spontaneous conception. 32.4% of women who conceived in this study achieved the outcome within 3 months of surgery while 67.6% women took 3-6 months (Mean duration 4 months, SD 1.3).[15] Fuchs et al reported a mean time interval of 2 months during which fertility outcome was maximal in women with stage I and stage II endometriosis.[16] Similarly, Porpora et al suggested that there was a time related reduction in pregnancy rate.[10] It was 65.4% in first 6 months since surgery and declined to 11.6% after two years. ESHRE and ASRM also recommend that fertility outcome is highest within first 6 months after surgery.

Similar to reports in literature, a mean duration of 4 months is being reported in the present study. It is recommended to resume trying for pregnancy as soon as possible. FIGO in its recommendations in 2016 suggested that laparoscopy must be done in women younger than 37 years of age with a shorter duration of infertility less than 4 years.[17] Normal male factor, absent structural abnormalities of the uterus, normal ovulation, limited infertility treatment prior to surgery and no contraindication for laparoscopy are pre-requisites. A trial with laparoscopy prior to IVF must be given for a period of 9-15 months. ASRM also reiterated that women's age less than 35 years must be considered as

a prognostic factor when laparoscopy is undertaken. Marcoux et al included only women with median duration of infertility of 2 years in their study.[6] Bearing all this in mind, inclusion criteria was defined in this study. All patients were selected after ensuring that semen analysis was normal in the male partner. Tubal patency was ensured using hysterosalpingogram in 17% of the patients while the rest had chromopertubation done during laparoscopy. Prior surgery for endometriosis hampers fertility, thus such candidates were excluded. Additional surgery such as polypectomy, myomectomy or ovarian cystectomy was not included in the study. Histological confirmation of the diagnosis was not done in this study as it is not routinely recommended and only typical findings of endometriosis were recorded. There were no intra-operative or post-operative complications such as difficult pneumoperitoneum, vascular trauma, serosal tear of bowel or infection as reported by Marcoux et al.[6] No medical or hormonal therapy was instituted after surgery. Ovulation induction agent was given after individualisation based on age, duration of infertility and AMH value. IVF or IUI was not done for any of the patients. 74.4% women had an optimum coital frequency of more than 3 times a week. These finding rules out coital dysfunction as a cause for infertility. Mean duration of return of menstrual cycle after surgery was 0.9 months (SD 0.5) and return of regular intercourse was 1.4 months (SD 0.5). Patients were aware of timed intercourse and resumed it early.

Laparoscopy may be considered as first line treatment for minimal and mild endometriosis associated infertility in younger women particularly those less than 35 years of age. Women with low AMH of <1 did not conceive and a good AMH level prior to surgery is an important pre-requisite to determine fertility outcome following laparoscopy surgery.

Unlike the Canadian collaborative trial, no limit was imposed on duration of infertility in this study. Mean time since marriage was 4.7 years (SD 2.5). Mean duration of infertility was 3 years (SD 2) with a duration as low as 2 years and as high as 14 years being recorded. Duration of infertility did not show any statistical significance (p=0.165). Although ASRM and FIGO suggest that laparoscopy must be offered as a treatment option only if the duration of infertility is not long, such a submission could not be established in this study. Patient's preference and ability to afford treatment must be borne in mind before offering the option of surgery. 41.5% of the total sample size had taken previous treatment for infertility. Fifteen women had unsuccessful IUI and IVF attempts prior to surgery and after surgery six of them conceived spontaneously. Though a statistical significance could not be made, it ratifies that stage I and stage II does impair fertility and its treatment improves the same.

80.5% of the participants had dysmenorrhea, 20.7% of them had chronic pelvic pain and dyspareunia and 2% had both. Literature says that early endometriosis is usually asymptomatic but a large proportion of women in this study had painful periods. Mean pre-operative pain score of 1.2 (SD 1) was recorded and mean post-operative pain score was 0.1 (SD 0.3). This suggests that a highly statistically significant (p=0.0005) pain relief is obtained after laparoscopy surgery for stage I and stage II endometriosis. The pain relief was significantly more in women with stage II endometriosis (p=0.015).

The observations made in this study are similar to existing literature thus validating the results obtained. Laparoscopy is a necessary and indispensable intervention to diagnose as well as treat stage I and stage II endometriosis. Maximum benefit can be ensured after surgical management of these stages by way of a positive pregnancy outcome and significant pain relief. The acceptance of expectant management and diagnostic laparoscopy alone among patients is limited. Marcoux et al reported only a 13-minute prolongation in operative time to complete ablation or excision of minimal and mild endometriosis.[6] It is a procedure that can be done as day care with minimum complications and post-operative pain. Although recurrence of endometriosis cannot be ruled out after surgery and will need a second look surgery at a later date, a theoretical aversion of progression of early endometriosis to more severe forms can be ascertained after surgery. The results of the study favour using operative laparoscopy in stage I and stage II endometriosis to improve reproductive outcome. The results of the study favour using operative laparoscopy in stage I and stage II endometriosis to improve reproductive outcome. This study provides supportive evidence in favour of the long-standing debate on whether it must be performed or not. It circumvents the need for assisted reproductive techniques to achieve conception. This study paves the way for future research on this subject to obtain robust and indigenous evidence. It will enable the recommendation of laparoscopy as the first line intervention to improve fertility in women with Stage I and Stage II endometriosis.

CONCLUSION

Endometriosis and infertility are more commonly seeing the light of the day in India. With infertility becoming a silent pandemic, research on treatment of infertility is the need of the hour. With the advent of more laparoscopy centres, improved surgical expertise and patient awareness, more cases of endometriosis are being detected and successfully treated. The purpose of this study was to evaluate the role of laparoscopy surgery on reproductive outcome in Stage I and Stage II endometriosis among women with infertility. Large proportion of women undergoing laparoscopy surgical management of stage I and stage II endometriosis, successfully achieved a conception. Most women conceived spontaneously within a short span after surgery. The symptom of pain due to endometriosis was also relieved after surgery. Favourable factors to achieve pregnancy are younger age, optimal BMI and good AMH level. Duration of infertility does not affect pregnancy outcome. Laparoscopy surgery improves fertility rate in women who previously had an unsuccessful IUI or IVF. Even if a woman requires further IVF

treatment, pregnancy rate will be better following primary laparoscopy surgery. A similar study has never been undertaken in India. This study paves the way for future research on this subject and serves as constructive evidence to recommend laparoscopy as a treatment option for infertile women with stage I and stage II endometriosis. The treatment plan should be individualized after considering the age and duration of infertility. Surgery is advantageous in that it is immediately effective after a single cycle when compared with IVF. There is no increased risk of multiple pregnancies and it facilitates the possibility of subsequent pregnancies. Disadvantages such as cost of surgery, post-operative morbidity and need for longer duration of follow up are existent.

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