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Original Research Article

Endometriosis fertility index at laparoscope: a ray of hope and lots of scope

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ABSTRACT

Background: Endometriosis fertility index (EFI) is used to predict the fecundity in women with surgically and histologically confirmed endometriosis. Aim of the study is to evaluate the successful spontaneous pregnancy rates in patients with endometriosis after laparoscopic surgery in relation to EFI score.
Methods: Observational cross-sectional study was conducted on 76 patients who desire to conceive with suspected endometriosis related infertility treated by laparoscopic surgery. EFI score was calculated and information on mode of conception (spontaneous or assisted reproductive technology-ART) was collected by contacting the patients.
Results: In women who conceived spontaneously, mean age was 31.33+3.29 years. Factors found to be significant were age (pvalue-0.0001), time to achieve spontaneous pregnancy (median-9 months). Patients with higher EFI score (5-10) has good spontaneous conception rate (96.2%) compared to those with lower EFI score (0-4) that conceived better with ART (60%) women with lower least function score has better outcome for spontaneous pregnancy ($p<0.001$).
Conclusions: EFI scoring system is effective in predicting postoperative successful spontaneous pregnancy rates in the patients with endometriosis. In our study patients with higher EFI score achieved successful spontaneous pregnancy.

Keywords: EFI score, Endometriosis, Infertility, Spontaneous conception, Laparoscopy

INTRODUCTION

Endometriosis is a benign uterine pathology that effects 10-15% of women of reproductive age group.[1] Basic pathology in endometriosis is extra uterine presence of endometrial tissue leading to chronic inflammation. Women with endometriosis are generally asymptomatic.[6] to 10 percent of women of reproductive age group are affected by endometriosis.[4] It is present in 38 percent of infertile women and in up to 87 percent of women suffering from chronic pelvic pain.[2] Imaging modalities of any pelvic compartment pathologies have low specificity. Gold standard diagnostic method is laparoscopy with biopsy for histological diagnosis.[3] commonly used staging for endometriosis is revised American Fertility Society classification system (rAFS), but it has a limitation to predict the fertility rate in these women.[4,5]

Adamson and Pasta proposed Endometriosis fertility index (EFI) 6,8 scoring system in 2010 to predict the fecundity rate in women who underwent laproscopic surgery for endometriosis that includes patient characteristics-age, duration of infertility, prior pregnancy, intra operative lesions description (American Society for Reproductive Medicine, American fertility society), functional postoperative score (least functional score).

EFI is a sum of all these factors and ranges from 0-10.

This index is clinically useful in patients with surgically and histologically confirmed endometriosis who wish to be pregnant. The higher the EFI score, higher the chances of spontaneous pregnancy.[5,9]

The aim of our study is to find the spontaneous pregnancy rates in patients with endometriosis after laproscopic surgery in relation to EFI score. Objective is to determine the role of EFI score in postoperative management of patients with endometriosis related infertility.

METHODS

Study design

The study design was observational cross-sectional study.

This is a retrospective study conducted at Sri Ramachandra Institute of Higher Education and Research, Chennai, India. All patients with a suspected endometriosis related infertility with the desire to conceive and underwent fertility sparing surgery between January 2018 to January 2021 were included. Patients with age >45 years, those who underwent radical surgery (hysterectomy, bilateral adnexectomy) and histology negative for endometriosis were excluded from the study.

Surgeries were undertaken by consultant gynecological surgeon, performed under general anesthesia. Intraoperative findings were collected from the records and EFI score was calculated. Patients were contacted and the following data information was collected and recorded- Age of the patient, how long the patient had attempted to achieve pregnancy, means of conception-spontaneous or ART, outcomes of pregnancy, time of infertility (in months), previous pregnancy details (spontaneous or ART), total conception time, Least function score, AFS score will be calculated, endometriosis grade of the patient. Mode of conception was analysed with the EFI score and documented.

Statistical analysis

All the historical factors, AFS score, LF score, ENDO grade and EFI score were compared according to conception mode (spontaneous and ART). Chi square test was used to test statistical significance of cross tabulation between categorical variables and conception mode. In case of zero frequency in some of the categories, simulated p-value was calculated wherever required. Independent t-test or its non-parametric alternative Mann-Whitney U test was used to compare continuous variables between two groups for normal and non-normal data respectively. Shapiro-Wilk test was used to test normality of the data. Association between two continuous variables was assessed by Pearson correlation coefficient.

P<0.05 was considered statistically significant. RStudio Version 1.2.1093 was used for statistical analysis.

RESULTS

Age of the patient and conception time were found to be statistically significant when compared between two groups of spontaneous conception and ART.

Table 1: Historical factors of patients according to mode of conception.

Variable	Spontaneous (n=27)	ART (n=15)	P value
Mean (+SD) Age	31.33±3.29 years	34.93±2.69 years	0.001
Median conception time (months)	9 (6.18)	12 (10.20)	0.025
Median infertility time (months)	32 (26.42)	44 (30.48)	0.062
Prior pregnancy			
Yes	6 (22.2%)	5 (33.3%)	0.062
No	21 (77.8%)	10 (66.7%)	

Table 2: Least function score according to mode of conception.

Variable	Group		P value
	Spontaneous (n=27)	ART (n=15)	
Median LF score	6 (5.7)	3 (3.4)	<0.001

Table 3: American Fertility society(AFS) score according to mode of conception.

Variables	Mode of conception		P value
	Spontaneous (n=27)	ART (n=15)	
Median AFS endometriosis score	6 (4.9)	32 (30.52)	<0.001
Median AFS total score	9 (4.9)	82 (52.82)	<0.001

There was statistically significant association between mode of conception and grade of endometriosis (p<0.05). We observed that women with grade 1 endometriosis has highest chance of spontaneous conception rate (44.4%) than women with grade 4 endometriosis. ART was beneficial in almost 53.3% of women with grade 4 endometriosis.

EFI is a scoring system is formulated by including the assessment of historical factors at the time of surgery (age,

duration of infertility and pregnancy history), of adnexal function at conclusion of surgery (least functional score of Fallopian tubes, fimbriae and ovaries bilaterally), and of the extensiveness of endometriosis (rAFS endometriosis lesion score and total rAFS score).

Table 4: Endometriosis grade according to mode of conception.

Endometriosis grade	Mode of conception		P value
	Spontaneous (n=27)	ART (n=15)	
1	12 (44.4%)	0 (0.0%)	0.001
2	9 (33.3%)	2 (13.3%)	
3	3 (11.1%)	5 (33.3%)	
4	3 (11.1%)	8 (53.3%)	

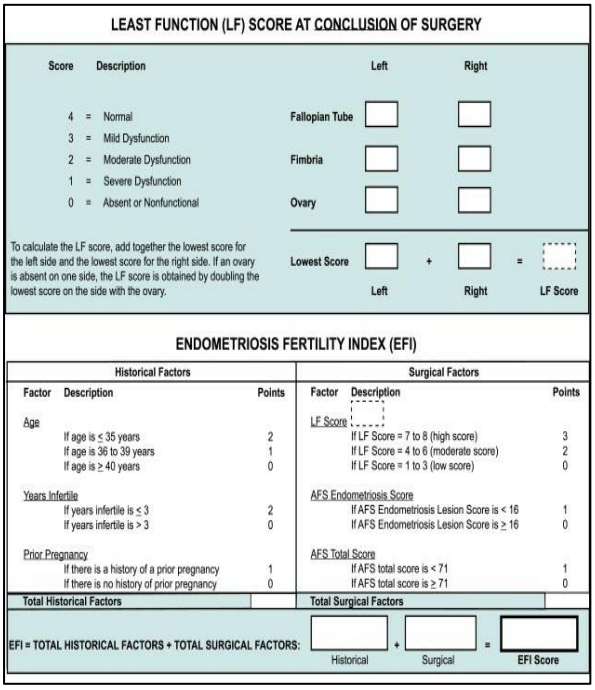

Figure 1: Endometriosis fertility index (EFI) surgery form.

Higher EFI score increases the spontaneous pregnancy rate.

All women with highest EFI score (9-10) were able to conceive spontaneously in 4.8 months after the laproscopic surgery.

Among 27 patients with spontaneous pregnancy rate, around 70% women were able to achieve successful spontaneous pregnancy rate less than a period of 12 months. Only 30% were able to achieve spontaneous successful pregnancy rate when given a time period of more than 2 months, observed for a maximum period of 36 months.

Table 5: EFI score according to mode of conception in numbers.

EFI	Spontaneous	ART
0-2	0	5
3-4	1	4
5-6	6	5
7-8	14	1
9-10	6	0

Table 6: Data on conception according to EFI.

EFI	0-2	3-4	5-6	7-8	9-10
Average period to achieve pregnancy in months (by either methods)	18.8	16.8	15	8.9	4.8
Percentage of spontaneous conception	-	20%	54%	93.3%	100%

Table 7: Conception time interval according to EFI score in spontaneous pregnancy.

Post operative time intervals (months)	3-4	5-6	7-8	9-10	N =27
1-6			3	6	9
7-12			10		10
13-18		2	1		3
19-24		4			4
25-30	1				1
31-36					

Table 8: Correlation between conception time (in months) and EFI score.

Variables	Correlation coefficient (95% CI)	P value
Conception time (in months) and EFI score	-0.765 (-0.867,-0.601)	<0.001

There was statistically significantly high and negative correlation found between conception time (in months)

and EFI score ($p<0.05$) which can also be visualized in Figure 1.

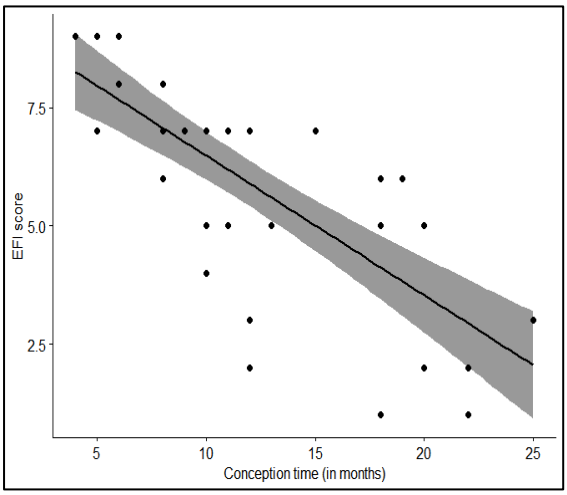

Figure 2: Scatter plot depicting correlation between conception time (in months) and EFI score.

DISCUSSION

EFI score is a robust tool for predicting the spontaneous pregnancy rate after surgery in women with endometriosis related infertility and it also helps in therapeutic decision making process as well.[10] In our study, patients who conceived spontaneously mean age was found to be 31.33±3.29 years, infertilty time was 26-42 months with a median value of 32 months. Time to achieve spontaneous pregnancy was 6-18 months with a median of 9 months. The historical factors found to be significant in our study are age (p value-0.001), time to achieve spontaneous pregnancy (p value-0.025) and no significance noted for prior pregnancy and infertility time. The results were comparable to the study published by Bailleul et al in 2021 where they found mean age (30.5 years), infertility time (23.3 months), conception time (14.3months) to be significant.[8]

The least function score suggests the impact of endometriosis on the function of adnexal structures such as fallopian tube, fimbria and ovary, observed intraoperatively and lower score (median=3) showed poor outcome for spontaneous pregnancy in patients with ART in current study ($p<0.001$) and was comparable to the study done by S. Maheux-Lacroix et all in 2017 where they quoted lower Least function score to be the most significant factor for the failure of spontaneous conception.[11]

Women with endometriosis grade 1 and 2 with an infertility period of >3 years has better post operative spontaneous conception rate (44.4 and 33.3% respectively) when compared to endometriosis grade 3 and 4 who conceived better with ART.

Patients with higher EFI score (5-10) has good spontaneous conception rate (96.2%) compared to lower EFI score (0-4) that conceived better with ART (60%). Hence endometriosis patients with lower EFI score (0-4) should be referred to ART at the earliest possible after surgery to optimise their chance of pregnancy. Vesali et al in 2020 found that the non ART pregnancy rate in patients with EFI score 0-2 to be 16%, 2-4 to be 18%, 5-6 to be 44%, 7-8 to be 55%.[1]

Spontaneous pregnancy rate was optimal upto 12 months postoperatively in patients with EFI score >7 and upto 24 months in patients with EFI sore >5 after which it reduced. Bailleul et al in 2021 quoted that fecundability reduced from 12 months for EFI 0-4, 24 months for EFI 5-10 and patients with favorable EFI may attempt spontaneous pregnancy for 24 months.[8]

Limitations

Small sample size, retrospective study design with recall bias on information about how long the patients attempted pregnancy postoperatively. Furthermore, we don't know if the woman became pregnant naturally after ART failure. Decision to attempt ART and duration of expectant management were highly dependant on preference of the woman and ability to afford ART.

CONCLUSION

Endometriosis fertility index scoring system is highly effective in predicting postoperative spontaneous pregnancy rate in patients with endometriosis and can be implemented in the clinical practice effectively. We observed that women with highest EFI score achieved successful spontaneous pregnancy when given a time frame of less than 12 months but when low EFI score is noted, it would be beneficial for the women to have an earlier approach to ART which will aid in achieving a better pregnancy outcome.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Vesali S, Razavi M, Rezaeinejad M, Maleki-Hajiagha A, Maroufizadeh S. Endometriosis fertility index for predicting non-assisted reproductive technology pregnancy after endometriosis surgery: a systematic review and meta-analysis. BJOG. 2020;127(7):800-9.
2. ACOG. Management of Endometriosis, 2010. Available at: https://www.acog.org/clinical/clinical-guidance/practicebulletin/articles/2010/07/management-of-endometriosis. Accessed on 10 February 2022.
3. Werner C. Williams gynecology study guide. 4th ed. Endometriosis. 2020: 233-247.

4. Wang W, Li R, Fang T. Endometriosis fertility index score maybe more accurate for predicting the outcomes of in vitro fertilisation than r-AFS classification in women with endometriosis. Reprod Biol Endocrinol. 2013;11:112.
5. Li X, Zeng C, Zhou YF, Yang HX, Shang J, Zhu SN et al. Endometriosis Fertility Index for Predicting Pregnancy after Endometriosis Surgery. Chin Med J (Engl). 2017;130(16):1932-7.
6. Adamson GD. Endometriosis classification: an update. Curr Opin Obstet Gynecol. 2011;23(4):213-20.
7. Missmer SA, Hankinson SE, Spiegelman D, Barbieri RL, Marshall LM, Hunter DJ. Incidence of laparoscopically confirmed endometriosis by demographic, anthropometric, and lifestyle factors. Am J Epidemiol. 2004;160(8):784-96.
8. Bailleul A, Niro J, Du Cheyron J, Panel P, Fauconnier A. Infertility management according to the Endometriosis Fertility Index in patients operated for endometriosis: What is the optimal time frame? PLoS One. 2021;16(5):e0251372.
9. Adamson GD. Endometriosis Fertility Index: is it better than the present staging systems? Curr Opin Obstet Gynecol. 2013;25(3):186-92.
10. Tomassetti C, Geysenbergh B, Meuleman C, Timmerman D, Fieuws S, D'Hooghe T. External validation of the endometriosis fertility index (EFI) staging system for predicting non-ART pregnancy after endometriosis surgery. Hum Reprod. 2013;28(5):1280-8.
11. Maheux-Lacroix S, Nesbitt-Hawes E, Deans R. Endometriosis fertility index predicts live births following surgical resection of moderate and severe endometriosis. Hum Reprod. 2017;32(11):2243-9.

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