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Use of the endometriosis fertility index in daily practice: A prospective evaluation

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ABSTRACT

Objective: To perform a prospective evaluation of postoperative fertility management using the endometriosis fertility index (EFI).
Study: This prospective non-interventional observational study was performed from January 2013 to February 2016 in a tertiary care university hospital and an assisted reproductive technology (ART) centre. In total, 196 patients underwent laparoscopic surgery for endometriosis-related infertility. Indications for surgery included pelvic pain (dysmenorrhoea, and/or deep dyspareunia), abnormal hysterosalpingogram, and failure to conceive after three or more superovulation cycles with or without intra-uterine insemination. Multidisciplinary fertility management followed the surgical diagnosis and treatment of endometriosis. Three postoperative options were proposed to couples based on the EFI score: EFI score $\leq$4, ART (Option 1); EFI score 5–6, non-ART management for 4–6 months followed by ART (Option 2); or EFI score $\geq$7, non-ART management for 6–9 months followed by ART (Option 3). The main outcomes were non-ART pregnancy rates and cumulative pregnancy rates according to EFI score. Univariate and multivariate analyses with backward stepwise logistic regression were used to explain the occurrence of non-ART pregnancy after surgery for women with EFI scores $\geq$5. Adjustment was made for potential confounding variables that were significant ($p < 0.05$) or tending towards significance ($p < 0.1$) on univariate analysis.
Results: The cumulative pregnancy rate was 76%. The total number of women and pregnancy rates for Options 1, 2 and 3 were: 26 and 42.3%; 56 and 67.9%; and 114 and 87.7%, respectively. The non-ART pregnancy rates for Options 1, 2 and 3 were 0%, 30.5% and 48.2%, respectively. The ART pregnancy rates for Options 1, 2 and 3 were 50%, 60.6% and 80.3%, respectively. The mean time to conceive for non-ART pregnancies was 4.2 months. The benefit of ART was inversely correlated with the mean EFI score. On multivariate analysis, the EFI score was significantly associated with non-ART pregnancy (odds ratio 1.629, 95% confidence interval 1.235–2.150).
Conclusion: In daily prospective practice, the EFI was useful for subsequent postoperative fertility management in infertile patients with endometriosis.

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Introduction

European and American guidelines [1,2] for the management of endometriosis-associated infertility are based on the stage of the disease according to the American Society of Reproductive Medicine (ASRM) classification or the revised American Fertility Society score (rAFS) [3,4]. Unfortunately, these classifications have limitations [5], especially in terms of effectiveness to predict postoperative pregnancy [6,7]. Another limitation is the failure to account for the different types of endometriotic lesions (e.g. superficial peritoneal and deep infiltrating endometriosis, endometrioma, adenomyosis etc.). However, the endometriosis phenotype could be related to natural fertility.

Considering the management of infertility, the first-line treatment remains unclear. On one hand, assisted reproductive technology (ART) could be the first option for women with a high risk of damage (e.g. asymptomatic deep or extensive

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endometriosis, previous surgery, recurrent endometrioma, postoperative complications) after surgery. On the other hand, surgery could be proposed to enhance non-ART pregnancy, especially after complete surgery.

Since 2010, the endometriosis fertility index (EFI) has been used for women who are concerned about their future fertility [8]. The EFI includes historical factors (age, duration of infertility, previous pregnancy) and surgical factors [total AFS score, AFS endometriotic lesions that negatively adjusted the score in the case of endometrioma or complete obliteration of the pouch of Douglas, and the least function score as the anatomic and functional result of the surgery on adnexae] (Fig. 1). The EFI is the first classification to give a clinical outcome following surgical diagnosis and treatment of endometriosis. Several external retrospective or combined studies have validated the EFI [9,10].

In a retrospective EFI validation, Boujenah et al. found that the benefit of ART was greater for patients with a low EFI score in terms of non-ART pregnancy rates [9]. These results could encourage rapid referral of patients with low EFI scores to ART management.

The World Endometriosis Society Consensus agreed that the EFI could be used for counselling couples, to provide reassurance to women with good prognoses, and to enable rapid referral of women with poor prognoses to ART management [11]. EFI could also be considered as a predictive factor for a spontaneous second pregnancy in fertility management [12].

However, the lack of prospective data on postoperative fertility management and results based on the EFI limit the counselling of women with endometriosis-related infertility. To date, a strict prospective evaluation of use of the EFI in daily practice has not been undertaken. Therefore, the aim of this study was to perform a prospective evaluation of postoperative fertility management using the EFI.

Materials and methods

Study design and patient selection

A prospective observational study was undertaken of all consecutive patients treated for infertility, who underwent a laparoscopy with histologic diagnosis and treatment of endometriotic lesions and who were offered postoperative fertility management based on their EFI score from 1 January 2013 to 29 February 2016.

Data were gathered from a tertiary care university hospital registry. All women underwent surgery at the university hospital, and were informed that data were entered routinely and prospectively into an electronic record-keeping system contributing to the PMSI (national "Programme de médicalisation des systemes d'information" L.710.5 du Code de la Santé Publique,

LEAST FUNCTION (LF) SCORE AT CONCLUSION OF SURGERY

Score		Description		Left		Right		
4	=	Normal	Fallopian Tube					
3	=	Mild Dysfunction						
2	=	Moderate Dysfunction	Fimbria					
1	=	Severe Dysfunction						
0	=	Absent or Nonfunctional	Ovary					
To calculate the LF score, add together the lowest score for the left side and the lowest score for the right side. If an ovary is absent on one side, the LF score is obtained by doubling the lowest score on the side with the ovary.			Lowest Score		+		=	
				Left		Right		LF Score

ENDOMETRIOSIS FERTILITY INDEX (EFI)

Historical Factors			Surgical Factors		
Factor	Description	Points	Factor	Description	Points
Age			LF Score		
	If age is ≤ 35 years	2		If LF Score = 7 to 8 (high score)	3
	If age is 36 to 39 years	1		If LF Score = 4 to 6 (moderate score)	2
	If age is ≥ 40 years	0		If LF Score = 1 to 3 (low score)	0
Years Infertile			AFS Endometriosis Score		
	If years infertile is ≤ 3	2		If AFS Endometriosis Lesion Score is < 16	1
	If years infertile is > 3	0		If AFS Endometriosis Lesion Score is ≥ 16	0
Prior Pregnancy			AFS Total Score		
	If there is a history of a prior pregnancy	1		If AFS total score is < 71	1
	If there is no history of prior pregnancy	0		If AFS total score is ≥ 71	0
Total Historical Factors			Total Surgical Factors		

EFI = TOTAL HISTORICAL FACTORS + TOTAL SURGICAL FACTORS: Historical + Surgical = EFI Score

Fig. 1. Endometriosis Fertility Index created by Adamson and Pasta (8).

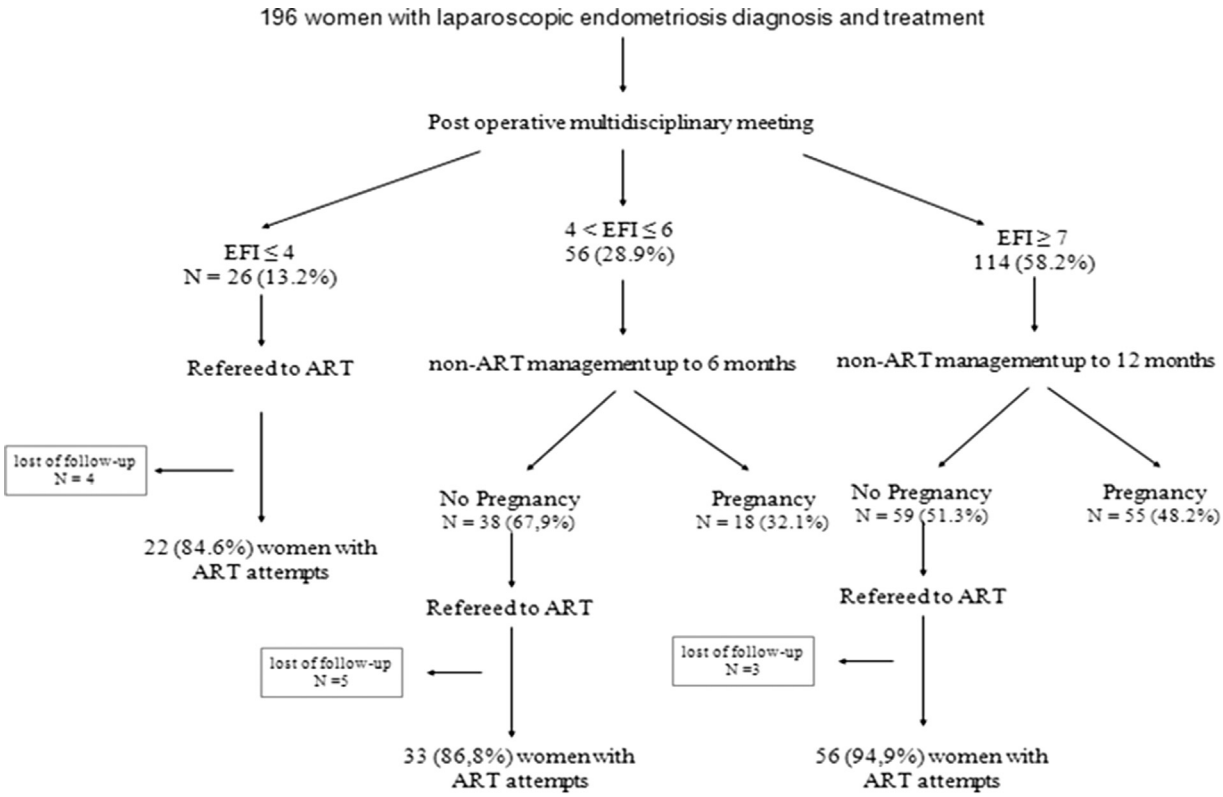

Fig. 2. Flow chart.

1991) database. Ethical review boards allow this electronic record keeping. Informed consent was obtained from each subject before surgery and ART, and a professional data management team reviewed these data. The local ethics committee of Jean Verdier Univeristy Hospital approved the study protocol (JVR93140-09-2012).

The study population met the following criteria: (i) infertility over a 12-month period; (ii) asymptomatic or pelvic pain (dysmenorrhoea, and/or deep dyspareunia); (iii) normal or abnormal hysterosalpingogram; (iv) normo-ovulation or failure to conceive after three superovulation cycles with or without intra-uterine insemination (IUI) (performed as first-line therapy for unexplained infertility); (v) laparoscopic diagnosis of endometriosis; and (vi) partner's semen classified as normal according to the criteria of the World Health Organization.

Surgical procedure

All laparoscopies were performed by two surgeons (BJ and PC). Indications for laparoscopy were: pelvic pain (dysmenorrhoea and/or deep dyspareunia), abnormal hysterosalpingogram, and failure to conceive after three or more superovulation cycles with or without IUI. Surgery was not performed solely for staging purposes.

In the case of women with asymptomatic deep infiltrating endometriosis, endometriosis with extensive adenomyosis or a history of endometrioma surgery, laparoscopy was not performed and ART was offered as the first-line treatment.

Complete surgical treatment of all recognizable endometriotic lesions was performed whenever possible. Surgical treatment of superficial peritoneal endometriotic lesions was performed by ablation with electrocoagulation, plasma ablation or excision (preferred choice for symptomatic women). Complete pelvic adhesiolysis was performed. Transient abdominal ovariopexy was performed using a non-absorbable suture (Prolene, Ethicon, Somerville, New Jersey, USA) for patients who had undergone complete adhesiolysis and endometriotic lesion removal with an rAFS score >8 per adnexa [13]. Prevention of adhesion recurrence was performed for patients with an rAFS score >6 or in cases with large peritoneal excision by hydro flotation with anti-adhesive liquid [Adept (4% icodextrin); Baxter, Maurepas, France] or by hyaluronic acid gel application (Hyalobarrier; Nordic Pharma France, Paris, France).

Digestive tract lesions (rectal shaving or resection) were treated when patients were clinically symptomatic or when tubal distortion was present. Endometriomas were treated by plasma ablation when they were <3 cm or when pre-operative diminished ovarian reserve was suspected, and were treated by cystectomy or plasma ablation when they were >3 cm in patients without diminished ovarian reserve[14,15]. Ovarian function was evaluated systematically after surgery using cycle length, ultrasound scan performed on Day 12 of cycle to check folliculogenesis, ovulation, antral follicle count (AFC), and serum anti-Mullerian hormone (AMH) (at 6 months when no pregnancy occurred). rAFS score, ASRM staging and EFI score were assessed after laparoscopy.

Postoperative management

According to a previous external validation of the EFI [9] and the fact that most pregnancies occur during the first 6 postoperative months, EFI score was classified into three groups:

(1) EFI score ≤4, referred to ART;
(2) EFI score 5–6, non-ART management for 3–6 months followed by ART (3 months for age >40 years, ovarian reserve assessed by ultrasound AFC <8); and

(3) EFI score ≥7, non-ART management for 9–12 months, followed by ART (6 months for age >40 years, ovarian reserve assessed by ultrasound AFC <8).

Patient distribution is detailed in Fig. 1. Postoperative management was decided after a multidisciplinary meeting (surgeon, biologist, medical gynaecologist). For Options 2 and 3 (described above), superovulation with or without IUI could be proposed for women who wanted active medical postoperative management. No hormonal suppression was prescribed because all patients wanted to become pregnant. For superovulation, the stimulated cycles were performed using recombinant gonadotrophins (Follitropin alpha GonalF, Merck-Serono, Lyon, France; Follitropin beta Puregon, MSD, Neuilly, France) in order to achieve two or three mature follicles >14 mm at ultrasound scan. Women were treated with a constant dose of follicle-stimulating hormone (FSH). The starting dose of FSH was adjusted individually according to age, body mass index and AFC, and began on the sixth or seventh day of the cycle. Ultrasound and biological assessment were performed after 5 days of FSH stimulation. Ovulation was triggered by human chorionic gonadotropin (hCG) injection, followed 24–36 h later by IUI.

Intent-to-treat analysis for postoperative pregnancy rates was performed to reflect current practice more accurately. Women, who were lost to follow up, were considered to be not pregnant, and were dropped from the study at this time.

Data collection and analysis

Data on history, physical examination, infertility history, surgery, postoperative follow-up and subsequent fertility were collected prospectively for all endometriotic and infertile patients in the database.

Diminished ovarian reserve was defined as FSH > 14 UI/l, AMH < 1 ng/ml or AFC < 8, and/or less than four oocytes retrieved at a previous in-vitro fertilization attempt (possibly at another centre).

The primary outcomes were non-ART pregnancy rate and cumulative (non-ART and ART) pregnancy rates for the three options for postoperative fertility management.

A spontaneous pregnancy was defined by a β-hCG level >25 IU/l. A live birth was defined as a delivery >25 weeks of pregnancy. The mean delay in spontaneous conception, or after superovulation with or without IUI, was calculated from the date of surgery to the date of hCG measurement.

The mean delay in conception after ART was expressed as the number of cycles started, including all cycles regardless of outcome (i.e. cancelled, triggered, no embryo transfer, fresh or frozen-warmed embryo transfer).

Statistical analyses were performed using Stata Version 11.0 (StatCorp LP, College Station, TX, USA). Descriptive data analysis used Student's *t*-test, and variance analysis used analysis of variance (ANOVA) for continuous variables when comparing more than two categories (two-way ANOVA). Chi-squared test or Fisher's exact test was used for qualitative variables when $n < 5$. Pearson's regression analysis was used to determine correlations. Bilateral tests were considered significant if $p < 0.05$.

To explain the occurrence of non-ART pregnancy after surgery for women with EFI scores ≥5, a multivariate analysis with a backward stepwise logistic regression was performed. Adjustment was made for potential confounding variables that were significant ($p < 0.05$) or tending towards significance ($p < 0.1$) on univariate analysis, and/or variables that may affect postoperative management (e.g. phenotypes of endometriosis and diminished ovarian reserve).

Results

From January 2013 to February 2016, 196 infertile women underwent laparoscopic surgery for endometriosis-related infertility (Fig. 2). Nine (4.6%) women were lost to follow-up. After surgery, 26 (13.2%) women with an EFI score ≤4 were referred directly to ART. Fifty-six (28.9%) women had non-ART management for 3–6 months due to EFI scores of 5–6, and 114 (58.2%) women had non-ART management for up to 12 months due to EFI scores ≥7. Seventy-three (37.2%) women achieved a non-ART pregnancy: 18 (32.1%) had EFI scores of 5–6 and 55 (48.2%) had EFI scores ≥7. The mean time to conceive for women with EFI scores of 5–6 and ≥7 was 5.2 [standard deviation (SD) 2.8] and 3.9 (SD 2.9) months, respectively.

Considering the overall population, superficial peritoneal endometriosis, endometrioma, deep posterior infiltrating

Table 1
Characteristics of patients.

Clinical variable	n (%) +/− SD
Previous endometriosis surgery	14 (7.1%)
Mean BMI (kg/m^2)	24.2 ± 3.3
Age (y), mean	32.3 ± 4.8
≤35	136
36–39	47
≥40	13
Infertility length (m), mean	37.5 ± 19.8
<3	87
≥3	109
Previous pregnancy	
Yes	63 (32.1%)
no	133 (67.9%)
Least Function score mean	6.7 ± 2.1
7–8	129 (65.8%)
4–6	49 (25%)
1–3	18 (9.2%)
AFS endometriosis score Index	
<16	96 (49%)
≥16	100 (51%)
ASRM total score, mean	22 ± 30
<71	168 (85.7%)
≥71	28 (14.3%)
ASRM staging	
I	74 (37.8%)
II	49 (25%)
III	34 (17.3%)
IV	39 (19.9%)
Superficial Peritoneal Endometriosis	192 (98%)
Endometrioma	36(18.4%)
Unilateral	23 (11.8%)
Bilateral	13 (6.7%)
Mean size (cm) (min-max)	4.5 (2–10)
Deep posterior infiltrating endometriosis	49 (25%)
With bowel involvement	12 (6.6%)
Without bowel involvment	37 (18.9%)
Deep anterior infiltrating endometriosis	4 (2%)
Adenomyosis	30 (15.3%)
Complete surgery	173 (88.7%)
Pre-operative Diminished ovarian Reserve	45 (23%)

ASRM: American Society for Reproductive Medicine; BMI: Body Mass Index; AFS: American Fertility Society.

Table 2
Predictive factors for non-ART pregnancy for women with EFI ≥ 5: Univariate analysis.

Clinical variable	Pregnancy $n = 72$	No Pregnancy $n = 97$	p
Previous endometriosis surgery	2 (2.7%)	5 (5.2%)	0,7
BMI (kg/m^2), mean ± SD	24 ± 2.9	24.2 ± 3.7	0.46
- Previous pregnancy			
- Livebirth	16 (22.2%)	20 (20.6%)	0.81
- Miscarriage or Ectopic Pregnancy	11 (15.3%)	13 (13.5%)	0.92
Adnexal distorsion (adherence, hydrosalpinges)	34 (47.2%)	48 (49.5%)	0.89
Superficial Peritoneal Endometriosis	72 (100%)	94 (96.9%)	N/A
Endometrioma	18 (25%)	10 (10.3%)	0.01
Deep posterior infiltrating endometriosis	12 (16.6%)	16 (16.6%)	0.85
Adenomyosis	5 (7%)	9 (9.4%)	0.77
Complete surgery	70 (97.2%)	88 (90.7%)	0.11
Pre-operative diminished ovarian Reserve	12 (16.6%)	19 (19.8%)	0.75
EFI, mean ± SD	7.7 ± 1.6	7.06 ± 1.42	0.002
rAFS score, mean ± SD	17.1 ± 22.7	13.5 ± 19.4	0.28
Post-operative ovarian stimulation	37 (51.4%)	13 (13.5%)	<0.01

EFI: Endometriosis Fertility Index; BMI: Body Mass Index; rAFS: revised American fertility Society.

endometriosis (i.e that penetrates >5 mm under the peritoneal surface involving uterosacral ligaments, torus uterinus-retrocervical area of the uterus where the uterosacral ligaments join together, complete obliteration of the pouch of Douglas, the posterior vaginal wall and the anterior rectal wall), deep anterior infiltrating endometriosis (i.e involving the anterior cul-de-sac lesions including endometriosis of the bladder detrusor) and adenomyosis rates were observed in 98%, 18.4%, 25%, 2% and 15.3%, respectively. Complete surgical excision was performed for 173 women (88.7%). Two patients who did not have diminished ovarian reserve pre-operatively were found to have diminished ovarian reserve 6 months after surgery. No laparoconversions were performed (Table 1).

On univariate analysis, women who achieved a non-ART pregnancy had a higher rate of endometrioma and postoperative ovarian stimulation (25% vs 10.3% and 51.4% vs 13.5%, respectively; $p < 0.05$). The mean EFI score was also higher in women who achieved a non-ART pregnancy (7.7 vs 7.06; $p < 0.05$) (Table 2).

On multivariate analysis, after adjusting for confounding factors, the EFI score, surgical treatment of an endometrioma, and postoperative ovarian stimulation remained significantly associated with achievement of a non-ART pregnancy {adjusted odds ratio 1.629 [95% confidence interval (CI) 1.235–2.150]; 5.731 [95% CI 1.726–19.024] and 15.232 [95% CI 5.485–42.302], respectively} (Table 3).

Of the women who did not achieve a non-ART pregnancy after surgery, 123 were referred to ART. Twelve women (6.1% of the study population) were lost to follow-up. Therefore, 111 women had an ART attempt (representing 372 started cycles). The mean follow-up of the patients who underwent ART management was 13 months. The overall pregnancy rate after ART was 67.9%: 11 (50%) women with EFI scores ≤4, 20 (60.6%) women with EFI scores of 5–6, and 45 (80.3%) women with EFI scores ≥7.

The benefits of ART were assessed for each group in order to analyse the benefits of this integrated approach to achieve pregnancy. The added value of ART was higher for women with low EFI scores (Table 4).

In the overall population, the rate of ongoing pregnancy was 76%. The 'baby take home rate' was 57.1%.

Comments

Main findings

In the authors' experience of using the EFI in daily practice, 149 (76%) women achieved a pregnancy (37.2% after non-ART management and 38.8% after ART management). The 'baby take home rate' was 57.1%. These results were consistent with the authors' previous retrospective external validation of the EFI [9]. The higher the EFI score, the higher the probability of achieving a non-ART pregnancy. Moreover, the authors confirmed that the EFI could be used clinically to manage postoperative fertility. As suggested by Adamson et al., women with low EFI scores (i.e poor prognosis of non-ART pregnancy) should be offered ART as an option after surgery [16]. Recommending surgery first in order to improve the non-ART pregnancy rate remains a matter of debate [17], although the combined approach, using surgery and ART, has been reported previously as an effective strategy to enhance the pregnancy rate rather than surgery or ART alone [18,19].

The univariate and multivariate analyses of predictive factors for non-ART pregnancy rate confirmed that the EFI score was an independent factor [8]. As reported previously, complete surgery was associated with a higher non-ART pregnancy rate [20,21]. Concerning the dilemma of endometrioma management, some authors found that surgical treatment could improve fertility [22]. However, Santulli et al. did not find a significant relationship between endometrioma and infertility, and therefore questioned the need for surgery [23].

An original finding of this study was the benefit of postoperative ovarian stimulation. Its use (including superovulation with or without IUI) for endometriosis related to infertility remains a matter of debate [24,25]. As most previous studies were retrospective case–control studies and did not determine the cumulative pregnancy rate over a long period, the only effect of postoperative ovarian stimulation could be a shortened time to conceive, rather than an actual increase in the pregnancy rate [26], especially for women with peritoneal superficial endometriosis [27].

Table 3
Predictive factors for non-assisted reproductive technology (ART) pregnancy after surgery for women with non-ART management (endometriosis fertility index scores 5–10): multivariate analysis.

Clinical variable	Adjusted Odd Ratio 95% CI
EFI	1.62 [1.235–2.150]
Peritoneal Superficial Endometriosis	2.108 [0.186–23.936]
Endometrioma	5.731 [1.726–19.024]
Deep Infiltrating Endometriosis	1.902 [0.659–5.486]
Diminished Ovarian Reserve	1.066 [0.939–2.893]
Complete Surgery	2.520 [0.336–18.878]
Post-operative ovarian stimulation	15.232 [5.485–42.302]

EFI: Endometriosis Fertility Index; CI: Confidence Interval.

Table 4
Integrated approach: surgery and assisted reproductive technology (ART).

EFI score n (%)	Non-ART pregnancy rate n (%) Mean time to conceive in months (range)	Women with attempted ART n (%) Mean no. of cycles started	Pregnancy ART rate n (%) Mean no. of cycles started (range)	Combined pregnancy rate n (%)	Multiplicative coefficient
4≤ 26 (13.4%)	0	22 (84.6%) 4.3	11 (50%) 2.3 (1–8)	11 (42.3%)	N/A
5–6 56 (28.9%)	18 (30.5%) 5 (2–13)	33 (57.1%) 3.6	20 (60.6%) 2.6 (1–8)	38 (67.9%)	2.22
≥7 114 (57.8%)	55 (48.2%) 4 (1–12)	56 (49.1%) 2.83	45 (80.3%) 2.8 (1–8)	100 (87.7%)	1.8

EFI, endometriosis fertility index; N/A, not applicable.

Strengths and weaknesses

To the authors' knowledge, this is the first prospective study to investigate the use of the EFI in daily practice. Surgery and postoperative management were performed at a single centre by surgeons and medical and biological specialists in infertility. The results provide useful information:

(i) The EFI score could be used after laparoscopic surgery for rapid referral of women with low EFI scores to ART management.
(ii) Expectant management after surgery did not further decrease the ART pregnancy rate.
(iii) Complete surgery, including the removal of endometrioma, may increase the non-ART pregnancy rate.
(iv) Postoperative ovarian stimulation could be an option for management.

Nevertheless, this study has some limitations. Firstly, the EFI staging did not include ovarian reserve and uterine factor. The degree and extent of surgery (urinary, digestive and vaginal lesions in particular) is not well described by the EFI score. Therefore, these clinical variables could have represented selection bias for postoperative delay before referral for ART. Secondly, the wide 95% CI on multivariate analysis for endometrioma and postoperative ovarian stimulation could be explained by significant correlation of the clinical variables, and therefore limits the real value of these odds ratios. Thirdly, the small number of women with deep infiltrating endometriosis with bowel or bladder/ureteral involvement limits the value for these phenotypes, and could represent a selection bias. Fourthly, with regard to endometrioma, fertility analysis was not performed according to the bilaterality and size. The mean size of an endometrioma (4.5 cm) limits external validation for larger endometrioma. Regarding postoperative ovarian stimulation, the rate of endometriosis recurrence was not noted. Finally, the prevalence of adenomyosis that could affect the pregnancy rate was not known.

Finally, the non-ART pregnancy rate could be associated with the duration before attempting ART. All previous external validations of the EFI have shown a slower pregnancy rate after 9–12 postoperative months, with a flattening of the Kaplan–Meier curve [8–10]. Regarding optimal management of infertility, these limitations should be considered to provide optimal care for women.

Meaning of the study

The 'baby take home rate' (57.1%) in this study was similar to that found in a retrospective external validation [8]. Hence, the EFI is a robust and reproducible tool for the prediction of postoperative non-ART pregnancy.

When using the EFI score, other predictive factors and fertility parameters (i.e. age, previous surgery, type, localization and extent of lesions) for non-ART pregnancy should be analysed. Regarding endometrioma, experimental data have suggested a deleterious effect on ovarian function, ovarian reserve and folliculogenesis [28–30]. Moreover, *peri*-ovarian endometriosis and distortion of pelvic anatomy due to adherences may explain infertility. These mechanisms could explain the advantages of adhesiolysis, as well as complete treatment of endometrioma [20–32]. On the other hand, excision may reduce the ovarian reserve, particularly if it is done on a wide scale by surgeons with little experience of laparoscopy. Regarding *deep infiltrating endometriosis,* or previous surgery for endometriosis, specialized imaging can be used for diagnosis, and ART management could be indicated and therefore conducted upfront [26]. Regarding postoperative ovarian stimulation, the potential negative effects of endometriosis on ovarian steroidogenesis and folliculogenesis [28] may explain its benefit.

Another consideration should be a focus on sexual and quality-of-life dysfunctions. Several studies have suggested that women with infertility [33] and women with endometriosis [34] had more sexual dysfunction and altered quality of life. This issue should be included in decision-making regarding laparoscopy and the postoperative management of women with endometriosis-related infertility [35].

To date, the EFI score is the only validated staging system. The benefit of the EFI score is to help practitioners to choose between ART or non-ART management after laparoscopic surgery. A strength of the EFI score is that it includes clinical parameters related to fertility (i.e. age, previous pregnancy and duration of infertility). Research should focus on a staging system that could include other predictive factors for pregnancy. Finally, these results reflect a combined approach in a multidisciplinary centre including medical doctors, surgeons and biologists.

Conclusion

In daily prospective practice, the EFI was useful for subsequent fertility management in infertile patients with endometriosis undergoing surgery. Patients with a low EFI score should be counselled regarding ART to increase global pregnancy rates.

Conflict of interest statement

None declared.

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None.

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