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**Association of Preoperative Enzian Score with Postoperative Fertility in Patients with Deep Pelvic Endometriosis.**

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**ABSTRACT**

**Introduction:** Endometriosis is a chronic inflammatory disease with a negative impact on fertility. The Enzian classification provides a precise description of deep pelvic endometriotic lesions, especially in the retroperitoneal area, from preoperative pelvic MRI scans. However, it is not known if it is correlated with postoperative fertility.

**Study objective:** To determine if there is an association between the preoperative Enzian score and postoperative fertility after deep pelvic endometriosis surgery.

**Design:** We conducted a descriptive, retrospective study using information from the ENDOREN database.

**Setting:** This was a retrospective study at the Department of Obstetrics and Gynecology at Rennes University Hospital (France) from January 2013 to May 2019

**Patients and interventions:** We used information from the ENDOREN database that included all women who underwent surgery for deep endometriosis and wish to conceive. This surgery was intended in a view to achieve a complete removal of endometriosis.

**Measurements:** The Enzian score was calculated from preoperative MRI scans, and total, spontaneous, and after In Vitro Fertilization (IVF) live births and pregnancies outcomes were collected from the patients' computerized medical records. Univariate and multivariate analysis was performed.

**Results:** Sixty-eight patients were included. The live-birth rate was 35% (24/68). According to the Enzian classification, 25 patients (35%) were classified in compartment A, 64 patients (94%) in compartment B, and 27 (40%) in compartment C. In multivariate analysis, positive predictor of live birth was single Enzian B score (OR=4.7[1.21; 18.81], p=0.03), negative predictors were uterine adenomyosis and a history of endometriosis surgery. In multivariate analysis, positive predictor of spontaneous live birth was EFI score  $\geq 7$  (OR =22.434; CI [1.138; 442.190]). In multivariate analysis, positive predictor was Enzian A score (OR=15.9[2.2; 114.7], p=0.006), and negative predictors was uterine adenomyosis and Enzian B score (OR=0.01[0; 0.495], p=0.02) for live birth after IVF.

**Conclusion:** The present retrospective study cannot strongly conclude about fertility and correlation with Enzian score because the groups are too small. However, it seems that when solely the compartment B is involved by endometriosis, complete full removal of endometriosis leads to better post-operative live births results. Other studies must be done to determine if Enzian classification based on preoperative pelvic MRI could be clinical value in the decision-making strategy for managing infertile patients with deep pelvic endometriosis.

**Keywords:** Endometriosis – Enzian score- fertility

## INTRODUCTION

Pelvic endometriosis is a benign inflammatory disease with a prevalence of 5-10% in women of reproductive age (1). It is responsible for infertility in 25-30% of patients through anatomical changes and distortions created by adhesions and fibrosis (2).

Different classifications and scores are used by the international community to characterize endometriosis. The most widely used is the revised American Society of Reproduction Medicine (rASRM) classification (3, 4). However, while easy to use, the rASRM classification is not correlated with postoperative fertility, does not take into account posterior pelvic involvement, and does not provide morphological and mapping data of deep endometriosis lesions. More recently, a German team developed the MRI-based Enzian-score classification to supplement the rASRM classification. The Enzian classification is more anatomical and more focused on deep pelvic endometriosis lesions with a complete morphological analysis including the retroperitoneal space (5), thereby providing a better preoperative description of the lesions. It has been shown to be better correlated with symptom severity than the rASRM classification (5, 6).

The Enzian score could be a powerful preoperative tool for personalized counselling of infertile patients with deep pelvic endometriosis. However, no studies to date have shown a correlation between the Enzian classification and fertility after surgery.

The objective of this study was to determine if there is an association between the preoperative Enzian score and postoperative fertility after surgery for deep pelvic endometriosis.

## **MATERIELS ET METHODES**

### Study Design

We conducted a descriptive, retrospective study using information from the ENDOREN database.

The study was approved by the Ethics Committee of the Rennes University Hospital (Reference number: 35RC17\_3077\_ENDOREN).

### Setting

At the Department of Gynecology and Obstetrics of Rennes University Hospital (France).

### Patients

The data of all women who underwent surgery for deep endometriosis from January 2013 to May 2019 were extracted from the ENDROREN database.

Patients were included for analysis if they were over 18 years, and if they had a desire to conceive following surgery.

Patients who had digestive lesions and had undergone colorectal resection (discoid or segmental) were excluded. Patients who had other type of medical induced pregnancy than IVF were excluded.

A diagnosis of deep endometriosis was retained based on clinical examination, pelvic ultrasound or pelvic MRI according to the criteria validated by various studies (7).

The MR images of deep pelvic endometriosis were defined as implants or tissue masses with hypointense and / or hyperintense at the T1-weighted, T2-weighted sequences or at T1 weighted Fat-Sat with hemorrhagic foci (7). All pelvic MRI exams in our center are performed after rectal cleaning and vaginal opacification.

Surgical indications were pelvic pain unresponsive to medical treatment with or without infertility, and/or infertility after failure of two assisted reproduction technology (ART) procedures (in vitro fertilization). Infertility was defined as a failure to conceive for 12 consecutive months.

### Intervention: Surgical management

All the women underwent a laparoscopic procedure performed by gynecologic surgeons who were experts in endometriosis.

The first step consists of exploring the abdominal cavity to identify all the endometriosis lesions, to perform a complete resection, and to provide the rASRM score. If an endometrioma is detected, a cystectomy can be performed depending on its size, and the preoperative ovarian reserve. If needed, a uterosacral ligament or a rectovaginal nodule resection, or ureterolysis and adhesiolysis are performed. For all the procedures, complete

excision of all endometriosis nodules was achieved. All patients had a first postoperative visit 4 – 6 weeks after surgery then once a year to evaluate fertility and identify obstetrical issues. This surgery was intended in a view to achieve a complete removal of endometriosis.

#### Data collection

The data were collected for each patient by retrospective access to their computerized medical records on the Dxcare software. Patient characteristics included age at surgery, body mass index (BMI), smoking, gestational age/parity, endometriosis-related surgery history and type of surgery. Data about the type of endometriosis included symptomatology and pelvic MRI results including adenomyosis. Surgical data were taken from detailed reports (including the rASRM score, and the Endometriosis Fertility Index (EFI)). The characteristics of infertility (duration of infertility, preoperative ART, day 3 FSH, AMH assay and spermogram of the spouse) were collected from the Medifirst software.

The Enzian score and the adenomyosis classification were established on the basis of a radiologist's review of the patient's pelvic MRI scans. The Enzian score was created in 2005 by a German team and revised in 2011 to describe deep pelvic endometriosis lesions in the retroperitoneal space (8). This last one was used in this study. It classifies endometriosis lesions into three compartments: compartment A (recto-vaginal and vaginal septum), B (pelvic wall uterosacral ligaments) and C (rectum and sigmoid). The severity of the lesions was based on the grade of invasion (1: less than 1 cm, 2: 1 to 3 cm and 3: more than 3 cm). Other locations are coded by AF for adenomyosis, FB for the bladder, FU for the ureters, FI for the digestive tract and FO for other organs. When several lesions were classified in one compartment, the most invasive lesion was taken into account.

Adenomyosis is frequently associated with deep endometriosis lesions and is defined by the presence of endometrial glands within the myometrium Chapron, 2017 #2397}. Its presentation may be internal with involvement of the thickened junction zone (JZ) (>12mm or JZ/posterior wall thickness ratio > 40%), external with involvement of the uterine serosa and in relation to deep pelvic endometriosis lesions present in the anterior and posterior compartments. Adenomyosis can be defined as either focal (one or more foci or adenomyomas in the myometrium) or diffuse with numerous foci scattered throughout the myometrium as described by Bazot et al (9).

The pregnancies obtained after surgery, as well as their outcomes, were recorded. The definition of a pregnancy included biochemical pregnancies (positive blood beta-HCG)

achieved spontaneously or after ART management. The total number of pregnancies was defined as live birth, miscarriage, or ectopic pregnancy.

Outcome measures:

The primary outcome measure was the live-birth rate. The secondary outcome measure was pregnancy (regardless of outcome) stratified by ART-induced pregnancy and spontaneous pregnancy.

### Statistical analyses

Quantitative results are expressed as mean  $\pm$  standard deviation (min; Q1; median; Q3; max) and qualitative results are expressed as numbers (%). For group comparisons, the Student's parametric test or Mann-Whitney Wilcoxon's non-parametric test was used for quantitative variables and the Chi2 test or Fisher's exact test was used for qualitative variables.

Multivariate analysis involved a logistic regression model including all factors that were statistically significant in the univariate analysis or that were clinically relevant in the literature. All statistical tests have a significance level of  $p < 0.05$ . Statistical analyses were performed using SAS v.9.4® (SAS Institute, Cary, NC, USA).

## RESULTS

Ninety-three patients underwent surgery for deep pelvic endometriosis without digestive lesions with a desire to conceive postoperatively between 2013 and 2019 and meet the inclusion criteria. Twenty-five patients were excluded due to missing radiological data. A total of 68 patients were included for analysis.

### 1) Patient characteristics, intraoperative findings and postoperative complications.

Patient characteristics are presented in Table 1. The median age of the population was 33 years [21-44] and the median BMI was 21.2 kg/m<sup>2</sup> [16.5 - 35]. Thirty-eight percent of the patients had at least one pregnancy before surgery. Thirty patients (44%) had previously undergone surgery for endometriosis. The predominant symptoms were dysmenorrhea (90%), dyspareunia (75%) and chronic pelvic pain (62%). Analysis of the pelvic MRI performed, showed that 37% of the patients had lesions in the uterosacral ligaments and 29% in the torus. Fifty-eight percent had at least one endometrioma. The surgical procedures were performed laparoscopically for 94% of the patients (n=64), of which 6% (n=4) were robot-assisted. Fifty-two percent (n=35) of the patients had undergone IVF prior to surgery. All the patients have a desire of conception and 57 really attended to conceive with a mean duration of 36 months. No intraoperative complications were observed in our population.

Overall, 53% procedures consisted of resection of the uterosacral ligaments and 21% of resection of the torus uterinum.

Postoperative complications were observed in five patients: one patient (1%) who required revision surgery for a complicated digestive fistula of a pelvic abscess requiring a discharge colostomy was classified as Clavien-Dindo grade IIIb; and three others (4%) were classified as Clavien-Dindo grade I (metrorrhagia, reflex ileus, wall hematoma and chest pain).

Forty-two (62%) patients were rASRM stage IV (severe endometriosis), 11(16%) stage III, and 15 (22%) stage II. The median EFI score was 7 [1-10] and half of the patients had a score  $\geq 7$  (49%).

### 2) Enzian Classification and Adenomyosis

According to the Enzian classification, 24 patients (35%) had lesions classified in compartment A, 64 patients (94%) in compartment B, and 27 (40%) in compartment C. The majority of the lesions were grade 2 (A2 (n=16), B2 (n=39) and C2 (n=13)). Sixty-three

percent (n=43) of the patients had adenomyosis which were internal for 24% (n=16) and external for 40% (n=27) mainly with a posterior localization (28%, n=19) (Table 2).

### **3) Postoperative fertility**

The live-birth rate was 35% (24/68). Overall, 31 patients conceived after surgery for pregnancy rate of 46% with 43 pregnancies.

Beyond this pregnancies, 27(40%) were spontaneous, 16(24%) after IVF. Among them, we report 24(35%) live births with 12(18%) spontaneous and 12(18%) after IVF.

The median time to spontaneous conception was 10 months, and 9 months after ART.

### **4) Univariate analysis and multivariate analysis of factors predictive of live births.**

#### **Total live births**

Presence of uterine adenomyosis, a history of endometriosis surgery, and an age  $\geq 35$  years were associated with a lower rate of live births, while a single Enzian B score, an AMH level at the upper threshold of 1 appeared to have a positive impact on live births (Table 4).

Using multivariate analysis, uterine adenomyosis, a history of endometriosis surgery remained associated with a lower rate of live births while a single Enzian B score with a positive impact on live births.

#### **Spontaneous live births**

In univariate and multivariate analysis, a higher spontaneous live birth rate was associated with an EFI score  $\geq 7$  (OR =22.434; CI [1.138; 442.190]) (Table 5).

#### **Live births after IVF**

In the multivariate analysis, uterine adenomyosis and Enzian score B were associated with lower rate of live births, while previous infertility, and Enzian A score with higher rate (Table 6).

## Discussion

The present retrospective study cannot strongly conclude about fertility and correlation with Enzian score because the groups are too small. However, we suggest an association between preoperative Enzian scores and post-operative live births. It seems that when solely the compartment B is involved by endometriosis, complete full removal of endometriosis leads to better post-operative live births results. We also showed that a history of endometriosis surgery, uterine adenomyosis, age at diagnosis were also correlated with post-operative fertility.

A recent consensus of the World Endometriosis Organization recommends the use of both the rASRM and Enzian scores to assess endometriosis preoperatively (13). The rASRM score is widely used, simple and well understood by surgeons, and is used to describe preoperative endometriosis lesions. However, it is not correlated with the prognosis of spontaneous postoperative pregnancy (3, 14). The only score validated by several international teams to predict pregnancy rates after endometriosis surgery is the EFI score which was recently developed by Adamson and includes preoperative and clinical data (15-17).

However, neither the rASRM nor the EFI scores take into account the extraperitoneal (i.e., retroperitoneal and subperitoneal) of deep endometriosis lesions. With this in mind, the Enzian classification was created by a German team in 2005 and then simplified in 2011 for easier use by surgeons. The advantage of the Enzian classification is that it is performed preoperatively and describes both sub- and retroperitoneal lesions. It has been shown to be accurate with excellent validity by MRI (18). However, its contribution in terms of assisting in the decision-making process to improve postoperative fertility in women managed for deep pelvic endometriosis has yet to be determined.

A previous study sought to demonstrate a relation between Enzian score and post-operative fertility. Arfi et al. used a nomogram to evaluate the fertility of patients operated on for deep pelvic endometriosis without digestive lesions by integrating the Enzian classification, and demonstrated that the following factors were associated with live births: age <30 years, BMI <25kg/m<sup>2</sup>, and an Enzian invasion grade 1 (19). They highlight the benefit of operating patients with grade 1 lesions to increase the live-birth rate. Their study differs from ours in that they used the Enzian classification intraoperatively (which was not at all the original purpose of this classification) and classed patients only by grade of invasion (i.e., size of lesion). In our study, we calculated the Enzian score preoperatively based on pelvic MRI as initially proposed in the literature. We also took into account the compartmentalization of the endometriosis lesion locations.

In the present study, we observe that patients with a single B Enzian compartment involved by endometriosis are more likely to have a post-operative live birth after complete removal of endometriosis lesions. Ninety-four percent of our patients had Enzian compartment B lesions. But 27 (40%) patients have a unique B compartment involved. The benefit of surgery could thus be more important for this population. Surprisingly we also observed that patients with A Enzian compartment involved are more likely and patients with Enzian B are less likely to have a post-operative live birth after complete removal of endometriosis lesions when entering IVF. It is surprising that an anatomical score could be predictable of pregnancy after IVF. This last result is difficult to interpret as 7 patients had both compartment A and B involved, 7 patients had both compartment A and B involved, and 15 patients with A, B and C compartments.

Several prognostic factors have been reported to impact endometriosis-related infertility. In the present study, age appears as a prognostic factor as has been found in other studies (26, 27). Adenomyosis was found to be a prognostic factor negatively impacting pregnancy, a finding which is described in the meta-analysis of Vercellini et al's 2014 metaanalysis (28).

No randomized studies have been published to date about whether patients with deep pelvic endometriosis with infertility should first undergo ART or surgery. However, recent studies have demonstrated that complete surgical resection of deep pelvic endometriosis is associated with increased fertility (10-12). In this work, we used the live-birth rate, a clinical element more relevant to our population of infertile patients with a desire for pregnancy, as the main outcome measure.

The main limitation of our study is its retrospective nature and the small size of our population that doesn't allow to strongly conclude about fertility and correlation with Enzian score.

However, our population is similar to that presented in the work of Haas et al (6). It is also similar to the population in Arfi et al.'s study on postoperative fertility, which found an identical distribution in the different stages of the rASRM score (19).

Another limitation is the difficulty of analysis using the Enzian classification due to the intricate nature of the compartments for each patient. A patient can have lesions in different Enzian compartments and thus the impact of separated compartments is difficult to analyze. In fact in this study, the population was heterogeneous with 35% patients with Enzian A, 94% patients with Enzian B and 40% patients with Enzian C. This could explain why patients have the contrary results for patients having a B compartment involved. Also, they underwent surgery

for various reasons: pain symptoms or failure of two IVF. This important heterogeneity may lead to misconception on the subsequent fertility.

### **Conclusion**

Other studies must be done to determine if Enzian classification based on preoperative pelvic MRI could be clinical value in the decision-making strategy for managing infertile patients with deep pelvic endometriosis. The development and use of new descriptive scores for endometriosis such as the Enzian score may give rise to personalized management of patients with deep pelvic endometriosis and infertility.

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**Table 1: Patient characteristics, Per operative findings and Postoperative complications**

<i>Total, N= 68 patients</i>	
Age (years) (min-max)	<b>33 (21-44)</b>
Age < 35 years (n, (%))	<b>52 (76,5%)</b>
BMI median en kg/m <sup>2</sup> (min-max)	<b>21.2 (16.5-35)</b>
Previous pregnancy	<b>26 (38.2%)</b>
Median (min-max)	1 (1-4)
ART before surgery : (n, (%))	<b>35 (52%)</b>
Duration of infertility (months), median (Min-Max)	<b>36 (5-252)</b>
AMH (ng/ml): median (min-max)	<b>2.2 (0.33-18.6)</b>
(n, (%))	
- Ectopic pregnancy	2 (3%)
- Miscarriage	22 ( <b>32%</b> )
- Induced medical abortion	6 ( <b>9%</b> )
- Live birth	16 (23,5%)
History of surgical endometriosis (n, (%))	30 (44%)
- Number of operations (%)	1 (1,5%)
- Type (n, (%))	
o Adhesiolysis	20 (30%)
o Cystectomy	14 (21%)
o deep endometriosis nodule resection without digestive procedures	8 (12%)
o Endometriosis nodule resection with shaving	4 (6%)
Digestive symptoms (n, (%))	
- Dyskesia	14 (21%)
- Defecation pain	10 (15%)
- Voiding dysfunction	13 (19%)
- Voiding pain	4 (6%)
Gynecologic symptoms : (n, (%))	
- Dysmenorrhea	60 (90%)
- Dyspareunia	51 (75%)
- Chronic pelvic pain	36 (62%)
Endometriosis nodule (MRI): (n, (%))	
- Torus	20 (29%)
- Uterosacral ligament	25 (37%)
- Vagina	6 (9%)
- Vesicouterine pouch	3 (5%)
- Rectum	10 (14%)
- Sigmoide	7 (10%)
- Ureter	4 (6%)
- Endométrioma	39 (58%)
o Unilateral	17 (25%)
o Bilateral	21 (31%)
Preoperative treatment by agonist GnRH (n, (%))	8 (12%)
- Mean duration of treatment (months)	4.75
Surgical route (n, (%))	
- Laparoscopic	<b>64 (94%)</b>
- Robotic-assisted laparoscopy	4 (6%)
- Laparoconversion	2 (3%)
Duration of the surgery, minutes (min-max)	78 (30-271)
Surgical acts: (n, (%))	
- Ureteral liberation	47 (70%)
- Uterosacral resection	36 (53%)
- Torus removal	14 (21%)
- Adhesiolysis	50 (74%)
- Shaving	30 (44%)
- Ovariectomy	1 (1%)
- Cystectomy	23(34%)
- Resection of nodule of the vesicouterine pouch	15 (22%)
rASRM score: (n, (%))	
- I	0

- II	<b>15 (22%)</b>
- III	11 (16%)
- IV	<b>42 (62%)</b>
Median EFI score (min-max)	6.5 (1-10)
- $\leq 4$	20 (29%)
- 5-6	15 (22%)
- $\geq 7$	33(49%)
Clavien-Dindo complications	
o Grade 1	3 (4%)
o Grade 2	0
o Grade 3	1(1%)
o Grade 4	0
o Grade 5	0

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**Table 2: Enzian classification and adenomyosis**

<i>Total, N = 68 patients</i>	
Compartment A Rectovaginal septum, vagina (n, (%))	24 (35%)
- Grade 1 less than 1 cm	2 (3%)
- Grade 2 between 1 and 3 cm	16 (24%)
- Grade 3 more than 3 cm	6 (10%)
Compartment B (n, (%)) sacro-uterine ligament, pelvic wall	64 (94%)
- Grade 1 less than 1 cm	<b>14 (21%)</b>
- Grade 2 between 1 and 3 cm	<b>39 (57%)</b>
- Grade 3 more than 3 cm	11 ( <b>16%</b> )
Compartment C (n, (%)) bowel	27 (40%)
- Grade 1 less than 1 cm	1 (1%)
- Grade 2 between 1 and 3 cm	<b>13 (19%)</b>
- Grade 3 more than 3 cm	13 (19%)
Endometriosis non genital lesions (F) (n, (%))	
- FA : adenomyosis	39 (61%)
- FI : bowel	2 (3%)
- FU : ureter	1 (1%)
- FB : bladder	1 (1%)
- FO : other	0
Total adenomyosis (n, (%))	43 (63%)
Internal adenomyosis (n, (%))	<b>16 (27%)</b>
External adenomyosis (n, (%))	27 (40%)
- Anterior	10 (15%)
- Posterior	19 (28%)
- Adenomyoma	7 (10%)

**Table 3: Postoperative pregnancy outcomes (with only IVF)**

<i>Total, N = 68 patients</i>	
Total pregnancies (n, (%))	43 (63%)
- Spontaneous	27(40%)
- Medical assisted Induced: IVF	16(24%)
Total Live birth (n, (%))	24 (35%)
- Spontaneous	12 (18%)
- Medical assisted Induced: IVF	12 (18%)
Miscarriage (n, (%))	16(25%)
Ectopic pregnancy (n, (%))	3(4%)

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**Table 4: Predictive factors of live births with univariate analysis and multivariate analysis with logistic regression**

Predictive factor of live birth				
Variables	Univariate analysis		Multivariate analysis	
	OR [IC95%]	P-value	OR [IC95%]	P-value
EFI score		p = 0.2576		
≤ 4	1		-	-
[5-6]	0.87 [0.19 ; 4.11]			
≥ 7	2.25 [0.64 ; 7.92]			
Adenomyosis yes/no		0.0269	0.245 [0.064 ; 0.933]	0.0392
No	1			
Yes	0.30 [0.10 ; 0.87]			
AMH classes threshold = 1		0.0374		
< 1	1		-	-
≥ 1	5.50 [1.10 ; 27.36]			
rASRM Score		0.4191		
[6-15]	1		-	-
[16-40]	1.80 [0.37 ; 8.68]			
≤ 41	0.72 [0.21 ; 2.49]			
Previous infertility		0.7062		
0	1		-	-
1	1.29 [0.34 ; 4.86]			
History of endometriosis surgery		0.0003	0.073 [0.016 ; 0.327]	0.0006
0	1			
1	0.08 [0.02 ; 0.32]			
Enzian A score		0.3798		
No	1		-	-
Yes	1.61 [0.56 ; 4.63]			
Enzian B score		0.0912		
No	1		-	-
Yes	0.06 [0.00 ; 1.58]			
Enzian C score		0.5054		
No	1		-	-
Yes	1.43 [0.50 ; 4.08]			
Enzian A+B score		0.7835		
No	1			
Yes	0.80 [0.16 ; 3.93]			
Enzian B+C score		0.6726		
No	1			
Yes	0.74 [0.18 ; 3.06]			
Enzian A+B+C score		0.6778		
No	1			
Yes	0.77 [0.23 ; 2.59]			
Single Enzian A score		0.4863		
No	1			
Yes	0.20 [0.00 ; 18.87]			
Single Enzian B score		0.0384	4.768 [1.209 ; 18.810]	0.0257
No	1			
Yes	3.14 [1.06 ; 9.29]			
Age classes		0.0242		
<30	1			
30-35	0.74 [0.22 ; 2.46]			
>35	0.05 [0.01 ; 0.43]			

**Table 5: Predictive factors of spontaneous live births with univariate analysis and multivariate analysis with logistic regression**

Predictive factor of spontaneous live birth				
Variables	Univariate analysis		Multivariate analysis	
	OR [IC95%]	P-value	OR [IC95%]	P-value
EFI score		0.0228		
≤ 4	1			0.0228
[5-6]	1.13 [0.02 ; 68.26]		1.129 [0.019 ; 68.255]	
≥ 7	22.43 [1.14 ; 442.19]		22.434 [1.138 ; 442.190]	
Adenomyosis yes/no		0.2870		
No	1		-	-
Yes	0.50 [0.14 ; 1.79]			
AMH classes threshold = 1		0.1232		
< 1	1		-	-
≥ 1	10.51 [0.53 ; 209.33]			
rASRM Score		0.1368		
[6-15]	1		-	-
[16-40]	1.57 [0.29 ; 8.42]			
≤ 41	0.33 [0.07 ; 1.56]			
Previous infertility		0.1717		
0	1		-	-
1	0.37 [0.09 ; 1.54]			
History of endometriosis surgery		0.0453		
0	1		-	-
1	0.19 [0.04 ; 0.97]			
Enzian A score		0.4270		
No	1		-	-
Yes	0.56 [0.14 ; 2.33]			
Enzian B score		0.1424		
No	1		-	-
Yes	0.21 [0.03 ; 1.68]			
Enzian C score		0.7997		
No	1		-	-
Yes	0.84 [0.22 ; 3.18]			
Enzian A+B score		0.7352		
No	1		-	-
Yes	1.47 [0.16 ; 13.46]			
Enzian B+C score		0.2496		
No	1		-	-
Yes	0.40 [0.08 ; 1.90]			
Enzian A+B+C score		0.2252		
No	1		-	-
Yes	3.76 [0.44 ; 32.04]			
Single Enzian A score		0.2664		
No	1		-	-
Yes	0.08 [0.00 ; 7.19]			
Single Enzian B score		0.7363		
No	1		-	-
Yes	1.24 [0.35 ; 4.44]			
Age classes		0.1480		
<30	1		-	-
30-35	0.45 [0.11 ; 1.81]			
>35	0.12 [0.01 ; 1.11]			

**Table 6: Predictive factors of live births after IVF with univariate analysis and multivariate analysis with logistic regression**

Predictive factor of live birth after IVF				
Variables	Univariate analysis		Multivariate analysis	
	OR [IC95%]	P-value	OR [IC95%]	P-value
EFI score		0.1981		
≤ 4	1			
[5-6]	0.87 [0.19 ; 4.11]			
≥ 7	0.26 [0.05 ; 1.25]			
Adenomyosis yes/no		0.0943		
No	1		0.106 [0.015 ; 0.760]	0.0256
Yes	0.32 [0.09 ; 1.21]			
AMH classes threshold = 1		0.5447		
< 1	1		-	-
≥ 1	1.67 [0.32 ; 8.70]			
rASRM Score		0.7890		
[6-15]	1		-	-
[16-40]	1.44 [0.17 ; 12.23]			
≤ 41	1.79 [0.33 ; 9.64]			
Previous infertility		0.1783		
0	1		137.958 [1.578 ; 12064.86]	0.0308
1	7.91 [0.39 ; 160.67]			
History of endometriosis surgery		0.0200		
0	1			
1	0.08 [0.01 ; 0.67]			
Enzian A score		0.0668		
No	1		15.872 [2.196 ; 114.704]	0.0062
Yes	3.36 [0.92 ; 12.28]			
Enzian B score		0.1424		
No	1		0.010 [0.000 ; 0.495]	0.0209
Yes	0.21 [0.03 ; 1.68]			
Enzian C score		0.2857		
No	1		-	-
Yes	2.00 [0.56 ; 7.14]			
Enzian A+B score		0.5012		
No	1		-	-
Yes	0.54 [0.09 ; 3.21]			
Enzian B+C score		0.5200		
No	1		-	-
Yes	2.05 [0.23 ; 18.14]			
Enzian A+B+C score		0.0815		
No	1		-	-
Yes	0.30 [0.08 ; 1.16]			
Single Enzian A score		0.8962		
No	1		-	-
Yes	0.74 [0.01 ; 70.74]			
Single Enzian B score		0.0360		
No	1		-	-
Yes	5.62 [1.12 ; 28.27]			
Age classes		0.1886		
<30	1		-	-
30-35	1.40 [0.36 ; 5.48]			
>35	0.09 [0.00 ; 1.90]			