The Role Of LPS In Infertility

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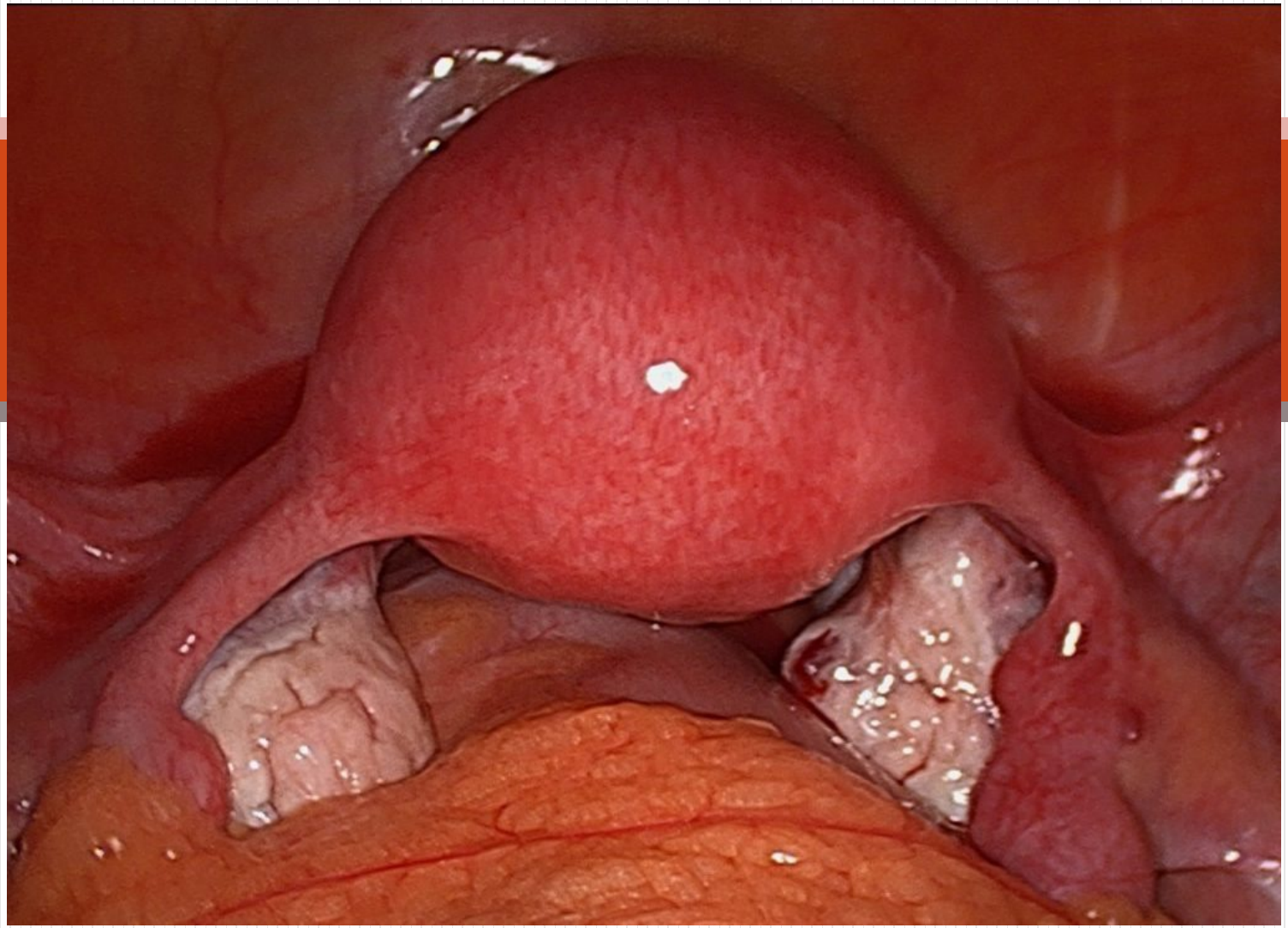
1400



Introduction

- **In gynecology, endoscopes are used most often to diagnose conditions and/or direct surgical procedures by direct visualization of the peritoneal cavity (laparoscopy) or the inside of the uterus (hysteroscopy).**

- **Laparoscopy is currently considered to be the `gold standard' of pelvic endoscopic procedures as it provides not only a panoramic view of the pelvic and abdominal cavities but also the opportunity to perform extensive surgery.**

ADVANTAGES & DISADVANTAGES

Advantages include:

Panoramic view & magnified pictures

- the possibility to perform both diagnosis and therapy at the same time, and the opportunity to combine the laparoscopy with the hysteroscopic exploration of the uterine cavity with an endometrial biopsy, all as part of day care surgery
- adhesions are less likely to form with laparoscopic surgery than with laparotomy.
- laparoscopy is the standard method for the surgical diagnosis of endometriosis and pelvic adhesions

- Disadvantages of laparoscopy include :
- general anaesthesia, patient's anxiety , the major & minor complications , cost , availability & surgeon skill
- Intramural myomas, or the inside of a hollow viscus such as the uterus or urinary bladder cannot be visualized or palpated. an imaging modality, such as ultrasonography, computed tomography (CT), or magnetic resonance imaging (MRI), is superior. Because of its ability to view soft tissue, ultrasonography is more accurate than laparoscopy for the evaluation of the inside of adnexal masses.
-

Therapeutic (Operative) LPS

- Many procedures previously performed as traditional laparotomic and vaginal operations are readily performed under laparoscopic direction.
- Better equipments , surgeon's skill
- **Operative laparoscopy has the benefit of shorter hospital stays, less postoperative pain, and faster return to normal activity when compared with procedures performed via laparotomy**

- In addition to the general benefits of endoscopic procedures, Because sponges are not used, the amount of direct peritoneal trauma is reduced substantially, and contamination of the peritoneal cavity is minimized. The reduced exposure to the drying effect of room air allows the peritoneal surface to remain relatively moist and, therefore, less susceptible to injury and subsequent adhesion formation.

Peritoneal Access

- **Before any laparoscopic procedure can be performed, the surgeon must successfully access the peritoneal cavity and pneumoperitoneum must be created.**
- **The main entry strategies are "open laparoscopy," often referred to as Hasson entry, and "closed" entry, which includes "preinsufflation" using a hollow needle to inflate the peritoneal cavity prior to positioning of the initial cannula or port, and "direct entry" techniques where the port is passed through the abdominal wall without prior inflation of the peritoneal cavity.**
- **The most accurate test of appropriate needle position is an initial intraperitoneal pressure of less than8 to 10 mm Hg as measured by the insufflator .**
- **Aspiration test, irrigation test, hanging drop test are other important tests for veress needle position**

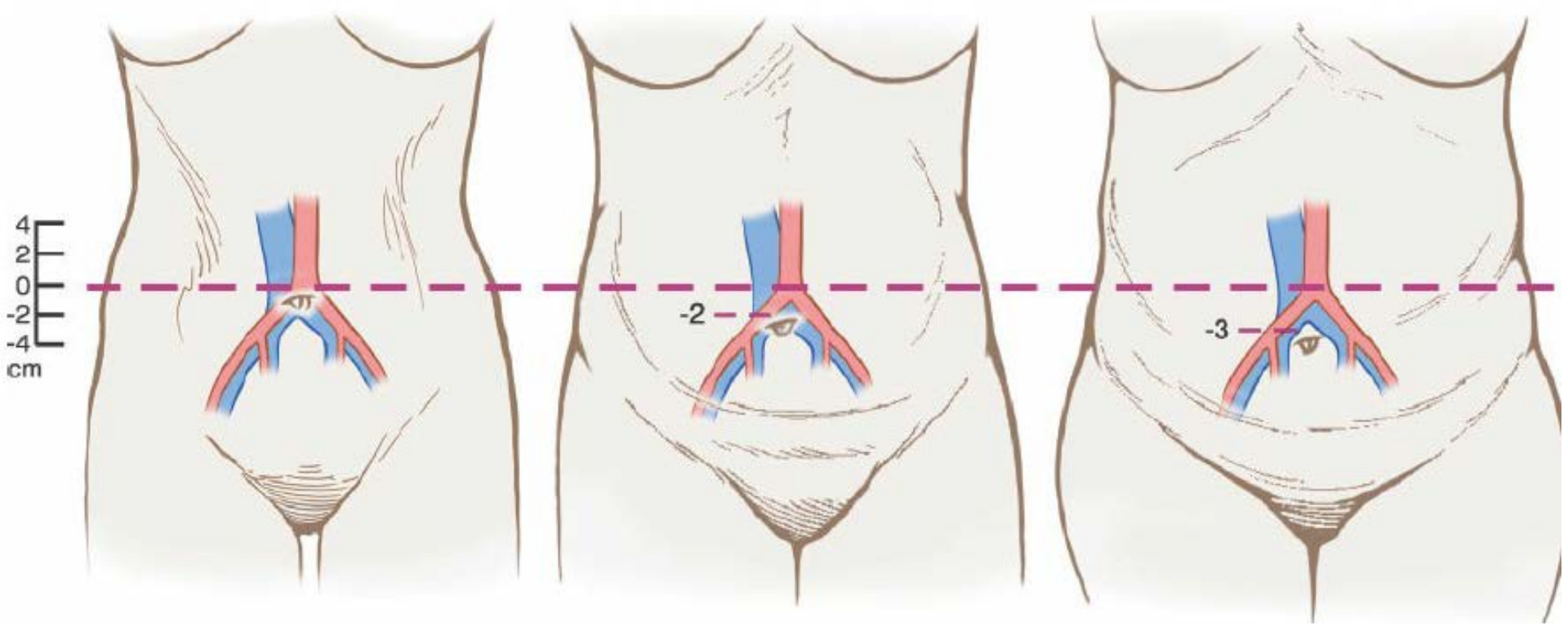


FIGURE 26-11 Umbilicus and weight. Location of the great vessels and their changing relationship to the umbilicus with increasing patient weight (from **left** to **right**). The

LPS & IVF

- The first ovum pickup procedures were done by LPS. Nowadays, TV OPU is the first way, but in virgins for Oocyte freezing, still has a good place.
- ZIFT & GIFT
- In pre pubertal girls and women who have not time to COH for oocyte freezing, ovarian tissue freezing with LPS and again transplantation of tissues by LPS
- ART complications : Torsions, Bleeding, EP

CAUSES OF INFERTILITY

The main causes of infertility include:

1. **Male factor**
2. **Decreased ovarian reserve**
3. **Ovulatory factor**
4. **Tubal factor**
5. **Uterine factor**
6. **Pelvic factor**
7. **Unexplained**

LPS & Ovarian factor

- **Ovarian cysts: persistent cysts, dermoid, endometrioma**
- **Female fertility preservation**
- **Ovarian transposition**
- **PCO& LOD**

Recommendations

5.7.1	EBR	Laparoscopic ovarian surgery could be second line therapy for women with PCOS, who are clomiphene citrate resistant, with anovulatory infertility and no other infertility factors.	❖❖❖ ⊕⊕◯◯
5.7.2	CCR	Laparoscopic ovarian surgery could potentially be offered as first line treatment if laparoscopy is indicated for another reason in women with PCOS with anovulatory infertility and no other infertility factors.	❖❖❖
5.7.3	CPP	Risks need to be explained to all women with PCOS considering laparoscopic ovarian surgery.	
5.7.4	CPP	Where laparoscopic ovarian surgery is to be recommended, the following need to be considered: • comparative cost • expertise required for use in ovulation induction • intra-operative and post-operative risks are higher in women who are overweight and obese • ere may be a small associated risk of lower ovarian reserve or loss of ovarian function • periadnexal adhesion formation may be an associated risk.	

Justification

LOS is an intervention that can lead to a singleton birth in women with PCOS. There is no convincing evidence of inferiority over other common ovulation induction agents, there is no need for monitoring (because of mono-ovulation) and only a background risk of multiple pregnancy. However, it is important to note that LOS is an invasive surgical intervention; there is a small risk of reduced ovarian reserve or loss of ovarian function; and adhesion formation should be considered. Issues covered in the clinical practice points should be carefully considered.

Tubal diseases

- About 25-35% of female factor infertility is tubal factor
- PID, EP, Pelvic surgeries, Endometriosis, septic abortions
- HSG is the first test to evaluate tubal patency and cavity of the uterus at the same time. **HSG should be avoided in the setting of known hydrosalpinges and/or current or suspected PID.**
- **In such cases LPS is the best option**
- HSG can not reveal peritoneal adhesion & endometriosis.LPS is gold standard .
- HSG can not distinguish septum from bicorn UT. LPS is necessary.

HSG

- If tubes are open in HSG, it is reliable(95%) but with unilateral or bilateral occlusion we need more investigation.

- Abnormal findings on HSG can be validated by direct visualization on laparoscopy using chromopertubation, which involves the transcervical installation of a dye such as indigo carmine to directly visualize tubal patency and fimbrial architecture.(N2019)

Tubal Occlusion

- Bilateral proximal tubal occlusion: Spasm, repeat after 1 month , tubal catheterization under HSG or HYS
- Laparoscopic surgery with chromopertubation and concomitant hysteroscopic tubal cannulation is the most common surgical treatment of proximal tubal obstruction(T2020)
- If failed then ART. Re anastomosis is no longer recommended.

- Distal tubal disease and occlusion are causal in 85% of all tubal infertility and can be secondary to a variety of inflammatory conditions including infection, endometriosis, or prior abdominal or pelvic surgery

Tubal Surgery in the Era of ART

- For women with tubal factor infertility, treatment options are reconstructive surgery and IVF. Over the last 2 decades, IVF success rates have increased steadily (from approximately 10% to over 40%) and now frequently exceed those achieved with surgery. And LPS skills and instruments have been improved dramatically.

- IVF has become the treatment of choice for much or most tubal factor infertility, particularly for couples with other infertility factors or severe tubal disease. However, surgery remains an appropriate option in select circumstances and for couples with ethical or religious objections or financial restrictions that preclude IVF.

Tubal surgery or IVF

- **The decision between surgery and IVF should be based on the following**
- **The age of woman**
- **Ovarian reserve**
- **Prior fertility status**
- **Number of children desired**
- **Site and extent of tubal damage**
- **Presence or absence of other factors necessitating IVF**
- **Surgeon's experience**
- **Success rate of IVF program**
- **Patient preference, that is, religious belief, cost, and insurance coverage for each option**
- Patients younger than 35 years of age with mild distal tubal disease, normal tubal mucosa, and absent or minimal pelvic adhesions are the best candidates for corrective microsurgery

Distal Tubal surgery

- Fimbrioplasty involves lysis of fimbrial adhesions or dilation of fimbrial phimosis, whereas salpingostomy (also known as neosalpingostomy) involves the creation of a new tubal opening in an occluded fallopian tube

- In well-selected patients, pregnancy rates are reported to be 32% to 42.2%, 54.6% to 60%, 30% to 34.6%,for adhesiolysis, fimbrioplasty, neosalpingostomy.

- **As a group, these procedures are associated with a 7.9% rate of subsequent ectopic pregnancy**

Tubal disease & IVF

- The majority of pregnancies occur within the first 2 years after surgical treatment of distal tubal obstruction(S2019

- IVF should be considered for older patients or those with diminished ovarian reserve, combined proximal and distal tubal disease, severe pelvic adhesions, tubal damage that is not amenable to reconstruction, or additional infertility factors and after one year tubal surgery

- **Please remember even in IVF candidates, LPS is important because of Hydrosalpinxes**.

Sterilization Reversal

- Twenty percent of women express regret following sterilization, and 1% to 5% of those will request reversal , often as a result of a change in marital status or children death.

- The technique for sterilization reversal involves microsurgical dissection of the occluded ends of the fallopian tube followed by a layered reapposition of the proximal and distal tubal segment.

- Surgical approaches include minilaparotomy, laparoscopy , and robotic-assisted laparoscopy

Sterilization Reversal

- Pregnancy rates following microsurgical tubal reanastomosis for sterilization reversal are 55% to 81%, with most pregnancies occurring within 18 months of surgery . Ectopic pregnancy rates following the procedure are generally <10% but may approach 18%

- **The main predictors of success are age <35 years , isthmic–isthmic or ampulo-ampullar anastomosis , final anastomosed tubal length >4 cm , and less destructive sterilization methods such as rings or clips** .

- Unlike vasectomy reversal, the length of time between fallopian tubal sterilization and reversal does not seem to affect outcome.

- IVF should be considered ***in lieu*** of sterilization reversal for older patients or those with diminished ovarian reserve, severe pelvic adhesions, additional infertility factors or prior unsuccessful reanastomosis .

Hydrosalpinx

- Distal occlusion may lead to fluid buildup in the fallopian tube causing a hydrosalpinx .Hydrosalpinx fluid impedes embryo development and implantation in natural and IVF cycles.

- Salpingectomy for hydrosalpinx prior to IVF significantly improves both pregnancy and live birth rates when compared to IVF performed with the fallopian tubes *in situ* ,although laparoscopic tubal occlusion appears to be a reasonable alternative .There is significantly less outcome data on the use of transvaginal needle drainage and salpingostomy for treatment of hydrosalpinges prior to IVF

Hydrosalpinx(S2019)

- One concern with salpingectomy or even tubal occlusion or ligation is its impact on ovarian reserve. Despite contradictory results in early reports, salpingectomy does not impact ovarian reserve, perhaps except when it is done for ectopic pregnancy. No significantly decrease serum AMH concentration, ovarian response to stimulation, or clinical pregnancy rates with IVF.
- Remove it across the distal mesosalpinx, close to the fallopian tube to avoid compromising the blood supply to the ovary and take care of IPL
- Laparoscopic salpingectomy or proximal tubal occlusion increases IVF success rates by twofold and should be recommended to all women with hydrosalpinges planning IVF.

Observational Study

Medicine®

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Laparoscopic surgery

Any role in patients with unexplained infertility and failed in vitro fertilization cycles?

Xiaoming Yu, MD, He Cai, MD, Jing Guan, MD*, Xingbang Zheng, MD, Hongjing Han, MD

Abstract

Patients who undergo several in-vitro fertilization (IVF) treatment cycles and fail to conceive present a frustrating problem to the clinician. When 1 cycle of IVF treatment fails, should we offer the couples to choose additional cycle of IVF instead of evaluation of the potential peritoneal factor? In cases of otherwise unexplained infertility, the investigation cannot be considered to be complete until laparoscopy has been performed. The aim of the study is to investigate the fertility outcome of laparoscopic treatment in infertile women with repeated IVF failures.

This is a retrospective case-control study conducted in a tertiary care, academic teaching hospital from January 2012 to December 2015. Patients recruited in this study were classified into 2 groups. Study group (n = 45) were offered laparoscopy for evaluation of infertility, control group (n = 45) elected to proceed to IVF without laparoscopy. Diagnostic laparoscopy and subsequent excision of suspected endometriotic lesions, lysis of adhesion and treatment of tubal pathology were performed when indicated.

Forty-four (97.8%) patients in study had pelvic pathologies and the treatment was performed at the same time. Twenty-four patients in study group conceived including 16 patients conceived spontaneously and 14 patients conceived with additional IVF following laparoscopy management. There was a significant difference in the ongoing pregnancy rates between patients conceived through IVF in study group and control group (41.9% vs 19.6%, $P < .05$).

Laparoscopy in women with normal hysterosalpingography but recurrent IVF failures can detect unrecognized pelvic pathologies. Laparoscopy evaluation prior to additional cycle of IVF seems to improve the subsequent pregnancy rate.

Abbreviations: ART = assisted reproductive techniques, FET = frozen embryo transfer, HSG = hysterosalingogram, IVF = in-vitro fertilization.

Keywords: adhesions, endometriosis, hysterosalpingography, IVF, laparoscopy, tubal pathology

Uterine Factors

- **Hysteroscopy is considered the gold standard for uterine cavity evaluation because it permits direct visualization**

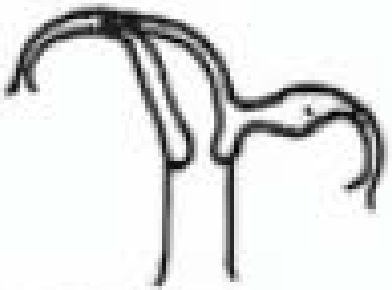
- **Mulerian anomaly:**
- **LPS & HYS: Bicorn from septate UT**

- **Rodimentory horns removal, salpingectomy**

II Unicornuate

(a) Communicating

(b) Non Communicating



(c) No cavity

(d) No horn

Acquired Abnormalities of the Uterus

- ***Leiomyomas:***Leiomyomas, also called myomas or fibroids, are benign monoclonal uterine myometrial tumors that affect 25% to 45% of all reproductive-age women;
- The mechanisms by which fibroids cause infertility are unknown, but may involve altered uterine contractility, impaired gamete transport, or endometrial dysfunction

MYOMAS

- **Subserosal fibroids do not appear to affect fertility or obstetric outcomes, while cavity-distorting intramural, noncavity-distorting >5 cm, and submucosal myomas are associated with lower implantation and live birth rates** novak 2019
- **In sum, the accumulated body of evidence indicates that submucous myomas reduce IVF success rates by approximately 70% and intramural myomas by approximately 20–40%, and subserosal myomas have no adverse impact on outcomes. Submucous myomas increase risk for miscarriage after successful IVF at least threefold and intramural myomas by more than half.Spirrof2019**

LPT VS LPS

- Compared to laparotomy, the laparoscopic approach to leiomyoma removal has been shown to have better perioperative outcomes, with lower postoperative pain, reduced blood loss, shorter length of hospital stay, and faster recovery. Reproductive and obstetric outcomes are similar
- As a general rule, a laparoscopic approach can be used if there are fewer than four myomas in different uterine locations. Also, a myoma size greater than 10 to 12 cm is typically best approached by laparotomy.

- After myomectomy, uterine rupture in pregnancy is very uncommon with all surgical approaches. Case series have suggested
- excessive use of electrosurgery to be associated with rupture

ESHRE GUIDELINE ENDOMETRIOSIS 2021

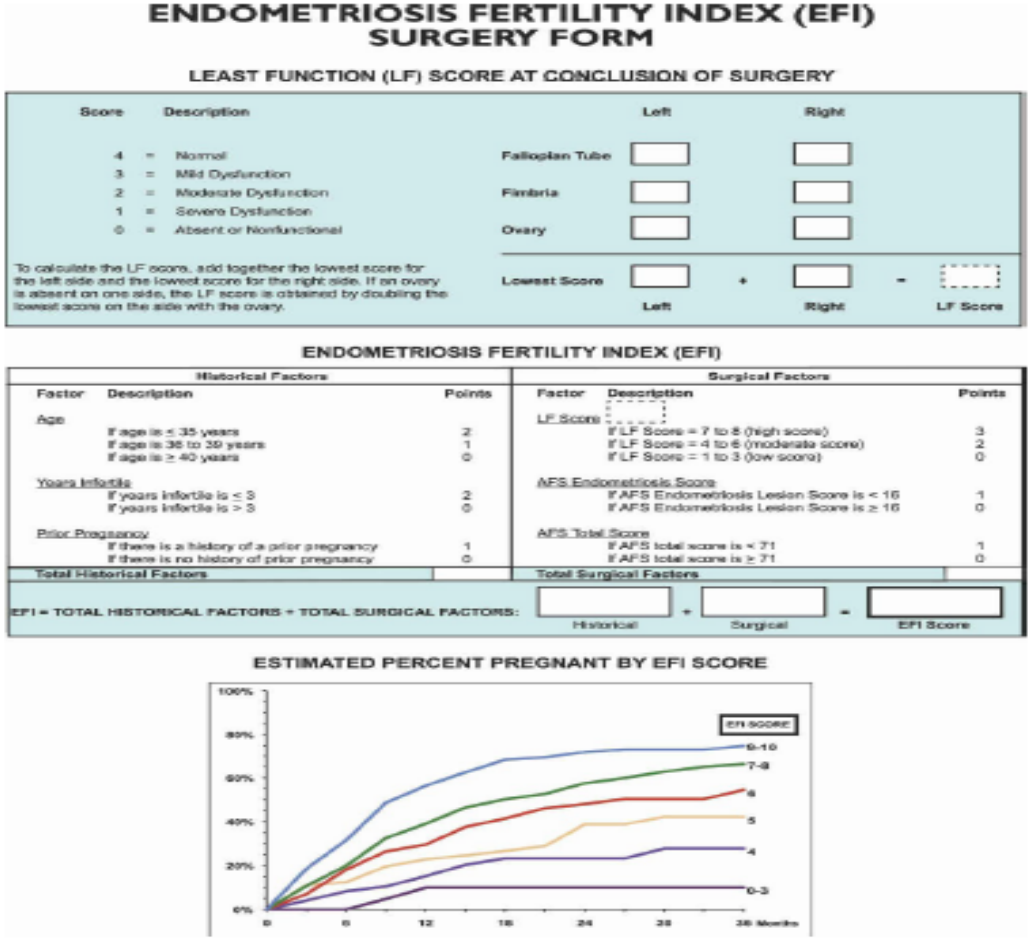
- **PICO QUESTION: IN WOMEN WITH ENDOMETRIOSIS, IS SURGERY EFFECTIVE TO INCREASE THE CHANCE OF NATURAL PREGNANCY?**
- Operative laparoscopy could be offered as a treatment option for endometriosis-associated infertility in rASRM stage I/II endometriosis as it improves the rate of ongoing pregnancy.
- Clinicians may consider operative laparoscopy for the treatment of endometrioma-associated infertility as it may increase their chance of natural pregnancy, although no data from comparative studies exist.
- Although no compelling evidence exists that operative laparoscopy for DE improves fertility, operative laparoscopy may represent a treatment option in symptomatic patients wishing to conceive.
- The GDG recommends that the decision to perform surgery should be guided by the presence or absence of pain symptoms, patient age and preferences, history of previous surgery, presence of other infertility factors, ovarian reserve, and estimated EFI.

NARRATIVE QUESTION: WHICH PATIENTS NEED TREATMENT WITH ASSISTED REPRODUCTION TECHNOLOGY AFTER SURGERY?

- Before and after surgery for endometriosis, those individuals who wish to become pregnant should be counselled objectively on their subsequent chances of achieving a pregnancy. To this purpose, the Endometriosis Fertility Index (EFI) was developed (Adamson and Pasta, 2010) as an end-of- surgery scoring system that predicts non-ART pregnancy rates (natural conception or IUI) after surgery.
- Women should be counselled of their chances of becoming pregnant after surgery. To identify patients that may benefit from ART after surgery, the Endometriosis Fertility Index (EFI) should be used as it is validated, reproducible and cost-effective. The results of other fertility investigations such as their partner's sperm analysis should be taken into account.

Endometriosis Fertility Index

- The EFI staging system predicts non-IVF pregnancy rates after surgical staging and treatment of endometriosis .The EFI is based on historical and surgical factors. The historical factors are age, years of infertility, and prior pregnancies. The surgical factors consist of the total ASRM score, the ASRM endometriosis score, and the least function score, which describes functionality of the fallopian tubes, fimbriae, and ovaries.



ENDOMETRIOSIS FERTILITY INDEX (EFI)
SURGERY FORM

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		
		Lowest Score	Left +	Right = LF Score

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.

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 35 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

ESTIMATED PERCENT PREGNANT BY EFI SCORE

FIGURE 13-7 Endometriosis Fertility Index. (From Adamson D, Pasta D. Endometriosis

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	Left	Right	
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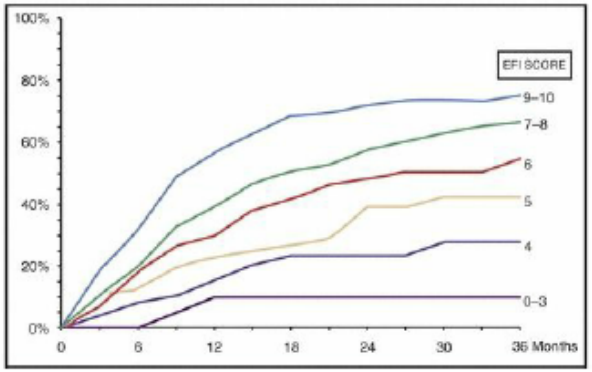
Total Historical Factors			Total Surgical Factors		

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

ESTIMATED PERCENT PREGNANT BY EFI SCORE



PICO QUESTION: IS MEDICALLY ASSISTED REPRODUCTION EFFECTIVE FOR INFERTILITY ASSOCIATED WITH ENDOMETRIOSIS?

Recommendations

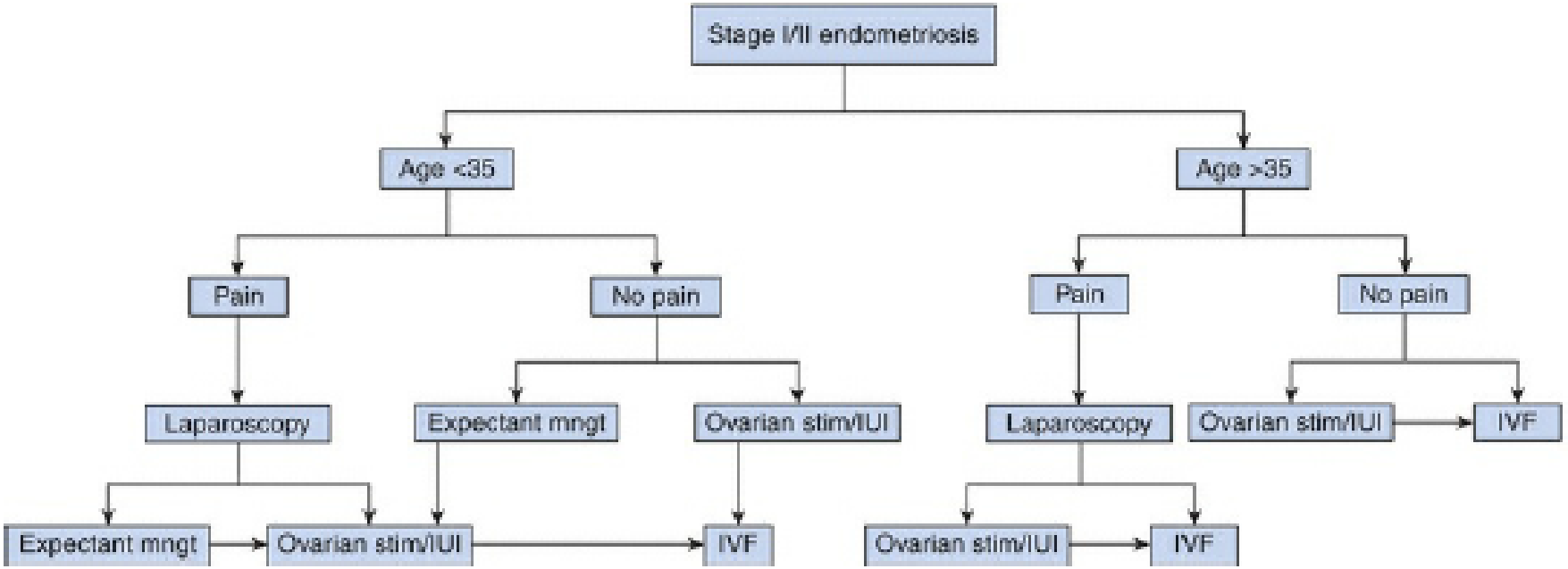
In infertile women with AFS/ASRM stage I/II endometriosis, clinicians may perform intrauterine insemination (IUI) with ovarian stimulation, instead of expectant management or IUI alone, as it increases pregnancy rates.	⊕OOO
Although the value of IUI in infertile women with AFS/ASRM stage III/IV endometriosis with tubal patency is uncertain, if performed, the use of ovarian stimulation could be considered.	⊕OOO

Justification

In women with AFS/ASRM stage I/II endometriosis, IUI with ovarian stimulation may be effective in increasing live birth rate, compared with expectant management and effective in increasing biochemical pregnancy rate, compared to IUI alone (weak recommendation). In these women, clinicians may consider performing intrauterine insemination with ovarian stimulation within 6 months after surgical treatment, since pregnancy rates are similar to those achieved in unexplained infertility (Werbrouck, *et al*, 2006).

Recommendations

ART can be performed for infertility associated with endometriosis, especially if tubal function is compromised, if there is male factor infertility, in case of low EFI and/or if other treatments have failed.	⊕⊕OO
A specific protocol for ART in women with endometriosis cannot be recommended. Both antagonist and agonist protocols can be offered based on patients' and physicians' preferences as no difference in pregnancy or live birth rate has been demonstrated.	⊕OOO



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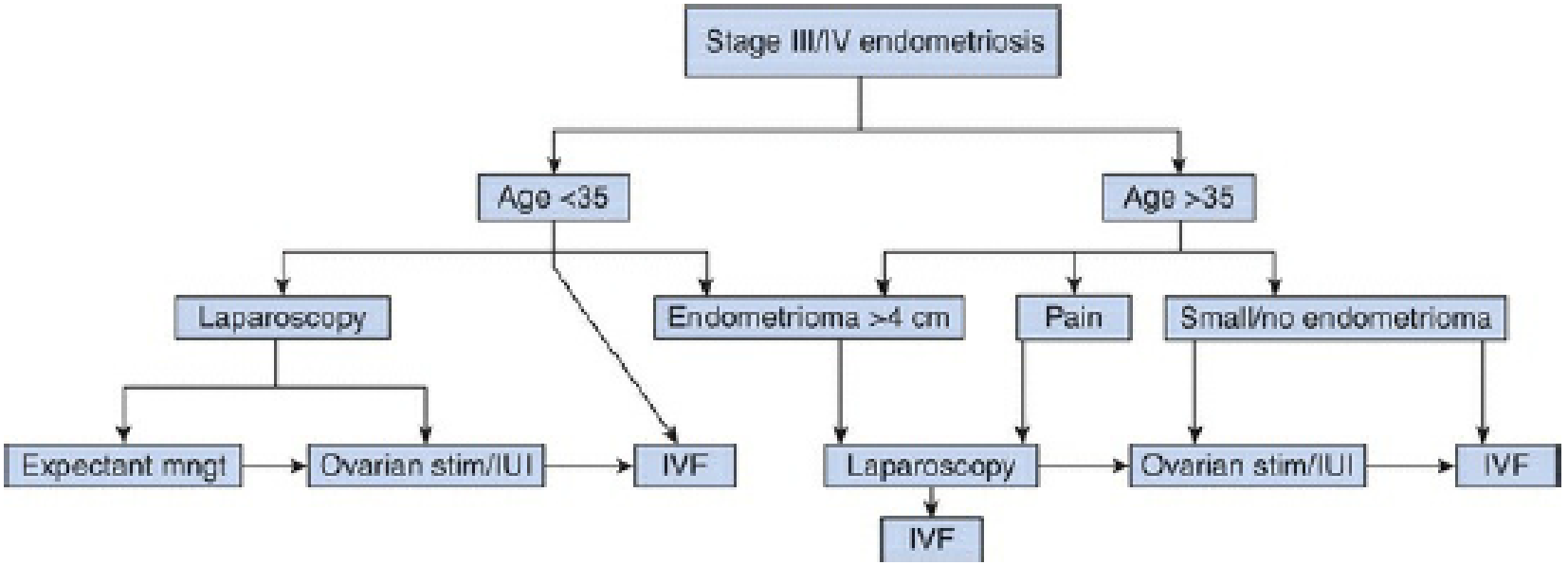

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THANKS FOR YOUR ATTENTION

Endometriosis Infertility(N2019)

- Hormonal suppression of endometriosis typically has minimal benefit for endometriosis-related infertility (341,347). For minimal to mild disease, laparoscopic ablation appears to significantly improve pregnancy rates when compared to diagnostic laparoscopy alone as evidenced by a large randomized trial reporting 31% (treated) versus 17% (untreated) pregnancy rates (348,349). A subsequent meta-analysis supported the effectiveness of laparoscopic treatment in stages I to II endometriosis-associated infertility (341,342,350,351). **[8] Number needed to treat analysis suggests that eight laparoscopies involving treatment of mild or minimal endometriosis would need to be performed for each pregnancy gained. A Cochrane review found moderate evidence in favor of** particularly excisional laparoscopic treatment of minimal-mild endometriosis for spontaneous pregnancy in the 9 to 12 months postoperatively
- removal of endometriomas may be indicated prior to IVF, when they would interfere with oocyte retrieval (349), endometrioma resection during IVF/ICSI treatment is associated with decreased ovarian function in up to 13% of cases (352,353), reduced quantity of dominant follicles, and fewer retrieved oocytes compared to unoperated patients in a meta-analysis of 2,649 IVF cycles (354). Furthermore, 40% of endometriomas recur postoperatively
- IVF is considered a reasonable first-line therapy for endometriosis-associated infertility because of the short time to pregnancy and avoidance of surgery (290). Sclerotherapy, whereby the endometrioma is drained via transvaginal puncture and a sclerotic agent such as ethanol is instilled into the cyst cavity, was associated with higher numbers of retrieved oocytes and similar pregnancy rates as compared to laparoscopic management, in a meta-analysis of 18 studies, and may be an alternative to surgery (345).