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Guidelines for diagnosis and treatment of endometriosis

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AUTHORS

These Recommendations have been written by a group of medical professionals (Drafters) identified by SIGO, AOGOI and AGUI Scientific Committees with the organizational support of the Confalonieri-Ragonese Foundation.

RECIPIENTS

These Recommendations are addressed to all professionals who deal with the diagnosis and treatment of the diseases covered by these guidelines.

METHODS

Writing medical Recommendations is a complex activity in terms of methods, and requires advanced technical skills, resources and time that companies usually are not able to provide. These recommendations are based on systematic reviews.

Today, however, acquiring the critical skills required to assess the extent to which systematic reviews (or already existing Guidelines/ recommendations produced in Italy or in other countries) are sufficiently valid from a scientific point of view to be taken into account for their application in Italy is the priority, and not writing new systematic reviews.

Based on these considerations, the production of these Recommendations included the following operational phases:

- Identification of expert drafters
- Identification of systematic reviews and the most recent guidelines published on the topic
- Formulation of clinical themes used to develop the guidelines
- Definition of recommendations by individual drafters through their response to the identified clinical themes
- Definition of the recommendations grading by the group of expert drafters

Specifically, the Quality Level and the strength of these recommendations were graded and expressed in Roman numerals (I to VI) and in letters (A to E). The Quality Level refers to the likelihood that a certain amount of knowledge derives from studies planned and conducted in such a way as to produce valid information without systematic errors, while the Strength of

Recommendation refers to the likelihood that the practical application of a recommendation will lead to an improvement in the health status of the target population to which the recommendation is addressed.
The Level of Quality and Strength of Recommendations were defined according to the criteria suggested by the Methodological Manual of the National Guidelines System (**table 1**).

Table 1.
Quality level and Strength of the Recommendations - Grading. From: ISS-PNLG 2002

	QUALITY LEVEL
I	Evidence obtained from multiple randomised controlled trials and/or systematic reviews of randomised trials
II	Evidence obtained from a single randomised study of adequate design
III	Evidence obtained from non-randomised cohort studies with concurrent or historical controls or their meta-analysis
IV	Evidence obtained from retrospective case-control studies or their meta-analyses
V	Evidence obtained from case studies («case series») without a control group
VI	Evidence based on the opinion of authoritative experts or expert committees as indicated in the guidelines or consensus conferences, or based on the opinions of the members of the working group responsible for these guidelines
	STRENGTH OF THE RECOMMENDATION
A	The execution of that particular procedure or diagnostic test is strongly recommended. It indicates a particular recommendation supported by good quality scientific evidence, even if not necessarily type I or II
B	There are doubts about whether that particular procedure or surgery should always be recommended, but it is believed that its execution should be carefully taken into account
C	There is substantial uncertainty in favour of or against the recommendation to perform the procedure or surgery
D	The execution of the procedure is not recommended
E	The execution of the procedure is strongly discouraged

To develop these phases, an operational meeting was organised during the SIGO-AOGOI AGUI National Congress, followed by an exchange of material and comments via email.
The Recommendations approved by a majority of the Group of Drafters have been revised by the Auditors appointed by the three Scientific Committees.

BACKGROUND

In recent years, several scientific societies have produced consensus guidelines/documents or recommendations for the treatment of endometriosis. In Italy, guidelines were produced for the treatment of pelvic endometriosis in the late '90, using the Delphi' method by the collaborative Group of Italian Endometriosis Study Group (GISE). Many recommendations/ guidelines published are similar to each other and without any special changes over the years, an aspect that indicates the shortage of high-quality and innovative recent studies. However, the therapeutic scenario has in part changed in recent years, also following the introduction of new therapeutic diagnostic methodologies or molecules.
Objective of this document is to provide Italian gynecologists a useful tool in clinical practice, based on updated evidences.

SECTION 1: OVARIAN ENDOMETRIOSIS

1.1 Diagnosis

1.1.1 Role of ultrasound

Transvaginal ultrasound (TV) should be the first diagnostic approach in case of ovarian endometriosis. The diagnostic accuracy of transvaginal ultrasonography for the diagnosis of ovarian endometriosis is very high.

Recommendation	Level of evidence	Strength of recommendation
Transvaginal ultrasound (TV) should be the first diagnostic approach in case of (suspected) ovarian endometriosis	V	A

1.1.2 Diagnostic Criteria

A "typical" endometrioma usually appears at ultrasound as a unilocular or, less frequently multilocular (with a low number of locules) cyst, with a homogeneous low-level echogenicity (ground glass) of the fluid content and regular walls with poor vascularization [1,2].
Some endometriomas can contain scarcely vascularized internal septa or can present as a fluid-dense cysts with an internal hyperechogenic level and a poor pericystic vascular pattern.
Color/power Doppler analysis of endometriotic cysts is useful in the differential diagnosis with other histotypes of adnexal masses [2,3].
Endometriomas with atypical appearance may present hyperechogenic internal content due

to blood clots or fibrin deposits lying adjacent to the cyst wall. Such content will show no vascularisation at Doppler examination.

Ovarian endometriosis is frequently associated with pelvic adhesions and deep infiltrating lesions. The percentage of this association varies from 20 to 80%. When both ovaries present adhesions they may tend to prolapse in the pouch of Douglas and adhere posteriorly to the uterine wall showing the typical so-called "kissing ovaries" ultrasonographic sign, possibly associated with concomitant posterior infiltrating endometriosis (20%) and tubal involvement (90%)[4]. A detailed ultrasonographic evaluation of pelvic adhesions, deep pelvic lesions and adenomyosis is of outmost importance in patients with ovarian endometriosis [5].

The sonographic appearance of endometriomas may vary depending on the hormonal status of the patient. Post-menopausal endometriomas more frequently appear as solid or multilocular-solid cysts with anechoic fluid content or with mixed echogenicity fluid content, sometimes mimicking borderline or malignant neoplasia [6].

The ultrasound pattern of endometriomas may transform also during pregnancy. In pregnant patients the typical endometrioma can undergo a decidualization process and appear as a unilocular- or multilocular-solid cyst, due to the presence of internal papillae, with a regular and smooth surface and often vascularized at Power Doppler examination. In these cases, knowledge of the presence of the endometrioma before pregnancy can facilitate a correct diagnosis and minimize the risk of unnecessary surgery [7].

Borderline and malignant tumors arising from endometriomas are rare (more often endometrial or clear call trimas): in these cases they show typical sonographic features of non-benign adnexal pathology such as cysts with vasularized internal papillar or solid tissue. Patients with an endometrioma that also present associated risk factors (e.s. familiar hystory of malignancy, menopause, infertility, long term persistent cysts) should undergo careful US follow-up with surgical removal and histologic evaluation when suspicious findings arise [8].

Recommendation	Level of evidence	Strength of recommendation
Color/power Doppler evaluation of endometriosis cysts may be useful in the differential diagnosis with other types of adnexal conditions	V	B

1) Timmerman D, Valentin L, Bourne TH, Collins WP, Verrelst H, Vergote I, **International Ovarian Tumor Analysis G. Terms, definitions and measurements to describe the sonographic features of adnexal tumors: a consensus opinion from the International Ovarian Tumor Analysis (IOTA) Group**. Ultrasound Obstet Gynecol 2000; 16: 500–505.

2) Exacoustos C, Manganaro L, Zupi E. **Imaging for the evaluation of endometriosis and adenomyosis**. Best Pract Res Clin Obstet Gynaecol. 2014;28:655-81.

3) Van Holsbeke C, Van Calster B, Guerriero S, Savelli L, Paladini D, Lissi AA, Czekierdowski A, Fischerova D, Zhang J, Mestdagh G et al. **Endometriomas: their ultrasound characteristics**. Ultrasound Obstet Gynecol 2010;35:730–740.

4) Ghezzi F, Raio L, Cromi A, Duwe DG, Beretta P, Buttarelli M, MuellerMD. **"Kissing ovaries": a sonographic sign of moderate to severe endometriosis**. Fertil Steril 2005; 83: 143–147.

5) Exacoustos C, Malzoni M, Di Giovanni A, Lazzeri L, Tosti C, Petraglia F, Zupi E. **Ultrasound mapping system for the surgical management of deep infiltrating endometriosis**. Fertil Steril. 2014;102:143-150.

6) Guerriero S, Van Calster B, Somigliana E, Ajossa S, Froyman W, De Cock B, Coosemans A, Fischerová D, Van Holsbeke C, Alcazar JL, Testa AC, Valentin L, Bourne T, Timmerman D. **Age-related differences in the sonographic characteristics of endometriomas**. Hum Reprod. 2016;31:1723-31.

7) Mascilini F,Moruzzi C, Giansiracusa C, Guastafierro F, Savelli L, De Meis L, Epstein E, Timor-Tritsch IE, Mailath-Pokorny M, Ercoli A, Exacoustos C, Benacerraf BR, Valentin L, Testa AC. **Imaging in gynecological disease. Clinical and ultrasound characteristics of decidualized endometriomas surgically removed during pregnancy**. Ultrasound Obstet Gynecol 2014; 44: 354–60.

8) Nezhat FR, Apostol R, Nezhat C, Pejovic T. **New insights in the pathophysiology of ovarian cancer and implications for screening and prevention**. Am J Obstet Gynecol 2015; 213):262-7.

1.2 Medical Therapy

The objectives of medical therapy in case of ovarian lesion are:

- treatment of the ovarian lesion before or instead of surgery
- reduction of risk recurrence after surgery
- pain control

1.2.1 Medical therapy vs surgery

The treatment of endometrioma depends mainly by the symptoms and the patient's desire of pregnancy. Options include waiting, medical or surgical therapy, and assisted reproduction techniques (ART).

Yap and Collaborators [(1)] in a review of the literature considered the role of medical treatment pre-and post-surgery according to cyst size, pain and infertility. With regard to pre-operative therapy, two studies were included: in both of them there was a difference in the size of the endometrioma of 1-2 cm between the treated vs untreated group, but there was no evidence of a clinical benefit of therapy.

Muzii et al. [(2)], in a recent meta-analysis on the efficacy of combined oral contraceptives (COC), administered cyclically versus non-cyclically, showed no significant reduction in endometrioma before surgical treatment on post-operative outcome. The efficacy of progestins in ovarian endometriosis has been object of several studies [(3-5)]. A randomized multicenter study evaluated the efficacy of administration of dienogest in 187 women, with a statistically significant reduction in the size of the cysts [(5)]. In consideration of side effects, therapy with GnRH agonists or with danazol (equally effective) should be considered as second-line treatment [(6-9)]. Medical therapy is symptomatic and not cytoreductive [(10, 11)].

Recommendation	Level of evidence	Strength of recommendation
Medical treatment of ovarian endometriosis (endometrioma) can be considered in case of lesions of limited size, but we have no data that allow us to consider such treatment as effective in the long period	V	B
Medical treatment with progestins alone (IA) or with estrogens (IIIA) may be considered in patients with pain and waiting for surgery with the goal of controlling pain but not of improve surgical outcomes	I	A

1) Yap C, Furness S, Farquhar. **Pre and post-operative medical therapy for endometriosis surgery**. Cochrane Database Syst Rev. 2004:CD003678.

2) Muzii L, Di Tucci C, Achilli C, Di Donato V, Musella A, Palaia I, Panici PB. **Continuous versus cyclic oral contraceptives after laparoscopic excision of ovarian endometriomas: a systematic review and metaanalysis**. Am J Obstet Gynecol. 2016 Feb;214(2):203-11

3) Andres Mde P1, Lopes LA, Baracat EC, Podgaec S. **Dienogest in the treatment of endometriosis: systematic review**. Arch Gynecol Obstet. 2015 Sep;292(3):523-9.

4) Kohler G, Faustmann TA, Gerlinger C, Seitz C, Mueck AO (2010). **A dose-ranging study to determine the efficacy and safety of 1, 2, and 4 mg of dienogest daily for endometriosis**. Int J Gynaecol Obstet 108(1):21–25

5) Momoeda M, Taketani Y. **A randomized, double-blind, multicenter, parallel, dose-response study of dienogest in patients with endometriosis**. Jpn Pharmacol Ther 2007;35:769-83

6) Vercellini P, Somigliana E, Vigano P, Abbiati A, Barbara G, Crosignani PG. **Endometriosis: current therapies and new pharmacological developments**. Drugs 2009;69:649–75

7) Crosignani PG, Luciano A, Ray A, Bergqvist A. **Subcutaneous depot medroxyprogesterone acetate versus leuprolide acetate in the treatment of endometriosis-associated pain**. Human Reprod 2006;21:248–56.

8) Surrey ES. **Gonadotropin-releasing hormone agonist and add-back therapy: what do the data show?** Curr Opin Obstet Gynecol 2010;22:283–8.

9) Somigliana E, Vigano P, Barbara G, Vercellini P. **Treatment of endometriosis related pain: options and outcomes**. Front Biosci 2009;1:455–65

10) Vercellini P, Viganò P, Somigliana E, Fedele L. **Endometriosis: pathogenesis and treatment**. Nat. Rev. Endocrinol 2014 May;10(5):261-75

11) Johnson N. P., Hummelshoj L. **World Endometriosis Society Montpellier Consortium. Consensus on current management of endometriosis**. Hum. Reprod. 28, 1552-1568 (2013)

1.2.2 Medical therapy to lower the risk of recurrence of ovarian lesion after surgery

The risk of recurrence of the ovarian lesion after surgery is about 10% per year for the first five years [(1)]. In consideration of the impact of surgery on the ovarian function, it is necessary to improve clinical strategies aimed to prevent repeated surgery, especially in young and not searching pregnancy patients [(2,3)].

Medical therapy after surgery for endometriosis has the objective of reducing the risk of long-term relapses, defined as recurrence of symptomatology or lesion after 12/24 months after surgery.

There is some evidence that post-surgical combined oral contraceptive (COC) use lower the risk of recurrences of ovarian endometriosis.

In a randomized controlled prospective study women who underwent laparoscopic enucleation of endometrioma were allocated to: no treatment, treatment with low doses monophasic COC for 24 months in cyclic or continuous regimen.

The 2-year recurrence rate was significantly lower in treated patients (cyclic regimen: 14.7%, continuing regimen: 8.2%, no treatment 29%). In cases of recurrence in treated patients with both regimens of administration, size and growth of the lesions were significantly lower than among the untreated patients. There were no significant differences between the continuous and cyclic regimes [4].

The similar efficacy of cyclic and continuous regimen in the prevention of recurrence of ovarian endometriosis is confirmed by another randomized prospective study, which reports, however, more side effects among patients treated with continuous regimen [5].

A controlled randomized study has analyzed the COC's efficacy in the prevention of relapses with different progestin formulation. The three regimens tested with different progestins (desogestrel, gestodene and dienogest), showed no significant difference (26.5%, 31.8%, 20.5%). The recurrence rate of untreated patients (74.7%) was significantly higher than in any COC treatment group [6]. Ota et al. [7] showed in a retrospective cohort study that the recurrence rate is significantly lower in patients with ovarian endometriosis treated with dienogest for five years after surgery, than in untreated patients (69% vs. 4%; OR = 0.09; 95% CI = 0.03 – 0.26; P < 0.0001) In this study anemia occurred in 4% due to metrorrhagia directly after administration, metrorrhagia including spotting was observed in 20% at 1 year and decreases in bone mineral density and depression were observed in 4 and 2.6%, respectively, in the dienogest group: these conditions did not require treatment interruptions.

Recommendation	Level of evidence	Strength of recommendation
After cystectomy for endometrioma, hormonal therapy with progestins alone is recommended	I	A
The choice of post-surgical treatment should be based on fertility desires, patient's preferences, costs and safety profile	VI	B
There is no difference in terms of recurrence rates among the different estroprogestins	II	A

1) Guo, S.W. **Recurrence of endometriosis and its control**. Hum Reprod Update. 2009; 15: 441–461

2) Busacca, M., Riparini, J., Somigliana, E. et al. **Postsurgical ovarian failure after laparoscopic excision of bilateral endometriomas**. Am. J. Obstet. Gynaecol. 2006; 195: 421–425

3) Vercellini, P., Somigliana, E., Viganò, P., de Matteis, S., Barbara, G., and Fedele, L. **The effect of second-line surgery on reproductive performance of women with recurrent endometriosis: a systematic review**. Acta Obstet Gynecol Scand. 2009; 88: 1074–1082

4) Seracchioli R, Mabrouk M, Frascà C, Manuzzi L, Montanari G, Keramyda A, Venturoli S. **Long-term cyclic and continuous oral contraceptive therapy and endometrioma recurrence: a randomized controlled trial**. Fertil Steril 2010 Jan;93(1):52-6

5) Muzii L., Di Tucci C., Achilli C., Di Donato V., Musella A., Palaia I., Panici P.B. **Continuous versus cyclic oral contraceptives after laparoscopic excision of ovarian endometriomas: a systematic review and metaanalysis**. Am J Obstet Gynecol. 2016; 214(2):203-11

6) Cucinella, G., Granese, R., Calagna, G., Svelato, A., Saitta, S., Tonni, G. et al. **Oral contraceptives in the prevention of endometrioma recurrence: does the different progestins used make a difference?**. Arch Gynecol Obstet. 2013; 288: 821–827

7) Ota, Y., Andou, M., Yanai, S., Nakajima, S., Fukuda, M., Takano, M. et al. **Long-term administration of dienogest reduces recurrence after excision of endometrioma**. J Endomet Pelv Pain Disord. 2015; 7: 63–67

1.2.3 Medical therapy in the control of pain

In case of pain, medical therapy of patients with ovarian endometriosis is similar to that of patients with superficial or deep endometriosis.

In presence of pain symptomatology, progestins alone or, in particular in case of contraceptive needs, in association with estrogen, should be considered as first choice treatment [1].

Controlled randomized studies have compared the use of GnRH agonists vs progestins alone or COC in the treatment of pain associated with endometriosis: a higher frequency of side effects in the GnRH group was reported.

Regidor et al. [2] compared Linestrenolo with Leuprorelina: In the Linestrenolo group there was a reduction of dysmenorrhoea in 50% of patients and chronic pelvic pain in 59% of cases after 6 months of treatment, vs 85 and 69%. In the Leuprorelina group respectively.

Strowitzki et al. [3] compared the use of dienogest vs monthly Leuprorelina and showed a similar reduction in pain symptomatology in the two groups and greater tolerability of the Dienogest.

Guzick et al. [4] compared a COC-based ethinyl estradiol-norestisterone (35 mg/1 mg per day) vs Leuprorelina 11.25 mg every 2 weeks and norestisterone 5 mg day). In both groups a

reduction in pain was observed.
Systematic reviews of controlled randomized trials [5,6] concluded that GnRH treatments, COC and progestins are equally effective in the control of pain associated with endometriosis. Studies have shown that dienogest (2 mg/day) is an effective (in comparison with placebo) therapy for the control of pain in patients with endometriosis. Desonorgestrel has shown similar results as GnRH analogues in pelvic pain control and in all other endometriosis-related symptoms. There are no studies comparing desonorgestrel with other progestin or oestrogens formulations as a first-line therapy in the control of pain symptomatology associated with endometriosis.

Recommendation	Level of evidence	Strength of recommendation
Progenstins alone or COC are the most efficaciuous treatments	III	A

1) Vercellini P., Buggio L., Berlanda N., Barbara G., Somigliana E., Bosari S. **Estrogen-progestins and progestins for the management of endometriosis**. Fertil Steril 2016 Dec; 106 (7):1552-1571.
2) Regidor PA., Regidor M., Schmidt M., et al. **Prospective randomized study comparing the GnRH-agonist leuprorelin acetate and the gestagen lynestrenol in the treatment of severe endometriosis**. Gynecol Endocrinol 2001;15:202-9.
3) Strowitzki T., Marr J., Gerlinger C. et al. **Dienogest is as effective as leuprolide acetate in treating the painful symptoms of endometriosis; a 24-week, randomized, multicentre, open-label trial**. Hum Reprod 2010;25:633-41.
4) Guzick DS., Huang LS., Broadman BA., et al. **Randomized trial of leuprolide versus continuous oral contraceptive in the treatment of endometriosis-associated pelvic pain**. Fertil Steril 2011;95:1568-73.
5) Jeng CJ., Chuang L., Shen J. **A comparison of progestogens or oral contraceptives and gonadotropin-releasing hormone agonists for the treatment of endometriosis: a systematic review**. Expert Opinion on Pharmacotherapy, 2014; 15: 767-73.
6) Andres M., Lopes L., Baracat E., Podgaec S. **Dienogest in the treatment of endometriosis: systematic review**. Arch Gynecol Obstet 2015. 292:523-529.

1.2.4 Medical therapy in adolescents
Lacking specific data guidelines for adult women should be considered.
COC (cyclic or continuous use) associated with non-steroidal anti-inflammatory drugs are indicated as first line treatment.
If the first-line therapies do not work, taking into account age and side effects, all the therapies available for endometriosis in adults can be used in adolescents as second-line therapies.
Clinicians should use GnRH-agonists cautiously, since teenagers may not have reached the maximum bone density [1].

Recommendation	Level of evidence	Strength of recommendation
In adolescents, the treatment of choice are COCs	VI	B

1) Lee DY, Kim HJ, Yoon BK, Choi D. **Clinical characteristics of adolescent endometrioma**. J Pediatr Adolesc Gynecol. 2013 Apr;26(2):117-9.

1.3 Surgical Therapy
1.3.1 Role of surgical therapy in the treatment of endometrioma
Surgical treatment of endometrioma is indicated if symptoms are or become not responder to medical therapy, or the endometrioma increases in volume or is greater than 3 cm in diameter in infertile patients [1,2].

Recommendation	Level of evidence	Strength of recommendation
Surgery should be considered in symptomatic women Or if endometrioma increases in volume or is greater than 3 cm in diameter in infertile patients	VI	B

1) Practice Committee of the American Society for Reproductive Medicine. **Treatment of pelvic pain associated with endometriosis: a committee opinion**. Fertil Steril. 2014 Apr;101(4):927-35. Erratum in: Fertil Steril. 2015; 104(2): 498.
2) Dunselman GA, Vermeulen N, Becker C, Calhaz-Jorge C, D'Hooghe T, De Bie B, Heikinheimo O, Horne AW, Kiesel L, Nap A, Prentice A, Saridogan E, Soriano D, Nelen W. **European Society of Human Reproduction and Embryology. ESHRE guideline: management of women with endometriosis**. Hum Reprod. 2014; 29(3): 400-12.

1.3.2 Surgical modalities in the treatment of endometrioma.
Laparoscopy is the gold standard for the treatment

of endometriosis, due to faster recovery, better post-operative outcome and reduced hospital costs. Ovarian cystectomy compared to laser vaporization or coagulation of the cystic bed, lowers the number of recurrences and is associated with an increase rate of spontaneous pregnancies in the short and long term [1-3].

Laser vaporization techniques are currently under evaluation in clinical studies with the aim of making the procedure reproducible and safe for the ovarian tissue.−A further application of the CO2 Laser involves the combined use of the excisional and the ablative surgery: a large part of the cystic capsule of the endometrioma is stripped followed by vaporization of the remaining part of the capsule. The combined technique respects the vascularization of the ovarian parenchyma, guarantees a greater preservation of the volume and the follicular count, compared to cystectomy. In addition, an increase in the rate of spontaneous pregnancies and a reduction in recurrences [4] have been reported.

The damage of ovarian parenchyma is inversely related to the experience of the surgeon [5].

Surgically treated patients showed an increase of 50% of spontaneous pregnancy 1-2 years after surgery [6,7]. However, it has been shown that the rate of spontaneous ovulation [8-10], as well as the response to ovarian hyperstimulation, are lowered after surgery [11].

Recommendation	Level of evidence	Strength of recommendation
Ovarian cystectomy when compared to laser vaporization or coagulation of the cystic bed, lowers the number of recurrences	II	A

1) Carmona F, Mart_ınez-Zamora MA, Rabanal A, Martinez-Rom_an S, Balasch J. **Ovarian cystectomy versus laser vaporization in the treatment of ovarian endometriomas: a randomized clinical trial with a five-year follow-up**. Fertil Steril. 2011; 96: 251–254

2) Chapron C, Vercellini P, Barakat H, Vieira M, Dubuisson JB. **Management of ovarian endometriomas**. Hum Reprod Update. 2002 ; 8(6): 591-7.

3) Hart, R. J., Hickey, M., Maouris, P. & Buckett, W. **Excisional surgery versus ablative surgery for ovarian endometriomata**. Cochrane Database of Systematic Reviews, Issue 2; 2008: Art. No.: CD004992.

4) Donnez J, Wyns C, Nisolle M. **Does ovarian surgery for endometriomas impair the ovarian response to gonadotropin?** Fertil Steril. 2001; 76: 662–665.

5) Muzii L, Marana R, Angioli R, et al. **Histologic analysis of specimens from laparoscopic endometrioma excision performed by different surgeons: does the surgeon matter?** Fertil Steril. 2011; 95: 2116–2119.

6) De Ziegler D, Borghese B, Chapron C. **Endometriosis and infertility: pathophysiology and management**. Lancet. 2010; 376: 730–738.

7) Adamson DG. **Laparoscopy, in vitro fertilization, and endometriosis: an enigma**. Fertil Steril. 2005; 84: 1582–1584.

8) Leone Roberti Maggiore U, Scala C, Tafi E, Racca A, Biscaldi E, Vellone VG, Venturini PL, Ferrero S. **Spontaneous fertility after expectant or surgical management of rectovaginal endometriosis in women with or without ovarian endometrioma: a retrospective analysis**. Fertil Steril. 2017 Apr;107(4):969-976.e5. doi: 10.1016/j.fertnstert.2017.02.106.

9) Candiani M, Barbieri M, Bottani B, Bertulessi C, Vignali M, Agnoli B, Somigliana E, Busacca M. **Ovarian recovery after laparoscopic enucleation of ovarian cysts: insights from echographic short-term postsurgical follow-up**. J Minim Invasive Gynecol. 2005; 12: 409–414.

10) Horikawa T, Nakagawa K, Ohgi S, Kojima R, Nakashima A, ItoM, Takahashi Y, Saito H. **The frequency of ovulation from the affected ovary decreases following laparoscopic cystectomy in infertile women with unilateral endometrioma during a natural cycle**. J Assist Reprod Genet. 2008; 25: 239–244.

11) Somigliana E, Benaglia L, Paffoni A, Busnelli A, Vigano P, Vercellini P. **Risks of conservative management in women with ovarian endometriomas undergoing IVF**. Hum ReprodUpdate. 2015; 21(4): 486-99.

1.3.3 Effect of surgery on ovarian reserve

Recent studies have shown that the laparoscopic stripping technique is associated with a reduction of the ovarian reserve, as documented by a reduction in the levels of postoperative Antimullerian hormone (AMH) [1]. Otherwise it has been suggested that AMH is lowered independently by the type of surgical procedure used [2]. The clinical consequences of surgical impairment are limited in cases of unilateral endometrioma [3,4]. On the contrary, the damage can become clinically relevant in cases of bilateral endometriomas. in this case a higher frequency of premature ovarian failure has been observed. Surgical treatment is not recommended in teens and young women who are searching pregnancy and are asymptomatic. In view of the reduction of the ovarian reserve and the increased risk of premature ovarian failure, especially in patients with bilateral endometrium, several

cryopreservation techniques are currently available [5].

Recommendation	Level of evidence	Strength of recommendation
No evidences are available on the comparative effect of different surgical techniques on ovarian reserve after surgery	V	A

1) Raffi F, Metwally M, Amer S. **The impact of excision of ovarian endometrioma on ovarian reserve: a systematic review and meta-analysis**. J Clin Endocrinol Metab. 2012; 97(9): 3146–54.
2) Saito N, Okuda K, Yuguchi H, et al. **Compared with cystectomy, is ovarian vaporization of endometriotic cysts truly more effective in maintaining ovarian reserve?** J Minim Invasive Gynecol. 2014; 21(5): 804–10.
3) Demirol A, Guven S, Baykal C, Gurgan T. **Effect of endometrioma cystectomy on IVF outcome: a prospective randomized study**. Reprod Biomed Online. 2006; 12: 639–643.
4) Tsoumpou I, Kyrgiou M, Gelbaya TA, Nardo LG. **The effect of surgical treatment for endometrioma on in vitro fertilization outcomes: a systematic review and meta-analysis**. Fertil Steril. 2009; 92: 75–87.
5) Donnez J, Dolmans MM. **Cryopreservation and transplantation of ovarian tissue**. Clin Obstet Gynecol. 2010; 53(4): 787-96.

1.4 Approach to the infertile patient

1.4.1 Endometrioma as cause of infertility

Endometrioma may be a cause of infertility. The impact of endometrioma and its surgical treatment have been the subject of a recent meta analysis including 30 retrospectives and 3 randomized studies [1].

Women with endometrioma admitted to IVF/ICSI have shown a clinical outcome similar to that observed in women whithout endometrioma, but showed a lower mean number of oocyte retrieved.

Recommendation	Level of evidence	Strenght of recommendation
Endometriosis should be always considered in the diagnostic work up of infertility	III	A

1) Hamdan M, Dunselman G, Li TC, Cheong Y. **The impact of endometrioma on IVF/ICSI outcomes: a systematic review and meta-analysis**. Human Reproduction Update, 2015; 21,6: 809–825.

1.4.2 Surgical treatment before ART

According to the guidelines of the European Society of Human Reproduction and Embryology[1], the surgical treatment of endometrium > 3 cm in diameter improves fertility better than simple drainage or only coagulation of the cyst.

The conservative treatment of the pseudo-capsule may be associated with a substantial risk of recurrence [1]. Endometriosis is a recurrent disease, thus he timing of management of the infertile patient should take into account future pregnancies. It is necessary to personalize each treatment taking into account other woman's characteristics such as age. Moreover, the presence of endometrioma during the IVF/ICSI treatment may be associated with difficulties in the recovery of the oocytes, contamination of the follicular fluid, potential progression of disease, complications in case of pregnancy. Nevertheless, the presence of endometrioma does not represent a contraindication to IVF/ICSI treatment

Recommendation	Level of evidence	Strenght of recommendation
Surgical treatment should take into account woman's characteristics such as age	VI	C
The presence of endometrioma does not represent a contraindication to IVF/ICSI treatment	VI	C

1) Dunselman GA, Vermeulen N, Becker C, Calhaz-Jorge C, D'Hooghe T, De Bie B, Heikinheimo O, Horne AW, Kiesel L, Nap A, Prentice A, Saridogan E, Soriano D, Nelen W. **European Society of Human Reproduction and Embryology. ESHRE guideline: management of women with endometriosis**. Hum Reprod. 2014 Mar;29(3):400-12

SECTION 2: PERITONEAL ENDOMETRIOSIS

2.1 Diagnosis

2.1.1 Role of ultrasound and other imaging techniques

Ultrasound is recognized as the most common diagnostic approach and first line imaging technique also for the evaluation of peritoneal endometriosis. MRI is useful when performed by expert operators and should be requested in specific cases that may benefit from further diagnostic investigations, considering it is

burdened by high costs.

Recommendation	Level of evidence	Strength of recommendation
Ultrasound examination should be the first line diagnostic technique in the diagnosis of peritoneal endometriosis	V	A

2.1.2 Sonographic Diagnostic Criteria for peritoneal/ superficial endometriosis

The presence of peritoneal/superficial endometriotic disease with associated adhesions should always be evaluated in patients with complaints of cyclic/chronic pelvic pain.

The US "sliding sign" allows to identify with high accuracy the obliteration of the Douglas pouch due to severe posterior adherences [1], that in turn can be associated with the presence of deep infiltrating endometriosis of the posterior compartment.

This simple maneuver can easily be performed by operators with different levels of expertise and should be routinely carried out when scanning patients with symptoms and a clinical history possibly related to pelvic endometriosis. Moreover, pain complained by patients during ultrasonographic examination in specific anatomic sites can guide in the detection of deep infiltrating lesions.

2.1.3 Sonographic Diagnostic Criteria for tubal endometriosis

Endometriotic tubal involvement is usually superficial, resulting in adhesions that can cause anatomic distortion, functional impairment and ectasia of the tubes.

When tubal occlusion occurs typical sonographic signs of hydrosalpinx can be observed: a tubular unilocular mass with thickened walls, incomplete septa and a fluid anechoic content or a dense content (ground glass) similar to endometrioma (haemato-salpinx).

2.1.4 Ultrasound evaluation in case of pelvic endometriosis infiltrating

Sonographic criteria for the diagnosis and mapping of deep pelvic endometriotic lesions were recently published by a consensus of experts [2]. A correct diagnosis is crucial for adequate clinical and/or surgical management of patients. Diagnostic accuracy of ultrasound performed by expert operators varies from 70 to 90% depending on the specific anatomic location [2,3]. An accurate evaluation of the extension of deep pelvic endometriosis is based on the identification, description and measurement of infiltrating lesions in the anterior, lateral and posterior compartments [4,5].

The typical sonographic features of postero-lateral deep infiltrating endometriotic lesions are the following: solid hypoechoic tissue with irregular margins and poor or no vascularization which alters the normal sonographic appearance of the involved anatomical site. Bladder and vaginal nodules can show a slight increase of the vascularisation when compared to typical postero-lateral lesions [2,5].–For deep infiltrating nodules of the anterior, lateral and posterior paracervical areas it is of outmost importance to verify the extension of the lesion and its distance from the intra-pelvic distal tract of the ipsilateral ureter in order to evaluate urinary tract involvement. In case of doubt or difficult ureteral direct visualization, evaluation of pyelectasis can be easily obtained with trans-abdominal ultrasound in order to identify patients requiring urgent surgical approach [5].

The sonographic evaluation of deep pelvic endometriosis requires specific skills and a high level of expertise arising from adequate training and strict cooperation with pelvic surgeons, which are usually achieved in dedicated tertiary centers.

In order to reduce potential diagnostic delay, even less experienced operator should be able to at least suspect pelvic endometriosis and identify the presence of infiltrating lesions, eventually referring affected patients to dedicated sonographic or MRI operators for further and more accurate investigation.

Recommendation	Level of evidence	Strength of recommendation
Accurate evaluation of deep pelvic endometriosis includes the identification and description of infiltrating lesions in the anterior, lateral and posterior pelvic compartment	V	B
Some easy and feasible maneuvers (sliding sign) allow less experienced operators to identify patients at risk of deep endometriosis that should be referred to dedicated sonographic or MRI operators for further and more accurate evaluation of the pelvic extension of the disease	V	B

1) Reid S, Lu C, Casikar I, Reid G, Abbott J, Cario G, Chou D, Kowalski D, Cooper M, Condous G. **Prediction of pouch of Douglas obliteration in**

women with suspected endometriosis using a new real-time dynamic transvaginal ultrasound technique: the sliding sign. Ultrasound Obstet Gynecol. 2013;41:685-91.
2) Guerriero S, Condous G, van den Bosch T, Valentin L, Leone FP, Van Schoubroeck D, Exacoustos C, Installé AJ, Martins WP, Abrao MS, Hudelist G, Bazot M, Alcazar JL, Gonçalves MO, Pascual MA, Ajossa S, Savelli L, Dunham R, Reid S, Menakaya U, Bourne T, Ferrero S, Leon M, Bignardi T, Holland T, Jurkovic D, Benacerraf B, Osuga Y, Somigliana E, Timmerman D. **Systematic approach to sonographic evaluation of the pelvis in women with suspected endometriosis, including terms, definitions and measurements: a consensus opinion from the International Deep Endometriosis Analysis (IDEA) group**. Ultrasound Obstet Gynecol. 2016;48:318-32.
3) Guerriero S, Ajossa S, Minguez JA, Jurado M, Mais V, Melis GB, Alcazar JL. **Accuracy of transvaginal ultrasound for diagnosis of deep endometriosis in uterosacral ligaments, rectovaginal septum, vagina and bladder: systematic review and meta-analysis**. Ultrasound Obstet 4 Gynecol. 2015;46:534-45.
4) Exacoustos C, Manganaro L, Zupi E. **Imaging for the evaluation of endometriosis and adenomyosis**. Best Pract Res Clin Obstet Gynaecol. 2014;28:655-81.
5) Exacoustos C, Malzoni M, Di Giovanni A, Lazzeri L, Tosti C, Petraglia F, Zupi E. **Ultrasound mapping system for the surgical management of deep infiltrating endometriosis**. Fertil Steril. 2014;102:143-150.
6) Di Giovanni A, Casarella L, Coppola M, Iuzzolino D, Rasile M, Malzoni M. **Combined transvaginal/ transabdominal pelvic ultrasonographic accurately predict the 3 dimensions of deep infiltrating bowel endometriosis measured after surgery: a prospective study in specialized center**. J Mimim Invasive Gynecol 2018:18 30155-9

2.2 Medical Therapy

2.2.1 Medical therapy in the prevention and therapy of pain syndrome.

Medical treatment has a role in controlling pain and avoiding the progression of injuries. Studies have shown that medical therapies are effective only during their use and the symptoms often recur after the stop of treatment [1].

In women with rectal-vaginal endometriosis, a review of the literature has shown that the effect of medical treatment in terms of pain reduction is substantial [2]. In the presence of pain symptomatology, the use of paracetamol, NSAIDs may be associated to hormonal treatments [3,4].

Recommendation	Level of evidence	Strength of recommendation
Medical therapies are effective only during their use and the symptoms often recur after the stop of treatment	I	A
Progestins alone are the most effective therapy in the reduction of dysmenorrhea, dyspareunia, dischizia and chronic pelvic pain	I	A
Estroprogestestinal treatments are effective in the treatment of dysmenorrhea, but not of chronic pelvic pain	I	A
In the presence of pain symptomatology, the use of paracetamol, NSAIDs may be associated to hormonal treatments	VI	B

1) Vercellini P, et al. **Estrogen-progestins and progestins for the management of endometriosis**. Fertility and Sterility. 2016;106(7):0015-0282.
2) Vercellini P, et al. **Medical Treatment for Rectovaginal Endometriosis: What is the Evidence?** Hum Reprod. 2009;24(10):2504-14.
3) Johonson NP, et al. **Consensus on current management of endometriosis. Human Reproduction**. 2013; 28,6: 1552–15681
4) Brown J, Crawford TJ, Datta S, Prentice A. **Oral contraceptives for pain associated with endometriosis**. Cochrane Database Syst Rev. 2018 May

2.3 Surgical Therapy

2.3.1 The aims of surgical treatment

A conservative approach aimed at restoring normal anatomical conditions with preservation of visceral innervation (nerve sparing techniques) must be the basis of the surgical strategy. Due to the high diagnostic accuracy of imaging techniques, the role of laparoscopy for purely diagnostic purposes is at present extremely limited [1] and histological evidence is not currently needed for treatments planning. The surgical approach should be whenever possible conservative and modulated according to patient's age and desire of pregnancy. Non-conservative surgical treatment should be considered only in cases of pain refractory to any medical and surgical treatment in perimenopausal patients whit no childbearing desire. When surgery is the treatment of choice, it should be appropriately planned and performed by expert operators in order to avoid unnecessary and potentially damaging repeated procedures.

Indications to surgical treatment for pelvic endometriosis are:

- symptomatic superficial/or infiltrating lesions in patient not responsive or with controindications to hormonal medical therapy (symptoms and/or disease progression).

- functional organ damage (bowel subocclusion/occlusion, urinary tract impairment with renal function compromission).

There is no reliable data showing superiority of excision compared to the ablation of lesions in the surgical treatment of peritoneal endometriosis [2]. However, the excisional technique allows histological diagnosis and removal of deep lesions which, to a simple inspection, could erroneously appear as superficial. For these reasons, it is considered that surgical excision of the endometriosis should be chosen when possible [3]. A "patient-centered" approach should represent the cornerstone in the management of patients with endometriosis disease.

Recommendation	Level of evidence	Strenght of recommendation
A conservative approach and nerve sparing must be the basis of the surgical strategy	III	B
Repeated surgeries should be avoided	III	B
Excisional tecnique should be preferred	III	B
Adequate counselling about therapeutic surgical options should be always offered to the patient	VI	B

1) Singh SS, Suen MW. **Surgery for endometriosis: beyond medical therapies**. Fertil Steril. 2017 Mar;107(3):549-554. doi: 10.1016/j.fertnstert.2017.01.001. Epub 2017 Feb 8.

2) Duffy J.M., Arambage K., Correa F.J., Olive D., Farquhar C., Garry R. et al. **Laparoscopic surgery for endometriosis**. Cochrane Database Syst Rev. 2014;:CD011031.

3) Yeung P Jr. **The laparoscopic management of endometriosis in patients with pelvic pain**. Obstet Gynecol Clin North Am. 2014 Sep;41(3):371-83. doi: 10.1016/j.ogc.2014.05.002. Epub 2014 Jul 9. Review.

2.3.2 Surgical technique

Several findings[1] show the superiority of laparoscopy vs laparotomy in the treatment of pelvic endometriosis, provided that the surgical procedure is performed in highly specialized centers for endoscopic pelvic surgery by operators with high level of experience in the treatment of endometriosis ("High volume surgeons").

Preferably procedures should be carried out by surgeons with proven experience in the laparoscopic treatment of extragenital conditions, such as urological or colorectal surgical procedures ("pelvic surgeon").

Otherwise the treatment can be carried out by a multidisciplinary team (gynecologist, general surgeon, urologist), but in any case with proven experience in the treatment of severe pelvic endometriosis.

Recommendation	Level of evidence	Strenght of recommendation
Laparoscopy is the gold standard in the surgical treatment of peritoneal endometriosis	VI	B

1) Jacobson TZ, Duffy JM, Barlow D, Koninckx PR and Garry R. **Laparoscopic surgery for pelvic pain associated with endometriosis**. Cochrane Database Syst Rev 2009:CD001300.

2.4 Approach to the infertile patient

2.4.1 Superficial and deep endometriosis as a cause of infertility

Deep endometriosis has a marked influence on the outcome of ART [1]. Clinical pregnancy rate (CPR) is reduced, being also related mainly to patient's age, serum value of AMH and presence of adenomyosis [2].

A complete evaluation of the couple should always be offered, taking into account not only endometriosis as a cause of infertility, but also of possible concomitant pathologies (e.g. male infertility).

Recommendation	Level of evidence	Strength of recommendation
A complete evaluation of the couple should always be offered, taking into account not only endometriosis as a cause of infertility, but also of possible concomitant pathologies (e.g. male infertility)	III	A

1) Hamdan M, Dunselman G, Li TC, Cheong Y. **Influence of Endometriosis on Assisted Reproductive Technology Outcomes. A Systematic Review and Meta-analysis**. Obstet Gynecol. 2015; 125:79–88.

2) Ballester M, Oppenheimer A, Mathieu d'Argent E, Touboul C, Antoine JM, Nisolle M, Daraï E. **Deep infiltrating endometriosis is a determinant factor of cumulative pregnancy rate after intracytoplasmic sperm injection/in vitro fertilization cycles in patients with endometriomas**. Fertil Steril. 2012 Feb;97(2):367-72.

2.4.2 Surgical treatment before ART

The impact of surgery for deep endometriosis on fertility is controversial. There is no level I evidence regarding the effect of surgery on fertility, thus there is no indication to surgical treatment to improve fertility [1]. In case of surgery, if spontaneous conception does not occur after 6 months, a IVF/ICSI should be recommended.

There is still no clear scientific evidence of the association between miscarriage rate and deep endometriosis [2].

Recommendation	Level of evidence	Strength of recommendation
There is no indication to surgical treatment to improve fertility	VI	B
In case of surgery, if spontaneous conception does not occur after 6 months, a IVF/ICSI should be recommended	IV	B

1) Barbosa MAP, et al. **Impact of endometriosis and its staging on assisted reproduction outcome: systematic review and meta-analysis**. Ultrasound Obstet Gynecol 2014; 44: 261–278.
2) Jacobson TZ, Duffy JM, Barlow D, Farquhar C, Koninckx PR, Olive D. **Laparoscopic surgery for subfertility associated with endometriosis**. Cochrane Database Syst Rev. 2010 Jan 20;(1):CD001398.

SECTION 3: ENDOMETRIOSIS IN ATYPICAL SITES

3.1 Endometriosis of the abdominal wall, inguinal canal, umbilicus

Endometriosis in these locations can be viewed with high frequency linear probes. Endometriosis appears as hypoechoic areas that interrupt the normal sonographic contour of the tissues.
These hypoechoic nodules have irregular margins and poor vascularity and are painful to palpation especially during menses.
At the umbilical level, endometriosis may show cystic appearance with fluid dense content.

3.2 Endometriosis in other sites

The presence of endometriosis in other sites should be suspected on a clinical basis.
Ultrasound examination is often not useful in case of deep abdominal (diaphragm) lesions and is non-diagnostic for thoracic and cranial lesions.
The ultrasound examination does not appear to be diagnostic in case of endometriosis involving nervous structures.

Recommendation	Level of evidence	Strength of recommendation
Contrast enhanced ultrasound techniques to MRI and other imaging tecnhinques should be considered in the diagnosis of endometriosis of atypical sites	V	B

3.2.1 Bowel deep endometriosis

The infiltrating endometriosis nodule appears as a hypoechoic, usually oblong thickening of the intestinal muscle.
The intestinal walls are generally visualized with TV approach up to the proximal sigma/distal descending colon, in conditions of adequate acoustic window. Intestinal nodules should be measured in the three orthogonal diameters, including the depth of infiltration (anteroposterior diameter).
Furthermore, the percentage of circumference involved, the degree of stenosis, the distance of the caudal boundary of the nodule from the margin of the anus can be evaluated [1].

3.2.2 Bladder endometriosis

Ureteral endometriosis may be a consequence of an intrinsic localization of the disease (endometriosis that infiltrates the muscle) or be caused by a peri-ureteral nodule with ureteral involvement. Both the localizations can cause hydroureteronefrosis.
In the evaluation of infiltrating endometriosis of the anterior/lateral/posterior parametrium it is appropriate to verify the relationship of the lesion with the intrapelvic tract of the ipsilateral ureter in order to identify a possible involvement. In case of doubt, pyelectasis should be verified through trans-abdominal route for the identification of patients with functional impairment of the urinary tract.

1) Reid S, Lu C, Casikar I, Reid G, Abbott J, Cario G, Chou D, Kowalski D, Cooper M, Condous G. **Prediction of pouch of Douglas obliteration in women with suspected endometriosis using a new real-time dynamic transvaginal ultrasound technique: the sliding sign**. Ultrasound Obstet Gynecol. 2013;41:685-91.

3.3 Medical terapy

3.3.1 Medical therapy in different location.

In the case of urinary endometriosis and, in particular, in case of symptoms related to bladder endometriosis, there is evidence on the efficacy of progestins (dienogest) [1] or GnRH analogues [2].
A prospective study of 500 women who underwent

surgical treatment for intestinal endometiosis showed a low percentage of recurrence (7.8% in 2-6 years). The percentage of recurrence of disease was lower in women who undergo progestin therapy after surgery (1%) or who had suspended it for a pregnancy (2%). In women who stopped treatment without getting pregnant ,the recurrence rate was 20% [3]. After surgery the goal of hormonal therapy is to prevent the recurrence of the disease and to prevent and treat the painful symptomatology [4].

Although most of the evidence regarding the role of medical therapy in preventing recurrences after surgery focuses on ovarian endometriosis, hormonal treatment should be considered also in case of deep infiltrating endometriosis.

There is no definitive evidence on the superiority of a drug on the prevention of recurrences, but the limitation must be made on the basis of the possibility of long-term adhesion and side effects, taking into account also woman's preferences.

Recommendation	Level of evidence	Strength of recommendation
Long term hormonal treatment is useful in pain control and disease progression	I	A
Progestins are the first line treatment	I	A

1) Angioni S, Nappi L, Pontis A, et al. **Dienogest. A possible conservative approach in bladder endometriosis. Results of a pilot study**. Gynecol Endocrinol 2015;31:406–8.-

2) Fedele L, Bianchi S, Montefusco S, Frontino G, Carmignani L. **A gonadotropin releasing hormone agonist versus a continuous oral contraceptive pill in the treatment of bladder endometriosis**. Fertil Steril 2008;90:183–4.

3) Donnez J, Squifflet J. **Complications, pregnancy and recurrence in a prospective series of 500 patients operated on by the shaving technique for deep rectovaginal endometriotic nodules**. Hum Reprod 2010;25:1949–58.

4) Somigliana E, Vercellini P, Vigano P, Benaglia L, Busnelli A, Fedele L. **Postoperative medical therapy after surgical treatment of endometriosis: from adjuvant therapy to tertiary prevention**. J Minim Invasive Gynecol. 2014;21:328–334.

3.4 Surgical Therapy

3.4.1 Surgical Therapy in different location

Indications to surgery are:

- failure of and/or controindications to medical therapy
- functional organ damage (Bowel subocclusion/occlusion, urinary tract impairment with renal function compromission)

Surgical techniques for the treatment of Bowel endometriosis include excision of the endometriotic infiltrating lesion by nodulectomy (shaving or discoid resection) or by segmental resection.

There are no guidelines to determine in which cases segmental resection should be performed. Instead of conservative tecnhniques, many operators base their choice on the anatomic localization of the disease and clinical symptoms. Whenever possible, nodulectomy should be the procedures of choice [1,2]. However, there are some cases in which shaving or discoid resection are not feasible and segmental resection should be performed [3,4]: multiple nodules, single nodule with longitudinal diameter greater than 3 cm and/or single nodule with deep infiltration of muscularis layer. In such cases, in fact, nodulectomy techniques could be unsatisfactory in terms of risk of excessive residual disease and an higher rate of complications.

Laparoscopic segmental Bowel resection is a safe and feasible technique with low complication rate when performed by expert operators with proper preoperative indications [4,5]. The risk of peri and postoperative complications is greater in the case of low or ultra-low anastomosis compared to the level of the anal verge and in case of simultaneous opening of the vaginal wall. The use of a transient ileum-or Colostomy protection is discretionary.

Concerning ureteral endometriosis, it is generally accepted that an intrinsic localization of the disease requires ureteral resection with reanastomoses or bladder reimplantation, whereas in the case of extrinsic involvement usually ureterolisis can be feasible [6]. Ureteral endometriosis can be silent but even in asymptomatic cases can lead to the loss of renal function [7], so if diagnosed it requires surgical approach. In case of bladder endometriosis the main indications for surgery are pain and urinary symptoms refractory to medical therapy [8].

The standard surgical treatment for bladder endometriosis is segmentary bladder resection. Laparoscopic shaving procedures are feasible only for superficial peritoneal disease. Cystoscopic treatment must be avoided.

Recommendation	Level of evidence	Strength of recommendation
Absolute indication to surgery are: - failure of and/or controindications to medical treatment in symptomatic patients - Bowel occlusion - Hydroureteronefrosis	V	B
The surgical tecnique should be choosen according to dimension of the lesion and symptoms	V	B
Conservative surgery should be considered in selected cases	IV	C
Continuous hormonal treatment should be considered after surgery	II	A-B

1) Koninckx PR, Ussia A, Adamyan L, Wattiez A, Donnez J. **Deep endometriosis: definition, diagnosis, and treatment**. Fertil Steril 2012;98: 564–71.

2) Donnez J, Squifflet J. **Complications, pregnancy and recurrence in a prospective series of 500 patients operated on by the shaving technique for deep rectovaginal endometriotic nodules**. Hum Reprod 2010;25:1949–58.

3) Abrao MS, Petraglia F, Falcone T, Keckstein J, Osuga Y, Chapron C. **Deep endometriosis infiltrating the recto sigmoid: critical factors to consider before management**. Hum. Reprod. Update 2015 May-Jun.

4) Malzoni M, Di Giovanni A, Exacoustos C, Lannino G, Capece R, Perone C, Rasile M, Iuzzolino D. **Feasibility and safety of laparoscopic assisted Bowel segmental reection for deep infiltrating endometriosis: a retrospective cohort study with description of technique**. J Minim invasive Gynecol. 2016 May-Jun.

5) De Cicco C, Corona R, Schonman R, Mailova K, Ussia A, Koninckx P. **Bowel resection for deep endometriosis: a systematic review**. BJOG 2011;118: 285–91.

6) Cavaco-Gomes J, Martinho M, Gilabert-Aguilar J, Gilabert-Estélles J. **Laparoscopic management of ureteral endometriosis: A systematic review**. Eur J Obstet Gynecol Reprod Biol. 2016; 210:94-101.

7) Langebrekke A, Qvigstad E. **Ureteral endometriosis and loss of renal function: mechanisms and interpretations**. Acta Obstet Gynecol Scand 2011; 90(10):1164-6.

8) Schonman R, Dotan Z, Weintraub AY, et al. **Deep endometriosis inflicting the bladder: long-term outcomes of surgical management**. Arch Gynecol Obstet 2013;288:1323–8.