

## Positive Results of Laparoscopic Surgery in Iraq to Treat Infertility

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**Abstract:** Background: Endometriosis is a prevalent gynaecological disease characterised by the presence of glands and submucosa of endometrium outside the uterine cavity. This illness affects 5–10% of women during their reproductive years. Objective: Our study was contributed to assess effective of laparoscopic surgery in patients with infertility. Patients and methods: A study was conducted that included the clinical analysis of 65 infertile women who underwent laparoscopic surgery in Iraq to treat infertility. The data was collected from different hospitals in Iraq over a period of 15 months, from 7 February 2022 to 18 August 2023. This study was evaluated the effectiveness of laparoscopic surgery in the treatment of infertility and to determine the extent of clinical improvements and their postoperative quality of life. Results: The surgical laparoscopic findings included an operative time of  $220 \pm 8.92$  minutes, a blood loss of  $175.48 \pm 9.75$  millilitres, and a bleeding rate of four cases, with one requiring admission to the intensive care unit (ICU). Two cases were successfully treated, with a 100% success rate. The average length of hospital stay was  $1.88 \pm 0.56$  days, and the complication rate was 7.69%. The most common complication was infection, which occurred in three cases. There were no deaths. In terms of the Fertility Quality of Life questionnaire, the emotional aspect was rated at  $80.19 \pm 11.69$ , the mind-body aspect at  $79.78 \pm 6.83$ , the relational aspect at  $84.43 \pm 8.84$ , and the social aspects of infertility at  $83.35 \pm 6.88$ . Conclusion: Laparoscopic surgery is the preferred method for female infertility procedures due to its minimally invasive nature, shorter hospital stays, faster recovery, and reduced risk of post-surgical adhesions.

**Keywords:** Laparoscopy; Pelvic pain; infertility; Fibroid; Infertility time; Follicle stimulating hormone, FSH (IU/l); and FertiQoL scale.

## INTRODUCTION

Over the past two decades, the introduction of diagnostic laparoscopy and then operative laparoscopy has led to significant advancements in the treatment of women with endometriosis symptoms (Giudice, L.C., 2004). These advances have enabled direct visualization of the pelvic and abdominal organs, allowing for the identification of endometriosis lesions in their various forms (Burney, R. O., & Giudice, L. C., 2012). Additionally, the development of a multitude of effective drugs for the management of endometriosis has been observed. Among these are danazol and analogues of gonadotrophin-releasing hormone, which are effective in relieving pain in patients with endometriosis. The benefit in patients with related infertility is not yet well defined (Burney, R. O., & Giudice, L. C., 2000; Adamson, G. D., & Baker, V. L. 2003; Counsellor VS. 1938). The results of patients in the authors' private practice have been reviewed in this study. These patients were consulting for pain and/or infertility. All were subjected to laparoscopic surgery (Wei, Q., *et al.*, 2009).

In recent years, the management of the sterile couple has undergone a significant evolution, and the improvement in the results achieved by assisted reproduction techniques (ART) has meant

that many patients are subjected to this type of treatment without having completed their diagnostic study (Arici, A. *et al.*, 1996). Nevertheless, diagnostic laparoscopy should be a fundamental component of reproductive medicine, particularly in cases of abnormal hysterosalpingography (HSG), unexplained infertility, suspected endometriosis, or pelvic adhesions (Carragher, R. P. *et al.*, 1986). Conversely, in addition to allowing for the evaluation of the pelvic cavity, diagnostic laparoscopy can be converted into an operative procedure, simultaneously addressing the various pathologies that contribute to infertility (Mansour, G. *et al.*, 2009).

Hysterosalpingography is a standard procedure in the investigation of couples who are unable to conceive (Kennedy, S. *et al.*, 2005). It is clear that if the results are abnormal, a diagnostic laparoscopy is indicated (Nayak, P. K. *et al.*, 2013). The discussion then arises when hysterosalpingography is normal. In their respective studies, various authors have observed a high degree of concordance in terms of tubal permeability between the two diagnostic procedures (for Women's, N. C. C. & Children's Health, U. K. 2013). However, a significant

proportion of patients with a normal hysterosalpingogram (HSG) have been found to exhibit some form of pelvic pathology during laparoscopy, with adhesions, agglutination of fimbriae, and endometriosis being the most commonly observed conditions. Consequently, a diagnostic laparoscopy is not justifiable on the basis of confirming tubal permeability; it is justifiable in the event of suspicion of endometriosis or pelvic adhesions (Hughes, E. *et al.*, 2005; Hughes, E., 2012).

Assisted reproductive technology (ART) has emerged as the primary treatment for tubal infertility, yet surgery continues to play an essential role in this field (Guzick, D. S. *et al.*, 1997). In particular, patients with hydrosalpinx should undergo a laparoscopy to assess the necessity for a salpingectomy prior to in vitro fertilisation (IVF) or reconstructive surgery with the intention of attempting a spontaneous pregnancy. Similarly, mild or moderate adhesions are also susceptible to surgical treatment (Deguara, C. S. *et al.*, 2012; Bonneau, C. *et al.*, 2012). The management of endometriosis in sterility is a topic that is the subject of ongoing debate. The ablation of peritoneal implants has been demonstrated to increase the rate of spontaneous gestation. However, there is currently no evidence that this also occurs in the context of assisted reproductive technology (ART). With regard to intramural and subserosal fibroids, it is now common practice for many teams to perform laparoscopic myomectomies. However, this remains a challenging procedure that requires advanced laparoscopic skills (Meuleman, C. *et al.*, 2013).

Other indications of laparoscopy in sterility are the "ovarian drilling" in patients with polycystic ovary syndrome and the orthotopic autotransplantation of ovarian tissue previously resected and cryopreserved in young oncological patients, although this technique has only been developed by some teams.

Fibroids are the most common tumor of the female genital tract. It is estimated that 20-50% of women have some fibroid, although 80% of them are asymptomatic. However, symptoms such as hypermenorrhea, irregular bleeding, pelvic pain, and infertility often require surgical treatment (Canis, M. *et al.*, 1997).

The relationship between fibroids and infertility is still controversial. Although traditionally, they were attributed to a great influence on

reproduction, today, their role in this aspect is doubted. This discussion is partly due to the fact that most of the published studies on this subject are retrospective or prospective uncontrolled trials (Adamson, G. D. & Pasta, D. J. *et al.*, 2010). It has also not been shown that fibroids, by themselves, increase the risk of abortion even when they are multiple and large since, in cases of fibroids associated with infertility or abortions, their location is more important than their volume (Guzick, D. S. *et al.*, 1997).

Preoperative treatment with GnRH analogues by depot preparations for 3-5 months is very useful because it reduces the size of fibroids and their vascularization so that bleeding is reduced during surgery (Jacobson, T. Z. *et al.*, 2010). In addition, these drugs also decrease the formation of post-surgical adhesions (Marcoux, S. *et al.*, 1997). However, their main drawback is that they increase fibrosis in the myometrium surrounding the fibroid, making it more difficult to dissect the planes. For this reason, some teams only use them for large-volume fibroids that would prevent the laparoscopic approach (Practice Committee of the American Society for Reproductive Medicine., 2012).

Although endometriosis was first reported more than a hundred years ago, it is a disease not very well known in terms of its pathophysiology and optimal treatments. It is a very common gynecological disease; it is found in up to 71% of women undergoing laparoscopy diagnosed with pelvic pain and up to 84% of patients evaluated for pelvic pain and infertility (Tinkanen, H. & Kujansuu, E. 2000).

## PATIENTS AND METHODS

A cross-sectional study of infertile women was conducted, with 65 patients included, whose ages ranged between 25 and 40 years. All patient data were collected while the patients underwent laparoscopic surgery in different hospitals in Iraq over a period of approximately one year, from 7 February 2022 to 18 August 2023. Women patients who had undergone other serious surgeries, were over 40 years of age, under 25 years of age, or suffered from other serious diseases were excluded from the study. This study included data on infertile women patients only, some of whom were associated with concomitant diseases or, some of whom would not be associated, and all of whom underwent laparoscopic surgery. All data pertaining to infertile women and the results of the multivariate

analysis were analysed and evaluated using the SPSS program, version 22.0. This study aimed to determine the demographic and clinical characteristics and data of infertile women. This included age, body mass index (underweight, normal weight, overweight, and obesity), smoking rate, comorbidities (asthma, diabetes, HIV, kidney disease, and hypertension), history of miscarriage, and previous ART, educational level, occupancy, and income level. Additionally, data on the most prevalent and common symptoms in women experiencing infertility were identified. This study conducted a comprehensive analysis to identify the most prevalent causes of infertility among women.

All women underwent a comprehensive diagnostic evaluation, which included blood testing, X-rays, and ultrasound. The data included information on the duration of infertility (in years), the severity of the infertility (mild, moderate, severe), and the type of infertility (basic). Secondary variables included pelvic surgery, history of tubal pregnancy, history of induced miscarriage, lowest grade of tubal function (mild to moderate injury, severe injury), techniques used (ultrasound, x-ray, carcino antigen 125, CA125 (IU/mL), FSH (IU/L) luteinizing hormone (LH) (IU/mL), estrogen, E2 (pg/mL), average uterine diameter (cm) and average sac diameter (cm).

## RESULTS

With regard to the outcomes of laparoscopic surgery, all infertile female patients underwent laparoscopic surgery under general anaesthesia. The data set included the duration of the operation, the rate of blood loss, the number of cases where bleeding occurred during the operation, admission to the intensive care unit, the operation survival rate, the mortality rate, and the length of stay. In the hospital, the rate of complications associated with patients after the operation and the level of patient satisfaction with the surgical procedure were classified as excellent, good, moderate, or poor. Additionally, a pain assessment was conducted for infertile women to determine the intensity of pain using the VAS scale, which ranges from 0 to 10, with 10 representing the highest degree of pain and 0 indicating no pain during the follow-up period after the operation, which lasted for seven months. Furthermore, the Fertility Quality of Life (FertiQoL) questionnaire was employed to ascertain the extent to which fertility problems affect the quality of life of women suffering from infertility. The questionnaire ranges from 0 to 100, with higher scores indicating an optimal quality of life for fertility. A multivariate analysis was conducted to determine the risk factors that affect the level of quality of life in infertile women following the surgical procedure.

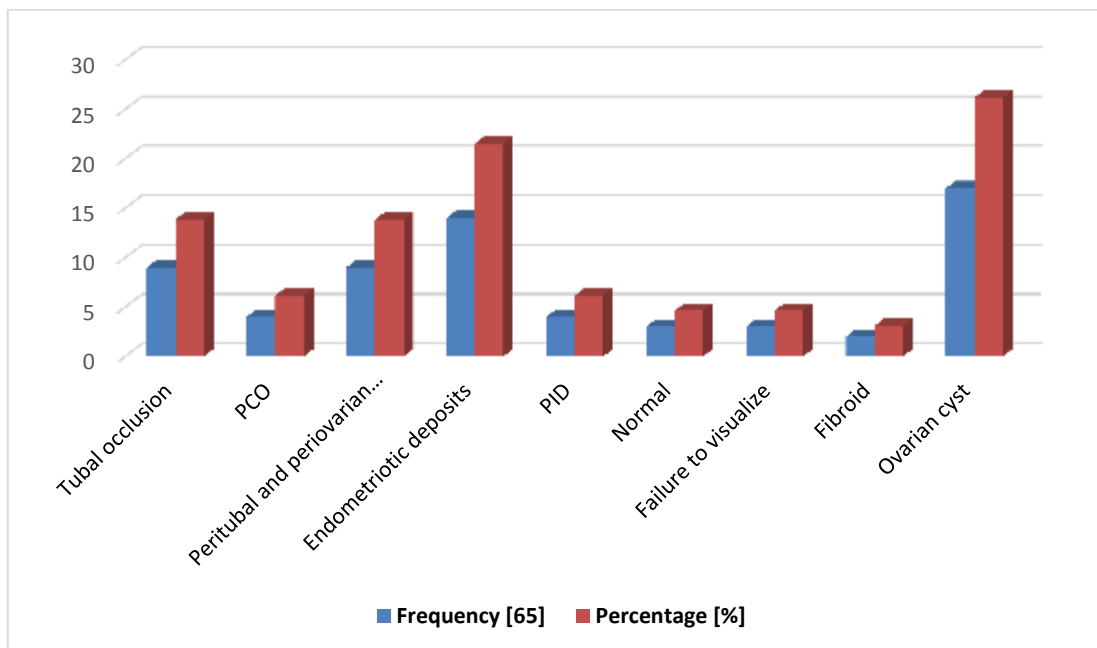
**Table 1:** Clinical and demographic characteristics of infertile women.

Characteristics	Frequency [65]	Percentage [%]
Age, years, n (%)		
25 – 30	5	7.69%
31 – 35	26	40.0%
36 – 40	35	53.85%
BMI, kg/m <sup>2</sup> , n (%)		
Underweight	8	12.31%
Normal weight	20	30.77%
Overweight	23	35.38%
Obesity	14	21.54%
Smoking n (%)		
Yes	10	15.38%
No	55	84.62%
Comorbidities		
Yes	34	52.31%
No	31	47.69%
Asthma	9	13.85%
Diabetes	7	10.77%
HIV	2	3.08%
Kidney diseases	2	3.08%
Hypertension	14	21.54%
Previous pregnancies		

Yes	20	30.77%
No	45	69.23%
Number of pregnancies		
0	45	69.23%
1	16	24.62%
> 2	4	6.15%
Abortion history		
Yes	8	12.31%
No	57	87.69%
Previous ART		
Yes	18	27.69%
No	47	72.31%
Educational level		
Primary	3	4.62%
Secondary	7	10.77%
College/university	55	84.62%
Occupation		
Housewife	23	23%
Student	10	10%
Employment	32	32%
Income level, n (%)		
< 400 \$	44	67.69%
> 400 \$	21	32.31%

**Table 2:** Determine the main Symptoms which prevalence into infertile women.

Symptoms	Frequency [65]	Percentage [%]
Irregular menstrual cycles	16	24.62%
Pelvic pain	20	30.77%
Heavy periods	7	10.77%
Hormonal imbalances	10	15.38%
Issues with ovulation	11	16.92%



**Figure 1:** Determination of the common causes resulted to infertility in women.

**Table 3:** Diagnostic findings of female infertility.

Variables	Frequency [65]	Percentage [%]
Infertility time (years)		
≥3	50	76.92%
<3	15	23.08%
Severity level of infertility		
Mild	11	16.92%
Moderate	18	27.69%
Severe	36	55.38%
Infertility type		
Primary	39	60.0%
Secondary	26	40.0%
Pelvic surgery		
Yes	36	55.38%
No	29	44.62%
Tubal pregnancy history		
Yes	42	64.62%
No	23	35.38%
Induced abortion history		
Yes	30	46.15%
No	35	53.85%
Lowest tubal function score		
Mild to moderate injury	12	18.46%
Severe injury	53	81.54%
Techniques used		
Ultrasound	36	55.38%
X-ray	29	44.62%
Cancer antigen 125, CA125(U/ml)	108.57 ± 96.40	
Follicle-stimulating hormone, FSH (IU/l)	8.40 ± 2.84	
Luteinizing hormone (LH) (IU/mL)	48.11 ± 4.26	
Estrogen, E2(pg/ml)	46.38 ± 20.79	
Mean uterus diameter (cm)	5.40 ± 1.21	
Mean cyst diameter (cm)	4.87 ± 3.38	

**Table 4:** Surgical laparoscopic findings of infertile women

Parameters	Number of patients [%]	Percentage [%]
Operative time, min	220 ± 8.92	
Blood loss, mL	175.48 ± 9.75	
Bleeding rate, N (%)		
Yes	4	6.15%
No	61	93.85%
Admission to the intensive care unit (ICU)		
Yes	2	3.08%
No	63	96.92%
Success rate, n (%)		
Successful	65	100%
Faild	0	0%
Length of stay in hospital, days	1.88 ± 0.56	
Complications	5	7.69%
Infection	3	4.62%
Damage to surrounding organs	0	0%
Scarring	1	1.54%
Adhesions	0	0%

Complications related to anesthesia	1	1.54%
Mortality rate		
Yes	0	0%
No	65	100%
Satisfaction rate		
Excellent	40	61.54%
Good	19	29.23%
Moderate	4	6.15%
Poor	2	3.08%

**Table 5:** Evaluation of pain rate into infertile women after laparoscopic surgery by VAS scale.

Follow-up time, months	VAS scale
1 <sup>st</sup> month	5.43 ± 0.12
2 <sup>nd</sup> month	4.24 ± 0.56
3 <sup>rd</sup> month	3.67 ± 0.44
4 <sup>th</sup> month	2.56 ± 0.31
5 <sup>th</sup> month	2.10 ± 0.65
6 <sup>th</sup> month	1.02 ± 0.40
7 <sup>th</sup> month	0.54 ± 0.25

**Table 6:** A conducting questionnaire of Fertility Quality of life (FertiQoL) in ascertain the extent of fertility problems on the quality of life of women experiencing infertility

Items	FertiQoL scale
Emotional aspect	80.19 ± 11.69
Mind-body aspect	79.78 ± 6.83
Relational aspect	84.43 ± 8.84
Social aspects of infertility	83.35 ± 6.88

**Table 7:** Performing a multivariate analysis of risk factors effect on infertility women after laparoscopic treatment of infertility.

Risk factors	Regression coefficient	SEM	P – value	OR (95% CI)
Infertility time (>3 vs. ≤3 years)	0.792	0.889	0.294	2.24 (0.37 – 13.14)
Age (>30 vs. ≤30 years)	0.866	0.158	0.003	2.34 (1.72 – 3.25)
Obesity	0.786	0.163	< 0.001	2.45 (1.69 – 4.68)
Smoking	0.652	0.171	< 0.001	2.58 (1.48 – 4.37)
Abortion history	0.761	0.132	0.0019	2.13 (1.62 – 2.81)
Lowest tubal function score (severe injury)	0.892	0.320	0.002	2.34 (1.64 – 4.76)

## DISCUSSION

Our outcomes found women patients with ages (36 - 40) years included 35 cases, infertile women with ages (31 – 35) years included 26 cases, and infertile women with ages (25 - 30) years included 5 cases, classifications BMI of infertile women had underweight included 8 cases, normal weight included 20 cases, overweight included 23 cases, and obesity included 14 cases, rate of smokers was 15.38%, rate of comorbidities was 52.31%, which the most diseases included asthma with 9 cases, diabetes with 7 cases, and hypertension with 14 cases, and previous pregnancies were 20 cases. Also, the main symptoms prevalent in the women were irregular menstrual cycles, which included 16 cases; pelvic pain, which included 20 cases; heavy periods, which included 7 cases; hormonal

imbalances, which included 10 cases; and issues with ovulation, which included 11 cases.

According to diagnostic findings, our outcomes enrolled Infertility time who more or equal three years 50 cases, severity level of infertility who are in mild was 11, moderate was 18 cases, and severe was 36 cases, infertility type included primary with 39 cases and secondary with 26 cases, rate of pelvic surgery was 55.38%, rate of tubal pregnancy history was 64.62%, induced abortion history was 46.15%, lowest tubal function score included mild to moderate injury was 12 cases and severe injury was 53 cases, techniques used included ultrasound with 36 cases and X-ray with 29 cases, cancer antigen 125, CA125(U/ml) was 108.57 ± 96.40, follicle-stimulating hormone, FSH (IU/l) was 8.40 ± 2.84, luteinizing hormone (LH)

(IU/mL) was  $48.11 \pm 4.26$ , estrogen, E2(pg/ml) was  $46.38 \pm 20.79$ , mean uterus diameter (cm) was  $5.40 \pm 1.21$ , mean cyst diameter (cm) was  $4.87 \pm 3.38$ .

In terms of surgical laparoscopic findings, our results enrolled operative time was  $220 \pm 8.92$  min; blood loss was  $175.48 \pm 9.75$  mL; bleeding rate included 4 cases, admission to the intensive care unit (ICU) included 2 cases, successful rate of surgery 100%, length of stay in hospital was  $1.88 \pm 0.56$  days, rate of complications was 7.69%, where the most factor was an infection which included 3 cases, mortality rate was 0 cases, satisfaction rate classified into excellent with 61.54%, good with 29.23%, fair with 6.15%, and poor with 3.08%. Furthermore, it was determined that rates of pain into infertile women after laparoscopic surgery during the follow-up period, where the rate of pain during the first month was  $5.43 \pm 0.12$  while the rate of pain during the seventh month was  $0.54 \pm 0.25$ . In terms of the questionnaire of Fertility Quality of life, the emotional aspect was  $80.19 \pm 11.69$ , the mind-body aspect was  $79.78 \pm 6.83$ , the relational aspect was  $84.43 \pm 8.84$ , and the social aspects of infertility was  $83.35 \pm 6.88$ .

The previous researches show that laparoscopy is of great importance when it comes to helping infertile women who suffer from infertility that is hard to treat, where endometriosis, pelvic adhesions, ovarian cysts, and fibroids were considered some of the major medical conditions that can be treated using laparoscopic interventions, where it can clear that by eliminating or correcting these determinants, reproductive ability is enhanced leading to increased rates of actual pregnancy (Cooper, T. G. et al., 2010; Vercellini, P. et al., 2009; Berlanda, N. et al., 2013).

American study was found laparoscopic surgery reduces post-operative pain, shortens recovery times, and reduces complications compared to traditional open surgeries; one of the key advantages of laparoscopic surgery when treating infertility is that it is minimally invasive, which many women who wish to be pregnant choose this less time-consuming method so that they go back to their usual chores and potentially begin "making babies" again as early as possible (Pawelczyk, L. et al., 2009).

Some studies noticed that with laparoscopic surgery, it is possible to see directly and handle

exactly sexual organs, thus leading to proper diagnosis and treatment of infertility by healthcare providers than ever before, which it would mean that patients will have better chances at getting well soon after visiting a doctor's place because the reason behind their inability to bear children can be effectively brought under control (D'Hooghe, T. M. et al., 2003; De Ziegler, D. et al., 2010).

## CONCLUSION

Laparoscopic surgery has evolved rapidly and is now the preferred approach to most surgical procedures related to female infertility. This minimally invasive surgery offers several advantages over the classical approach, including a shorter hospital stay, faster recovery, and a reduced risk of post-surgical adhesions. In order to facilitate effective treatment decisions in women with a history of pelvic surgery, pelvic inflammatory disease (PID), and chronic pelvic pain, it is recommended that laparoscopy be considered at an earlier stage.

## REFERENCES

1. Giudice, L.C. "Endometriosis." *Lancet* 364 (2004): 1789–1799.
2. Burney, R. O., & Giudice, L. C. "Pathogenesis and pathophysiology of endometriosis." *Fertility and sterility* 98.3 (2012): 511-519.
3. Bischoff, F. Z., & Simpson, J. L. "Heritability and molecular genetic studies of endometriosis." *Human reproduction updates* 6.1 (2000): 37-44.
4. Adamson, G. D., and Baker, V. L. "Subfertility: causes, treatment and outcome." *Best Practice & Research Clinical Obstetrics & Gynaecology* 17.2 (2003): 169-185.
5. Counsellor VS. "Endometriosis: a clinical and surgical review." *American journal of obstetrics and gynecology* 36.5 (1938): 877-888.
6. Wei, Q., Clair, J. B. S., Fu, T., Stratton, P., & Nieman, L. K. "Reduced expression of biomarkers associated with the implantation window in women with endometriosis." *Fertility and sterility* 91.5 (2009): 1686-1691.
7. Arici, A., Oral, E., Bukulmez, O., Duleba, A., Olive, D. L., & Jones, E. E. "The effect of endometriosis on implantation: results from the Yale University in vitro fertilization and

- embryo transfer program." *Fertility and sterility* 65.3 (1996): 603-607.
8. Carraher, R. P., Foldes, R. G., & McGuire, J. L. "Experimental evidence for failure to implant as a mechanism of infertility associated with endometriosis." *American journal of obstetrics and gynecology* 155.5 (1986): 1109-1113.
  9. Mansour, G., Aziz, N., Sharma, R., Falcone, T., Goldberg, J., & Agarwal, A. "The impact of peritoneal fluid from healthy women and from women with endometriosis on sperm DNA and its relationship to the sperm deformity index." *Fertility and sterility* 92.1 (2009): 61-67.
  10. Kennedy, S., Bergqvist, A., Chapron, C., D'Hooghe, T., Dunselman, G., Greb, R., ... & Saridogan, E. "ESHRE guideline for the diagnosis and treatment of endometriosis." *Human reproduction* 20.10 (2005): 2698-2704.
  11. Nayak, P. K., Mahapatra, P. C., Mallick, J. J., Swain, S., Mitra, S., & Sahoo, J. "Role of diagnostic hystero-laparoscopy in the evaluation of infertility: A retrospective study of 300 patients." *Journal of human reproductive sciences* 6.1 (2013): 32-34.
  12. Womens, N. C. C., & Children's Health, U. K. "Fertility: assessment and treatment for people with fertility problems." (2013).
  13. Hughes, E., Fedorkow, D., & Collins, J. "Ovulation suppression for endometriosis." *Cochrane Syst Rev. Cochrane Library, Issue 1.* (2005).
  14. Polskiego, S. Z. E. "diagnostyki i metod leczenia endometriozy." *Ginekol Pol* 83 (2012): 871-876.
  15. Guzick, D. S., Silliman, N. P., Adamson, G. D., Buttram Jr, V. C., Canis, M., Malinak, L. R., & Schenken, R. S. "Prediction of pregnancy in infertile women based on the American Society for Reproductive Medicine's revised classification of endometriosis." *Fertility and sterility* 67.5 (1997): 822-829.
  16. Deguara, C. S., Pepas, L., & Davis, C. "Does minimally invasive surgery for endometriosis improve pelvic symptoms and quality of life?." *Current Opinion in Obstetrics and Gynecology* 24.4 (2012): 241-244.
  17. Bonneau, C., Chanelles, O., Sifer, C., & Poncelet, C. "Use of laparoscopy in unexplained infertility." *European Journal of Obstetrics & Gynecology and Reproductive Biology* 163.1 (2012): 57-61.
  18. Meuleman, C., Tomassetti, C., Gaspar, M., et al. "Laparoscopic treatment of endometriosis." *Minerva Ginecol.* 65. 2 (2013): 125-142.
  19. Canis, M., Donnez, J. G., Guzick, D. S., Halme, J. K., Rock, J. A., Schenken, R. S., & Vernon, M. W. "Revised American Society for Reproductive Medicine classification of endometriosis: 1996." *Fertil Steril* 67 (1997): 817-821.
  20. Adamson, G. D., & Pasta, D. J. "Endometriosis fertility index: the new, validated endometriosis staging system." *Fertility and sterility* 94.5 (2010): 1609-1615.
  21. Guzick, D. S., Silliman, N. P., Adamson, G. D., Buttram Jr, V. C., Canis, M., Malinak, L. R. & Schenken, R. S. "Prediction of pregnancy in infertile women based on the American Society for Reproductive Medicine's revised classification of endometriosis." *Fertility and sterility* 67.5 (1997): 822-829.
  22. Jacobson, T. Z., Duffy, J. M., Barlow, D. H., Farquhar, C., Koninckx, P. R., & Olive, D. "Laparoscopic surgery for subfertility associated with endometriosis." *Cochrane Database of Systematic Reviews* 1 (2010).
  23. Marcoux, S., Maheux, R., Bérubé, S., & Canadian Collaborative Group on Endometriosis. "Laparoscopic surgery in infertile women with minimal or mild endometriosis." *New England Journal of Medicine* 337.4 (1997): 217-222.
  24. Practice Committee of the American Society for Reproductive Medicine. "Endometriosis and infertility: a committee opinion." *Fertility and sterility* 98.3 (2012): 591-598.
  25. Tinkanen, H. & Kujansuu, E. "In vitro fertilization in patients with ovarian endometriomas." *Acta Obstetrica et Gynecologica Scandinavica: Original Article* 79.2 (2000): 119-122.
  26. Cooper, T. G., Noonan, E., Von Eckardstein, S., Auger, J., Baker, H. G., Behre, H. M., ... & Vogelsong, K. M. "World Health Organization reference values for human semen characteristics." *Human reproduction update* 16.3 (2010): 231-245.
  27. Vercellini, P., Somigliana, E., Vigano, P., Abbiati, A., Barbara, G., & Crosignani, P. G. "Surgery for endometriosis-associated infertility: a pragmatic approach." *Hum Reprod.* 2009; 24 (2): 254-269.
  28. Berlanda, N., Vercellini, P., Somigliana, E., Frattaruolo, M. P., Buggio, L., & Gattei, U.



- "Role of surgery in endometriosis-associated subfertility." *Seminars in reproductive medicine*. 31.02 (2013).
29. Pawelczyk, L., Duleba, A. J., Spaczyński, R. Z., Sokalska, A., & Jędrzejczak, P. "Effects of presacral neurectomy on pelvic pain in women with and without endometriosis." *Ginekologia Polska* 80.3 (2009).
30. D'Hooghe, T. M., Debrock, S., Hill, J. A., & Meuleman, C. "Endometriosis and subfertility: is the relationship resolved?." *Seminars in reproductive medicine*. 21. 02 (2003). 584-4662.
31. De Ziegler, D., Borghese, B. & Chapron, C. "Endometriosis and infertility: pathophysiology and management." *The Lancet* 376.9742 (2010): 730-738.

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