

# Effectiveness of laparoscopic surgeries in treating infertility related to endometriosis

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Słabuszewska-Jóźwiak A, Ciebiera M, Baran A, Jakiel G. Effectiveness of laparoscopic surgeries in treating infertility related to endometriosis. *Ann Agric Environ Med.* 2015; 22(2): 329–331. doi: 10.5604/12321966.1152089

## Abstract

**Introduction.** Endometriosis is defined as an illness caused by the presence of foci of endometrial tissue outside the uterine cavity. The illness is found in 5–10% of women at reproductive age. In the group of those suffering from endometriosis, the percentage of infertile women amounts to 50%. At higher stages of endometriosis clinical advancement, the suggested treatment is the application of assisted reproductive technology.

**Objective.** The aim of the study was assessment of the effectiveness of laparoscopy in treating infertility related to endometriosis among women treated in our clinic in 2009–2012.

**Materials and method.** The clinic is a medical centre focused on advanced minimally invasive surgical treatment, especially laparoscopic surgeries in diseases of the uterus – with a focus on laparoscopic surgeries for patients with endometriosis of the recto-vaginal area. 53 female patients treated for infertility who underwent a laparoscopic surgical procedure to remove the foci of endometriosis in 2009–2012, were analysed retrospectively. After the surgical procedure, the patients were observed over a period of 12 months, during which the frequency of pregnancies (including natural and assisted pregnancies) was assessed in relation to the stage of endometriosis advancement (rAFS).

**Results.** In 17 out of 53 (32%) patients who underwent the surgical procedure a clinical pregnancy was diagnosed. 11 out of 53 (20.75%) women became pregnant spontaneously, 6 out of 53 (11.32%) patients became pregnant as a result of assisted reproductive technology (ART) (5 IVF and 1 IUI). The average time from the date of surgical procedure to spontaneous pregnancy amounted to 6 months.

**Conclusions.** Laparoscopy is a vital therapeutic method. Operative laparoscopy is an efficient method for treating infertility related to endometriosis, and the procedure seems to be the most effective particularly at stage III rAFS. The period for expectant management after a surgical procedure should last 6 months.

## Key words

endometriosis, infertility, laparoscopy

## INTRODUCTION

Endometriosis is one of the most common diseases in gynaecology, which is characteristic of the presence of glands and submucosa of endometrium outside the uterine cavity. This illness affects 5–10% of the female population at reproductive age.

An incorrect location of the endometrium and its biochemical activity initiate an inflammatory reaction which results in pelvic pain. This pain intensifies during menstruation, dyspareunia, staining, non-cyclical bleedings, and ailments related to the urinary and digestive systems. The condition also presents problems related to infertility [1, 2, 3, 4].

Research shows that in 25–50% of women, infertility is a result of the presence of endometriosis [5]. The probability of pregnancy in an infertile woman who additionally suffers from endometriosis is approximately twice as low than in relation to women with idiopathic infertility [4]. Among the biological mechanisms responsible for the decrease in fertility in women with endometriosis are: anatomical changes in the architecture of the pelvis minor, disorders of the transportation function of the oviduct, disorders of

immunologic balance within the peritoneal cavity, changes in cells' functionality, retardation of ovulation, displacements of the spermovum, as well as difficulties with embryo implantation [6, 7, 8]. Recent research proves the relation between infertility in women with endometriosis, both with lesions in the ovary and in the endometrium. The influence of endometriosis on spermatozoa is also significant. Under the influence of secreted inflammatory, growth, and hormonal agents, spermatozoa decrease their mobility and their DNA is fragmented [9].

In the diagnostics of endometriosis, laparoscopic imaging of the pelvis is regarded as the gold standard [10, 11]. Biochemical methods have a limited significance due to the lack of a marker specific for endometriosis [12]. Pharmacotherapy of endometriosis does not improve fertility sufficiently [13, 14]. Surgical treatment decreases pain ailments and improves fertility; however it may lower the ovarian reserve and at the same time increase the risk of premature termination of ovaries' functions [15, 16, 17]. The ablation of endometrial lesions, together with the reduction of adhesions, increases the number of women who become pregnant in relation to the use of diagnostic laparoscopy itself. Moreover, during a surgical procedure there is a possibility to assess and localise lesions thoroughly [11, 17, 18]. The advancement of lesions may be defined with the use of a four-stage improved classification by the American Society for Reproductive Medicine (rAFS) [19]. Another assessment tool is the Endometriosis Fertility Index (EFI) in which, apart

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Received: 20 August 2013; accepted: 19 December 2013



from anatomical lesions, data from the medical history and the results of the conducted surgery are also included [20].

According to the American Society of Reproductive Medicine (ASRM), the treatment of stage I and stage II lesions with the use of laparoscopy slightly increases the percentage of pregnancies. In case of stage III and stage IV, correctly conducted laparoscopy significantly increases the percentage of pregnancies [21]. National Institute for Health and Clinical Excellence (NICE) recommendations from 2012, in the case of conducting laparoscopy and finding possible lesions at stage I or II order to remove them [22, 23], in the case of lesions at stage III or IV surgical treatment is the only method left. It should be stressed that female patients with endometriomas below 3 cm do not qualify for surgical treatment because the procedure of removing such a cyst decreases the ovarian reserve and does not positively influence the increase of pregnancy percentage. Advanced endometriosis in stage III and stage IV will require surgical treatment consisting of the removal of the disease foci and restoring anatomical interrelations [24].

In case of an inability to become pregnant after surgery, the ASRM recommendations suggest the use of assisted reproductive technology instead of another surgical procedure. The indication for the stimulation of ovulation and intra-uterine insemination is minimal for mild endometriosis before the age of 35. Extracorporeal insemination is used at the same stages after the age of 35 for patients with advanced endometriosis, when we deal with other causes for infertility and after ineffective surgical treatment [12, 25]. In each case, therapy should be personalised and based on a detailed analysis of all clinical data while taking into account the age of a patient.

## OBJECTIVE

The aim of the study was assessment of the effectiveness of laparoscopic surgeries for removing endometriosis implants in the treatment of infertility among women treated in our clinic in 2009–2012.

## MATERIALS AND METHOD

53 female patients treated for infertility who underwent a laparoscopic surgical procedure to remove the foci of endometriosis in 2009–2012 were retrospectively analysed. After the surgical procedure, patients were observed over a period of 12 months during which the frequency of pregnancies was assessed. All patients with diagnosed primary infertility at an age not exceeding 40 years, who declared a willingness to become pregnant immediately, and whose partners met the criteria of correct spermogram, were qualified for the research group [26]. They were informed to try to become pregnant during the first menstrual cycle after the surgical procedure.

## RESULTS

In 2009–2012, 53 female patients with primary infertility, in whom endometriosis was diagnosed and remedied without operation, were hospitalised in the clinic. In the

patients who underwent a surgical procedure, the stage of endometriosis was defined on the basis of an intraoperative assessment according to the rAFS scale. On this basis, those diagnosed were: stage I – 2 (3.8%), stage II – 10 (18.9%), stage III – 22 (41.5%), stage IV – 19 (35.8%). Subsequently, the diagnosed lesions were completely removed surgically. After the procedure, the patients underwent a 12-month-long observation. In 17 out of 53 (32%) patients who underwent the surgical procedure, a clinical pregnancy was diagnosed. 11 out of 53 (20.75%) women became pregnant spontaneously, 6 out of 53 (11.32%) patients became pregnant as a result of the application of assisted reproductive technology (ART) (5 IVF and 1 IUI) (Tab. 1). The women who underwent the surgical procedure, regardless of its effect on fertility, reported a decrease or discontinuance of ailments which accompanied endometriosis, such as pain in the pelvis minor, dysmenorrhea, and dyspareunia (Tab. 2). The patients described their functioning, both physical and psychological, in the post-operative period as better.

**Table 1.** Relationship between number of patients who became pregnant and stage of endometriosis' advancement

The number of patients who became pregnant in relation to the stage of endometriosis' advancement (without ART)				
	The stage of endometriosis' advancement (according to ASRM)			
	I	II	III	IV
Total number of patients	2	10	22	19
Number of patients who became pregnant	1 (50%)	2 (20%)	7 (31.8%)	1 (5.2%)
The number of patients who became pregnant in relation to the stage of endometriosis' advancement (with ART)				
	The stage of endometriosis' advancement (according to ASRM)			
	I	II	III	IV
Total number of patients	2	10	22	19
Number of patients who became pregnant	1 (50%)	4 (40%)	8 (36.4%)	4 (21%)

**Table 2.** Relationship between time to pregnancy after surgical procedure and stage of endometriosis' advancement

The time to pregnancy after a surgical procedure in relation to the stage of endometriosis' advancement						
		The stage of endometriosis' advancement (according to ASRM)				Percentage
		I	II	III	IV	
		The time to pregnancy after a surgical procedure	1-2 months	-	-	
	3-4 months	-	1	5	-	54.5%
	5-6 months	-	-	-	-	0%
	7-8 months	-	1	1	-	18.2%
	9-10 months	1	-	1	1	27.3%
	11-12 months	-	-	-	-	0%

## DISCUSSION

Analysis of the latest research concerning the operative treatment of infertility caused by endometriosis indicated that no more than a quarter (10–25%) of women who underwent a surgical procedure due to peritoneal endometriosis, deep infiltrating endometriosis (DIE), lesions in deep perineal space, or recurring ovarian cysts of endometrial origin, would become pregnant spontaneously [27, 28]. The published results use a homogenous, longer period of observation than that in the presented analysis. The results obtained in the current analysis are similar: 20.75% of women who underwent a surgical procedure without additional therapeutic methods became pregnant spontaneously within the consecutive 6 months of treatment, and gave birth to healthy children. This short period suggests that in this group of patients,



endometriosis was the primary factor which limited fertility. The percentage of spontaneous pregnancies after the period of 6 months is comparable with the percentage achieved with the use of advanced assisted reproductive technology. The additional value of the laparoscopic method is the minimalisation or elimination of other ailments related to endometriosis and the natural character of conception [16, 18, 29].

The analysis of 53 patients who underwent the surgical procedure in the presented study showed good, reproducible results of the operative treatment in the case of lesions caused by endometriosis classified as stage III (according to ASRM). 7 out of 22 (31.8%) patients who underwent the surgical procedure became pregnant within 5 months. This corresponds with the results of research conducted by other research centres, and is in accordance with the recommendations of international gynaecological societies. The European Society for Human Reproduction and Embryology (ESHRE) and ASRM in unanimously claim that lesions classified as moderately severe and severe should be treated operatively as the treatment of choice (or IVF). Controversies are related to the period of the post-operative observation. A large percentage of spontaneous pregnancies within a short period of postoperative observation proves that the postponed decision about recommending a couple to IVF, if there are no other documented causes for infertility, is justifiable. A similar view is also presented by the leading research centres in Europe [27, 28, 30, 31].

The obtained results prove that the highest percentage of spontaneous pregnancies may be most often observed until the 6<sup>th</sup> month following the surgical procedure. In the later period, the number decreases. Randomised research is needed on a large sample group, which will define the best timeframes for expectant management after which, in case of the lack of pregnancy, a patient should be offered assisted reproductive technology.

## CONCLUSIONS

1. Operative laparoscopy is an efficient method for treating infertility related to endometriosis; at stage III rAFS it seems to be the most effective.
2. The period for expectant management after a surgical procedure should last 6 months.

## REFERENCES

1. Giudice LC. Endometriosis. *Lancet* 2004; 364: 1789–1799.
2. Burney RO, Giudice LC. Pathogenesis and pathophysiology of endometriosis. *Fertil Steril*. 2012; 98 (3): 511–519.
3. Bischoff FZ, Simpson JL. Heritability and molecular genetic studies of endometriosis. *Hum Reprod Update*. 2000; 6: 37–44.
4. Adamson G, Baker V. Subfertility: causes, treatment and outcome. *Best Pract Res Clin Obstet Gynaecol*. 2003; 17: 169–185.
5. Counsellor VS. Endometriosis. A clinical and surgical review. *Am J Obstet Gynecol*. 1938; 36: 877.
6. Wei Q, Clair JB, Fu T, et al. Reduced expression of biomarkers associated with the implantation window in women with endometriosis. *Fertil Steril*. 2009; 91: 1686–1691.
7. Arici A, Oral E, Bukulmez O. The effect of endometriosis on implantation. Result from the Yale University in vitro fertilization and embryo transfer program. *Fertil Steril*. 1996; 65: 603–607.
8. Hahn D, Carraher R, Foldsy R. Experimental evidence for failure to implant as a mechanism of infertility associated with endometriosis. *Am J Obstet Gynecol*. 1986; 155: 1109–1113.
9. Mansour G, Aziz N, Sharma R, et al. The impact of peritoneal fluid from healthy women and from women with endometriosis on sperm DNA and its relationship to the sperm deformity index. *Fertil Steril*. 2009; 92: 61–67.
10. Kennedy S, Bergqvist A, Chapron C, et al. ESHRE guideline for the diagnosis and treatment of endometriosis. *Hum Reprod*. 2005; 20(10): 2698–2704.
11. Nayak PK, Mahapatra PC, Mallick J, et al. Role of diagnostic hystero-laparoscopy in the evaluation of infertility: A retrospective study of 300 patients. *J Hum Reprod Sci*. 2013; 6 (1): 32–34.
12. National Collaborating Centre for Women's and Children's Health. Fertility: assessment and treatment for people with fertility problems. London, RCOG Press, 2004. [www.nice.org.uk/page](http://www.nice.org.uk/page) (access: 2013.08.20).
13. Hughes E, Fedorkow D, Collins J, Vandekerckhove P. Ovulation suppression for endometriosis. *Cochrane Database Syst Rev*. 2000; 3: CD000155.
14. Drews K, Barlik M, Łukaszewski T. Leczenie zachowawcze endometriozu. *Ginekol Pol*. 2012; 83: 209–213 (in Polish).
15. The Practice Committee of the American Society for Reproductive Medicine. Endometriosis and infertility. *Fertil Steril*. 2006; 86(Supl. 4): 156–160.
16. Deguara CS, Pepas L, Davis C. Does minimally invasive surgery for endometriosis improve pelvic symptoms and quality of life? *Curr Opin Obstet Gynecol*. 2012; 24(4): 241–244.
17. Bonneau C, Chanelles O, Sifer C, et al. Use of laparoscopy in unexplained infertility. *Eur J Obstet Gynecol Reprod Biol*. 2012; 163(1): 57–61.
18. Meuleman C, Tomassetti C, Gaspar Da Vitoria Magro M, et al. Laparoscopic treatment of endometriosis. *Minerva Ginecol*. 2013; 65 (2): 125–142.
19. American Society for Reproductive Medicine. Revised American Society for Reproductive Medicine classification of endometriosis: 1996. *Fertil Steril* 1997; 67: 817–821.
20. Adamson GD, Pasta DJ. Endometriosis fertility index: the new, validated endometriosis staging system. *Fertil Steril*. 2010; 94 (5): 1609–1615.
21. Guzik DS, Sillian NP, Adamson GD, et al. Prediction of pregnancy in infertile women based on the American Society for Reproductive Medicine's revised classification of endometriosis. *Fertil Steril*. 1997; 67: 822–829.
22. Jacobson T, Barlow D, Koninckx P, et al. Laparoscopic surgery for subfertility associated with endometriosis. *Cochrane Database Syst Rev*. 2002; 4: CD001398; Update: *Cochrane Database Syst Rev*. 2010; 1: CD001398.
23. Marcoux S, Maheux R, Berube S. Laparoscopic surgery in infertile women with minimal or mild endometriosis. Canadian Collaborative Group on Endometriosis. *N Engl J Med*. 1997; 337: 217–222.
24. Practice Committee of the American Society for Reproductive Medicine. Endometriosis and infertility: a committee opinion. *Fertil Steril*. 2012; 98(3): 591–598.
25. Tinkanen H, Kujansuu E. In vitro fertilization in patients with ovarian endometriomas. *Acta Obstet Gynecol Scand*. 2000; 79: 119–122.
26. Cooper TG, Noonan E, von Eckardstein S, et al. World Health Organization reference values for human semen characteristics. *Hum Reprod Update* 2010; 16 (3): 231–245.
27. Vercellini P, Somigliana E, Vigano P, et al. Surgery for endometriosis – associated infertility: a pragmatic approach. *Hum Reprod*. 2009; 24(2): 254–269.
28. Berlanda N, Vercellini P, Somigliana E, et al. Role of Surgery in Endometriosis-Associated Subfertility. *Semin Reprod Med*. 2013; 31(2): 133–143.
29. Jędrzejczak P, Sokalska A, Spaczyński R, et al. Effects of presacral neurectomy on pelvic pain in women with and without endometriosis. *Ginekol Pol*. 2009; 80: 172–178.
30. D'Hooghe TM, Debrock S, Hill JA, et al. Endometriosis and subfertility: is the relationship resolved? *Semin Reprod Med*. 2003; 21: 243–254.
31. De Ziegler D, Borghese B, Chapron C. Endometriosis and infertility: pathophysiology and management. *Lancet* 2010; 376: 730–738.

