Prevention of Infertility in Surgical Treatment of Endometriosis with Monitoring of AMH Values

S. Zambova (Silvia Zambova)[1,2], L. Borucka (Lucia Borucka)[3,4], S. Zamba (Stefan Zamba)[5], I. Rusnak (Igor Rusnak)[6,7]

Original Article

[1] Private gynecological clinic, Michalovce – doctor, Slovakia.
[2] Štefan Kukura Hospital, Michalovce – doctor, Slovakia.
[3] Slovak Medical University, Bratislava – teacher, Slovakia.
[4] Bratislava University Hospital, Bratislava – doctor, Slovakia.
[5] Štefan Kukura Hospital, Michalovce – doctor, Slovakia.
[6] Slovak Medical University, Bratislava – teacher, Slovakia.
[7] Bratislava University Hospital, Bratislava – doctor, Slovakia

E-mail address:

silviazambova@seznam.cz

Reprint address:

Silvia Zambova
Remeselnicka 16
Michalovce
071 01
Slovakia

Source: Clinical Social Work and Health Intervention *Volume: 14* *Issue: 4*
Pages: 68 – 72 *Cited references: 5*

Reviewers:

Michael Costello
University of Scranton School of Education, USA
Gabriela Lezcano
University of California, San Francisco, USA

Keywords:

Endometriosis. Prevention. Laparoscopy. Surgical Treatment. Infertility.

Publisher:

International Society of Applied Preventive Medicine i-gap

CSWHI 2023; 14(4): 68 – 72; DOI: 10.22359/cswhi_14_4_10 © Clinical Social Work and Health Intervention

Abstract:

Introduction: Endometriosis is a disease defined as the presence of endometrium outside the uterine cavity. The cause of endometriosis is multifactorial. An appropriate approach to the treatment of the disease affects a woman's chance of conceiving, either spontaneously or with the help of assisted reproduction techniques. Adherence to the principles of appropriate treatment is how to prevent a negative impact on a woman's fertility.

Research sample group and aim of the research: 109 female

respondents with fertility disorders from the private gynaecological outpatient clinic Zagyn s.r.o. from the Michalovce district were included in the research. The respondents' ages were between 18 and 50 years with an average age of 30.89 years (SD = 5.21); marital status was not decisive.
The data were obtained through a clinical study and from the medical documentation of the observed women. The aim of the research was to find optimal criteria and procedures that lead to the prevention of infertility in the treatment of endometriosis.
Methods: For evaluation, we used descriptive statistics and the Chi-square test. The values of continuous variables between two groups were analysed by a t-test for 2 independent sets, or between several groups by ANOVA analysis.
Results: Using logistic regression models we examined the associations of the type of treatment and the type of medical treatment with 5 dichotomized variables of success of conception and delivery. However, we confirmed only one statistically significant association. Women who received medical treatment alone were 2.6 times more likely to conceive naturally and deliver than women who received combined treatment (logistic regression, OR=2.60, confidence interval: 1.11-6.07, $p < 0.05$).
Conclusion: Endometriosis can even occur in young patients with the development of menarche. Early diagnosis and proper treatment are the way to prevent the infertility caused by this disease. Excision of endometriotic cysts does not improve the pregnancy rate or embryo quality. For women with recurrent endometriomas who have already undergone a previous surgery, IVF is a more successful option than another surgery.

Introduction

Prevention refers to the prevention of diseases or preventive care, a set of measures to prevent diseases, errors, injuries and their consequences. Our work focuses on secondary prevention, which is a set of measures aimed at preventing the outbreak of a disease that the individual has already overcome, to prevent the development of the disease or its complications when the disease is in a latent stage or it is a person at risk. Research is devoted to the possibility of preventing infertility in the treatment of endometriosis, which is a disease defined as the appearance of the endometrium outside the uterine cavity. The cause of endometriosis is multifactorial. The disease is typically manifested by chronic pelvic pain, irregular, painful bleeding, pain during sexual intercourse or fertility disorders. The treatment of endometriosis consists of a comprehensive approach to the disease, focusing on the type and stage of the disease, the age and parity of the patient, and clinical symptoms (1).

A surgical approach to the treatment of endometriosis can affect the function of the ovaries and reduce their ovarian reserve, which is already at risk. It is necessary that the surgical removal of endometriosis be strictly individually considered and the degree of risk of the operation to reduce the ovarian reserve be evaluated. It is known from practice that if pregnancy did not occur after the first surgical procedure, the next surgical procedure only very rarely increases the probability of pregnancy (2). Currently, with the development of laparoscopic surgery, the number of surgeries is increasing, but if the principles are not followed, their impact on a woman's fertility can be negative (3). AMH (Anti-Müllerian hormone) begins to be produced in women at puberty, by the granulosa cells of the follicles in the ovaries. Its main

role is to control the formation of primary follicles by inhibiting the excessive action of FSH. Its level does not change during the individual phases of the menstrual cycle, so it can be taken at any time. It is secreted only in follicles up to a maximum size of 4 mm and is an indicator of the so-called follicular reserve. It is a relatively new marker of ovarian function. AMH level does not say anything about egg quality.

Research objective

The main goal of the research was to determine the optimal therapeutic procedure in the treatment of endometriosis that maximally reduces the negative impact on a woman's fertility. We investigated the relationship between the age of patients with endometriosis in connection with the success of conception and childbirth, as well as the effect of treatment on the success of conception and childbirth.

Research sample group and methodology

The research study included 109 female respondents who visited the gynaecological clinic with a fertility disorder during the research period and in whom, through further examinations, endometriosis was confirmed as the main cause of infertility. They ranged in age from 18 to 50 years with a mean age of 30.89 years (SD = 5.21), and their marital status was not decisive. After twelve months from the end of the treatment, we retrospectively evaluated the percentage of pregnancy success in the groups with medical and surgical treatment and in the group without treatment.

All patients underwent a preoperative examination, abdominal and transvaginal ultrasound of the organs of the small pelvis, and an evaluation of Ca 125 and AMH parameters from their blood. We used descriptive statistics (mean values, standard deviations, frequencies) to describe the investigated variables. We verified

Table 1 Age distribution of the research sample group

	Age in years
minimum-maximum	20,0-42,0
mean/ standard deviation	30,89/5,21
percentiles 25	27,0
50	31,0
75	34,5
	N (v %)
30 years and under	52 (47,7)
over 30 years	57 (52,3)

Table 2 The connection between the type of treatment and the success of conception and delivery (multinomial regression analysis, n=106)

Parameter Estimates

CONCEIVED[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
IVF conceived, delivered	Intercept	-,486	,449	1,167	1	,280			
	Medical	-1,440	,605	5,670	1	,017	,237	,072	,775
	Combined	0[b]	.	.	0	.	.	.	.
IVF conceived, did not deliver	Intercept	-,773	,494	2,454	1	,117			
	Medical	-1,152	,638	3,259	1	,071	,316	,090	1,104
	Combined	0[b]	.	.	0	.	.	.	.
did not conceive did not deliver	Intercept	-,956	,526	3,297	1	,069			
	Medical	-,431	,617	,487	1	,485	,650	,194	2,180
	Combined	0[b]	.	.	0	.	.	.	.

a. The reference category is: conceived, delivered

b. This parameter is set to zero because it is redundant.

the differences in the occurrence of selected parameters of categorical variables using the Chi-square test. The values of continuous variables between two groups were analysed by t-test for 2 independent sets, or between several groups by ANOVA analysis. We analysed the association of selected variables with the categorical variable conception/delivery using multinomial regression analysis. The reference category was the category conceived naturally, delivered. The category conceived naturally and did not deliver was excluded from the analyses due to the low representation of female patients (n=1). We analysed the association of selected variables with dichotomous variations of the conception/ delivery variable using logistic regression analysis.

Results

We calculated age by subtracting the year of birth from 2019. For the purposes of some analyses, we dichotomized this variable, dividing the patients into groups „aged 30 and under and older". The research sample group consisted of 109 women between the ages of 23 and 49.

For the purposes of analyses, we used pre-treatment AMH to categorize, but we also used the change in AMH after treatment compared to pre-treatment (AMH ante – AMH Table 3 Distribution of AMH in the research sample group

Discussion

Compared to patients who underwent only medical treatment, patients who underwent surgical treatment had a 4.22-fold higher chance of undergoing IVF and giving birth than of conceiving naturally and giving birth (multinomial regression analysis, OR=0.237, confidence interval: 0.072-0.775 / $p<0.05$). The chance of failure of conception and delivery was not related to the type of treatment. It is likely that surgical intervention and IVF will be offered at the same stage of treatment. Due to the small representation of female patients in the groups, it is not possible to verify the statistical significance of the investigated connections by multinomial regression analysis. Using logistic regression models, we examined the associations of the type of treatment and the type of medical treatment with 5 dichotomized variables of success of conception and delivery, but we confirmed only one statistically significant association. Women who received medical treatment alone were 2.6 times more likely to conceive naturally and deliver than women who received combined treatment (logistic regression, OR=2.60, confidence interval: 1.11-6.07, $p<0.05$). For women with recurrent endometriomas who have already undergone a previous surgery, IVF is a more successful option than another surgery. Women who

Table 3 Distribution of AMH in the research sample group

	N	v %
AMH1ante 1-9	52	81,3
AMH1ante under 1	8	12,5
AMH1ante over 9	4	6,5
Missing data	45	

Table 4 Association of AMH before treatment with the success of conception, delivery - multinomial regression analysis (n=63)

Parameter Estimates

CONCEIVED[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
IVF, delivered	Intercept	-1,053	,695	2,295	1	,130			
	AMH1a	-,134	,166	,656	1	,418	,874	,632	1,210
IVF, did not deliver	Intercept	-,206	,643	,102	1	,749			
	AMH1a	-,356	,205	3,002	1	,083	,700	,468	1,048
Did not conceive, Did not deliver	Intercept	-,989	,533	3,441	1	,064			
	AMH1a	,030	,095	,097	1	,755	1,030	,855	1,240

a. The reference category is: conceived, delivered

achieved a postoperative pregnancy had a lower risk of disease recurrence. Women who get the disease at a younger age are more likely to be infertile. We found that the greater the involvement of the ovaries and the lower the AMH, the lower the probability of spontaneous pregnancy. Other results show that the younger the affected person's age, the smaller the chance of spontaneous pregnancy. It is important to define the consequences of surgical interventions from the point of view of the probability of post-operative pregnancy and to evaluate the possibility of a reduced ability to conceive after reoperation compared to the first operation. The young age of a patient must be a key factor influencing the decision on the advantages and disadvantages of the treatment being considered. Even before surgical treatment, affected women have lower AMH levels than healthy women, and this decrease is more pronounced in cases of bilateral ovarian involvement. It is not clear whether the tissue is more damaged by surgical intervention or by the oxidative stress of the present endometrioma. The decrease in AMH compared to a control set of the same age women without endometriosis appears to be progressive and increasing with the size of the endometrioma. Asymptomatic patients with reduced ovarian reserve benefit more from a direct IVF procedure. The effect of treatment is very difficult to reliably measure due to the presence of a large number of factors affecting fertility. Therefore, the use of a suitable therapeutic procedure requires an assessment of all possible infertility factors, subjective difficulties, possible side effects and, above all, the wishes of the patient.

Conclusion

Surgical excision of endometriotic cysts does not improve pregnancy rates, fertilization rates, or embryo quality. The fact is that for women with recurrent endometriomas who have already undergone a previous surgery, IVF is a more successful option than another surgery. Women who achieved a postoperative pregnancy had a lower risk of disease recurrence. Globally, there is a prevailing trend away from radical surgical methods. And despite this, clinical studies do not report an increase in the recurrence of the disease, which is around 1-4% in the short postoperative period (4). Before surgical treatment, especially if a radical procedure is expected, it is appropriate to consider egg banking and a consultation at an assisted reproduction centre (5). After performing the surgical intervention, it is necessary to consider the subsequent medical treatment to suppress the residual endometriotic deposits. It is important even for young patients who do not yet have reproductive plans to think about this disease and start appropriate treatment in time as a way of preventing infertility caused by endometriosis.

References

1. ZAMBOVA S, BORUCKA L, RUSNAK I (2022) Medical versus surgical treatment of endometriosis and its impact on fertility. In *Slovak gynaecology and obstetrics*. ISSN 1335-0862, vol. 29, no. 3, p. 156 -160.
2. HARBULAK P, BEHUNOVA Z (2015) Treatment of endometriosis in patients with sterility. *Slovak gynaecology and obstetrics*. 2015, p. 64 -65.
3. VERCELLINI P et al. (2009) Surgery for endometriosis – associated infertility: a pragmatic approach. *Human Reproduction Update.* 2009, vol.24, pp. 254 - 269.
4. HANACEK J, REDECHA M, DRAHONOVSKY J (2021) Surgical treatment of endometriosis. In *Modern gynaecology and obstetrics*. ISSN 1211-1058, 2021, vol. 28, no. 3, p. 396.
5. IVANKOVA K, MATVANOVA Z, HANACEK J et al. (2021) Conservative treatment of endometriosis. In *Modern gynaecology and obstetrics.* ISSN 1211-1058, 2021, vol. 28, no. 3, p. 390-394.