

Significance of Ki67 expression in endometriosis for infertility

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Introduction

Endometriosis is a widespread but also a poorly understood disease. With a prevalence of 6-10% of all women and a large number of associated symptoms, including lower abdominal pain and infertility, as well as a reduction in quality of life. Ki67 is a proliferation marker that can be detected using immunohistology and thus give insight into the level of activity of the endometriosis.

Tab. 1 Ki67 expression in the three age groups

Expression from Ki67	15-29 Y [%] [n/n]	30-44 Y [%] [n/n]	45-49 Y [%] [n/n]
<10%	(61,5) 104/169	(50) 140/280	(88,6) 31/35
10-30%	(24,9) 42/169	(30) 84/280	(8,6) 3/35
>30%	(13,6) 23/169	(20) 56/280	(2,9) 1/35

Tab. 2 Ki67 expression in association with infertility

Expression from Ki67	No infertility [%] [n/n]	Infertility [%] [n/n]	Total [%] [n/n]
<10%	(61,8) 217/351	(43,6) 58/133	(56,8) 275/484
10-30%	(23,6) 83/351	(34,6) 46/133	(26,6) 129/484
>30%	(14,5) 51/351	(21,8) 29/133	(16,5) 80/484

Table 3 Correlation of Ki67 expression in three groups and pregnancy onset one year postoperatively.

Expression from Ki67	Pregnancy rate 1 year postoperatively [%] [n/n]
<10%	(17,3) 9/52
10-30%	(38,7) 12/31
>30%	(66,7) 16/24
All	(34,6) 37/107

Ki67 expression was examined in 133 of 170 (78.2%) infertile patients.

In infertility, it was found that within the group of women with infertility, the high expression levels were more frequent than the low ones, whereas they were less frequent in non-sterile women and in the overall collective (Table 2).

From 204 answered follow-up questionnaires, 134 patients answered regarding the occurrence of pregnancy. In 91 patients (67.9%) infertility persisted after one year. By contrast, 43 patients (32.1%) became pregnant. Of these, 14 of 42 patients belonged to the first age group (15-29 years), 28 of 90 patients to the second (30-44 years), and one of two patients to the third group (45-59 years).

From 134 patients who answered the follow-up questionnaire regarding infertility, Ki67 expression was examined in 107 patients.

When correlating the results of the follow-up questionnaire one year after surgery with the detected Ki67 expression level, a significant correlation was shown with the expression of proliferation activity and pregnancy onset. Patients with low Ki67 expression were less likely to experience pregnancy onset within one year than patients with intermediate or high Ki67 expression (Table 3).

Conclusion

In this work, high Ki67 expression was more frequent than low Ki67 expression in women with infertility than in patients without infertility. There was a significant correlation between Ki67 expression and postoperative pregnancy onset: 66,7% of patients with high proliferation activity became pregnant within one year postoperatively, whereas the 38,7% of patients with moderate and only 17,3% of patients with low Ki67 expression became pregnant. These results contribute to the importance of endometrial resection in the context of infertility treatment.

Method and material

In 484 cases, immunohistochemical proliferation analysis was performed to determine the expression of Ki67. 204 patients responded to the postoperative questionnaire, so a follow-up was possible with these patients. A follow-up questionnaire was sent to each patient one year after surgery. The patients were asked about several different topics, however, in this study we are solely focussed on the pregnancy outcome.

The histological examination of the resected endometriosis lesions was performed as per usual. The indicated percentages of Ki67 expression were divided into three groups. An expression below 10% is considered low, 10-30% intermediate, and over 30% is considered high.

Results

In 170 patients, infertility was the primary reason or a secondary reason (after pain) for the surgery.

Of 170 patients with infertility, 155 (91.2%) had peritoneal endometriosis and 24 (14.1%) had adenomyosis.

Of the patients where Ki67 expression was examined, 275/484 (56.8%) were in the low range below 10%, another 129/484 (26.6%) patients showed intermediate expression between 10 and 30%, and 80/484 (16.5%) patients had Ki67 expression of >30%.

At older ages, the proliferation index was less profound than in young patients (Table 1).