Survivin as a marker for non-invasive diagnosis of minimal-mild endometriosis

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Introduction

Endometriosis is one of the most common pathologies of female reproductive system. Currently there is a considerable delay in the diagnosis of the disease, especially of its peritoneal forms. Existing diagnostic tools such as bimanual examination, ultrasound, MRI, surgery, and even histological verification do not provide essential information to exclude the presence of endometriosis with certainty. Despite the ongoing search for new non-invasive ways to its diagnose there are no reliable biomarkers for the minimal-mild stages. The eutopic endometrium of patients with endometriosis is characterized by increased expression of antiapoptotic factors and decreased expression of proapoptotic factors, compared to the endometrium of healthy women.

Aim

Considering a significant impact of apoptosis dysregulation in endometriosis pathogenesis, especially the role survivin in this process the usage of the latter in diagnostic algorithm in our opinion seems to be a promising approach.

Materials and methods

Survivin ELISA (Cloud-Clone Corp.) was used to quantify serum survivin levels. Survivin was measured in serum taken from the ulnar vein on an empty stomach on day 5-7 of menstrual cycle in a group (60 people) with I-IV stages of endometriosis (according to the revised American Fertility Society (R-AFS) classification after laparoscopy and histological examination), including 33 women with I-II stages of endometriosis, and in a control group (17 people) of healthy women with no gynecological pathology revealed by laparoscopy before the IVF procedure.

Quantitative variables following a normal distribution were described using mean (M) and standard deviation (SD), 95% confidence interval (95% CI) for the mean were estimated. Comparison of the two groups was performed using Student's t-test ($p<0,05$). ROC analysis was used to assess the diagnostic performance of quantitative variables in predicting a categorical outcome with an optimal cut-off value.

Results

The median serum survivin levels were significantly higher in endometriosis group compared with the control group (58,0±5,3 pg/ml and 42,7±3,1 pg/ml, $p<0,05$). The same considerations applied to comparison I-II stage of endometriosis and control group (70,6±3,9 pg/ml and 42,7±3,1 pg/ml, $p<0,05$).

Assessing survivin levels in I-IV endometriosis group and controls the area under the ROC curve was 0,650 with 95% CI: 0,433 – 0,884. The resulting model was not statistically significant ($p = 0.340$). Fig.1

However, in endometriosis groups I-II and controls, the ROC curve area was 0,853 with 95% CI: 0,710 – 0,995. Fig.2

The cut-off value of survivin was 56.9 pg/ml. If the level of survivin was greater or equal to this value, I-II stages of endometriosis was predicted. The sensitivity and specificity of the method were 71.3% and 88.2%, respectively.

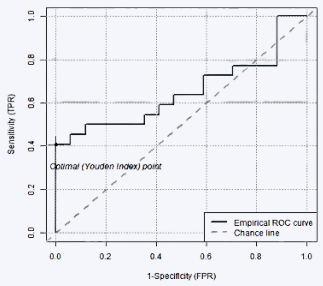


Figure 1. ROC curve assessing the diagnostic profile of survivin between endometriosis and control groups

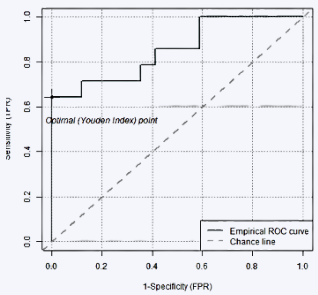
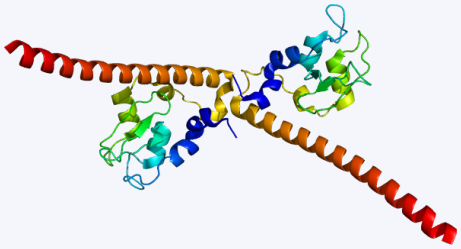


Figure 2. ROC curve assessing the diagnostic profile of survivin between endometriosis I-II and control groups



Conclusion

Thus, in patients with suspected endometriosis, determination of survivin level in peripheral blood on day 5-7 of menstrual cycle may be considered as a biomarker of the minimal-mild endometriosis. Therefore, highly specific and sensitive non-invasive diagnostics will allow timely surgical intervention, proper drug therapy, as well as a timely detection of disease relapse and assessment of reproductive capacity

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