

Mean platelet volume as a prognostic factor in ovarian lesions

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ABSTRACT

Even nowadays the diagnostic of ovarian cancer is difficult to be established preoperatively, and therefore a significant number of patients are submitted to a much too extensive or to an incomplete surgical procedure. Therefore attention was focused on identifying more reliable markers which might help the clinician to distinguish between benign and malignant ovarian lesions. The aim of the current paper is to analyze the differences between benign and malignant ovarian tumors based on the preoperative levels of the mean platelet volume.

Keywords: mean platelet volume, ovarian tumors, prognostic marker

INTRODUCTION

Ovarian tumors represent one of the most commonly encountered lesions of the gynecological tract and are in a significant number of cases difficult to be properly characterized preoperatively; moreover, cases presenting malignant tumors remain clinically asymp-

tomatic for a long period of time due to the fact that the ovaries are anatomically placed in a concealed region and due to the absence of a reliable diagnostic test [1,2]. Cancer antigen 125 (CA125), maybe the most commonly cited ovarian tumor marker presents high levels especially in late stages of the disease and slightly increased values in other gynecological and non-

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gynecological conditions such as pregnancy, endometriosis, liver or cardiac dysfunction, pancreatic, endometrial or lung cancer [3-6].

In order to increase the accuracy of differentiation of benign versus malignant tumors, other biological markers have been investigated such as the number and dimensions of the circulating platelets; therefore, it has been widely demonstrated the fact that increased number of platelets represent a promoting factor for tumor progression and dissemination in different malignancies such as colorectal, biliary tract or gynecologic tract malignancies [7,8]. Moreover, mean platelet volume, a routinely investigated parameter in any blood cell count which is also a marker of activated platelets seem to be significantly modified in ovarian tumor patients. The aim of the current paper is to investigate the correlation ship between the mean platelet volume and the presence of different ovarian lesions.

MATERIAL AND METHODS

Between 2017-2020 there were 79 patients diagnosed with ovarian tumors submitted to surgery in Cantacuzino Clinical Hospital. After receiving the ethics committee approval number 39/ 2023 data of these patients were retrospectively reviewed.

RESULTS

After analyzing the histopathological reports, we classified the 79 cases in two groups: the first group included 31 cases in which the final diagnostic was of ovarian cancer and the second group consisted of 48 cases diagnosed with benign lesions. The mean age was significantly higher in the ovarian cancer group – 56 years (range 28-71 years) versus 38 years (range 16-56

years) in the ovarian benign tumor group ($p=0,0023$) while the range of severe comorbidities such as arterial hypertension, diabetes mellitus or chronic pulmonary obstructive disease were also significantly more likely to be found in the ovarian cancer group. When studying the blood count, we observed that patients with ovarian cancer were more likely to be associated with anemia and higher levels of circulating platelets when compared to cases in which benign diseases were discovered. As for the mean platelet volumes, we demonstrated that ovarian cancer patients tended to have a significantly lower level of mean platelet volume when compared to cases diagnosed with benign lesions. Details regarding the clinical and biological characteristics of the two groups are shown in table 1.

As expected, patients diagnosed with malignant ovarian tumors also presented significantly lower levels of hemoglobin, serum albumin and protein due to the fact that in such cases poorer nutritional status is to be expected.

Meanwhile, postoperative complications were significantly more common in the ovarian cancer patients due to the higher extent of the lesions and due to the necessity of performing more complex resections and so was the hospital in stay. However, the 30 day mortality rate was null in the two groups.

DISCUSSIONS

Circulating platelets seem to play a crucial role in the process of angiogenesis, tumor development, dissemination and metastasis [9]. Meanwhile, the number of circulating platelets seems to be strongly influenced by certain factors such as interleukin 1, interleukin 6 or granulocyte colony stimulating factor [10]. Due to the fact that ovarian cancer has certain characteristics resembling to an inflammatory disease, in such cases in-

TABLE 1. Clinical and biological characteristics of patients with benign versus malignant ovarian tumors

Parameter	Benign ovarian lesions	Malignant ovarian lesions	P value
No of cases	48	31	
Age, years, mean	38 (range 16-56 years)	56 (range 28-71 years)	$p=0,0023$
Associated comorbidities:			$P=0,0032$
- Diabetes mellitus	3	7	
- Arterial hypertension	5	11	
- Obesity	6	9	
- Chronic pulmonary disease	2	5	
- Atrial fibrillation	1	4	
Number of circulating platelets	233000 (range 187000- 454000)	487000 (range 361000-788000)	$P=0.0012$
Mean platelet volume	9,45 (range 8,9-9,7)	8,2 (range 7,9-9,1)	$P=0,033$
Hemoglobin levels (g/dl)	13,4 (range 12,8-14,6 g/dl)	9,7 (range 7,1-11,9 g/dl)	$P=0,001$
CA 125 U/ml	25,5 (range 13-77 U/ml)	198 (range 95-1156 U/ml)	$P=0,002$
Albumin (g/dl)	3,7 g/dl (range 2,8-3,9 g/dl)	2,4 g/dl (range 1,6-3,7 g/dl)	$P=0,001$
Protein (g/dl)	6,3 g/dl (range 5,8 g/dl-7,6 g/dl)	4,7 g/dl (range 4,1-6,2 g/dl)	$P=0,003$

creased levels of circulating cytokines such as interleukin 1, interleukin 17, tumor necrosis factor alpha are present, increasing the processes of apoptosis and production of different blood cell lines [11]. In this context it can be easily understood the fact that in ovarian cancer patients high proinflammatory status is present and therefore increased levels of circulating platelets are to be found; even though, we should not omit the fact that in such cases other conditions such as diabetes mellitus, thrombosis, cardiovascular diseases, renal dysfunction or recent administration of iron and blood products might influence the number of circulating platelets. Therefore attention was focused on identifying other features of the circulating platelets which might be modified in ovarian cancer patients and which might have prognostic value. In this respect the mean platelet volume has been investigated, consumption of the circulating platelets due to chronic inflammation being considered to be responsible for decreased mean platelet volume [12]. In this respect, certain authors investigated the correlation ship between different histopathological subtypes and stages and the preoperative levels of the mean platelet volumes alone or in association with CA125 levels; therefore, in the study conducted by Qin et al and published in the Journal of Ovarian

Research in 2018 the authors included 326 patients with ovarian cancer, 290 patients with benign ovarian tumors and 162 healthy controls and demonstrated that the mean platelet volumes were significantly lower in the ovarian cancer group compared to the benign ovarian tumor group and respectively to the healthy subject group. Moreover the mean platelet volume was negatively corelated with the stage at diagnostic of ovarian cancer patients [13].

Interestingly, certain authors also demonstrated the fact that the mean platelet volume could also be a useful biomarker in order to monitor the long term outcomes of ovarian cancer patients due to the fact that the value of this parameter seem to normalize after resection to no residual disease [14].

CONCLUSIONS

Mean platelet volume seem to be a promising marker when distinguishing between benign and malignant ovarian lesions. Moreover, certain authors underline the fact that this parameter can also be useful when monitoring the long term outcomes of ovarian cancer patients.

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