

The predictive role of thrombocytosis in benign, borderline and malignant ovarian tumours

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Background

- Ovarian cancer is a lethal gynaecological malignancy
- A major challenge of ovarian cancer is late presentation, owing mainly to non-specific symptoms in the early stages, which usually results in presentation with advanced disease
- Although CA-125 is usually measured in women with suspicious pelvic mass, it is not without its own deficiencies as a screening test
- It is estimated that CA-125 only has a positive predictive value (PPV) of 69%, although a higher negative predictive value (NPV) of 88% for detection of ovarian cancer

Platelets



- Platelets (thrombocytes) play a vital role in haemostasis and vascular integrity
- Thrombocytosis has previously been suggested as a possible risk marker of malignancy
- Prospective cohort study in the United Kingdom
- Lung and colorectal cancers were the commonest malignancies diagnosed in this cohort representing 23% and 18% respectively among males, and 21% and 14% respectively in females

Br J Gen Pract. 2017 Jun;67(659):e405-e413. doi: 10.3399/bjgp17X691109.

Clinical relevance of thrombocytosis in primary care: a prospective cohort study of cancer incidence using English electronic medical records and cancer registry data.

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Author information

Abstract

BACKGROUND: Thrombocytosis (raised platelet count) is an emerging risk marker of cancer, but the association has not been fully explored in a primary care context.



Importance of early diagnosis

	I	II	111	IV
Cervix	70-90	45-65	20-40	5-15
Uterus	70-90	45-65	20-40	5-15
Ovary	70-90	45-65	20-40	5-15
Vulva/Vagina	70-90	45-65	20-40	5-15



Aims

To investigate the incidence of thrombocytosis in a cohort of women with high-risk pelvic mass and to determine how clinically useful thrombocytosis could be in predicting an underlying ovarian malignancy.



Methodology

- Retrospective cohort study of women with pelvic mass who underwent surgery at Swansea Gynaecological Oncology Centre, Wales, United Kingdom between September 2014 and September 2018.
- Electronic records of blood results, Multidisciplinary Team (MDT) discussion, clinic letters, operative notes and histology reports.
- Thrombocytosis was defined as platelet count of > 400 x 10⁹/L, which is the upper limit of normal in our laboratory.
- Receiver operating characteristic (ROC) curves were constructed to compare the performance of platelet count, CA-125 and risk of malignancy index (RMI) in predicting ovarian malignancy.
- Positive likelihood ratio (LR+) and negative likelihood ratios (LR-) were performed. LR+ and LR- describe the discriminatory properties of a positive test result and a negative test result respectively.
- Statistical analyses were performed with IBM SPSS 25.0 (SPSS Inc, Chicago, IL, USA).



Results

- A total of 294 women who underwent surgery for suspected or confirmed ovarian cancer during the study period.
- 206 women (70%) had final histology confirming ovarian cancer
- 54 women (18%) had benign tumours
- 34 women (12%) had borderline tumours
- 90 of the 206 women (43.7%) with ovarian cancer had thrombocytosis prior to primary surgery or neoadjuvant chemotherapy (NACT)
- 8/54 (14.8%) women had thrombocytosis in benign tumours
- 4/34 (11.8%) women had thrombocytosis in borderline tumours



Results (Cont'd)

The positive likelihood ratio of platelet count in the detection of ovarian cancer was 2.61 while the negative likelihood ratio was 0.72, with a diagnostic odds ratio of 3.625.

FIGO Stage	Positive likelihood ratio	Negative likelihood ratio	Diagnostic odds ratio
All stages	2.61	0.72	3.625
1	1.07	0.99	1.08
Ш	2.92	0.66	4.42
III	2.96	0.65	4.55
IV	4.34	0.41	10.59



Improving outcomes





Results (Cont'd)

- Thrombocytosis was seen in all age groups of women with ovarian cancer except women below the age of 40 years.
- More women between 40 years and 60 years with thrombocytosis were diagnosed with ovarian cancer compared to women that did not have thrombocytosis (p=0.041).





Platelet count in comparison to Ca-125 and RMI





Thrombocytosis in benign tumours

- Of the 8 women with thrombocytosis diagnosed with benign tumours, 4 of them had ovarian fibroma/fibrothecoma.
- All cases of ovarian fibroma/fibrothecoma presented with ascites with or without pleural effusion.
- 1 benign mucinous cystadenoma
- 1 benign serous cystadenoma,
- 1 mature cystic teratoma
- I serous-type cyst, which had no borderline or malignant features but it was difficult to determine the exact nature due to ischaemic necrosis consistent with torsion.



Strengths

- First study on the association of thrombocytosis with ovarian cancer in Wales and the largest series from Europe.
- Our prospectively collected surgical database, supplemented by the electronic medical records, provided accurate information on women that underwent surgery for high-risk pelvic mass over a 48-month period.
- Based on the concept of intention-to-treat, our cohort of patients included all women that were treated as high-risk pelvic mass.
- Although the study was based in a regional gynaecological oncology centre, the cases of high-risk pelvic mass that were benign and borderline tumours on final histology allowed for comparison.



Limitations

Retrospective study of women with high-risk pelvic mass referred to a gynaecological oncological centre.

Risk of selection effect.



Conclusion

- Platelet count may be of potential use in triaging women with pelvic mass.
- Our findings are particularly of relevance in primary care settings where women often first present and in incidental finding of adnexal mass during physical examination or radiological investigations in secondary/tertiary care settings as platelet count is often routinely tested in these settings.
- Platelet count may be used as an adjunct to CA-125 to determine women at high risk.
- The potential association of thrombocytosis with uncommon benign tumours like fibromas/fibrothecomas could advance our understanding of the role of platelets in ovarian tumorigenesis.
- Predictive markers for borderline tumours continue to remain a challenge.
- We suggest that elevated platelet count in the context of suspicious pelvic mass should be considered ovarian cancer until proven otherwise and therefore requires an urgent referral to a gynaecological cancer specialist.



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THANK YOU FOR YOUR ATTENTION

