Thrombocytosis as a Predictor of Malignancy in Patients with a Pelvic Mass

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Abstract

Objective: To determine if thrombocytosis (platelet count >350x10^9/L) is a predictor of malignancy in women with a pelvic mass.

Study design: A cross-sectional study on seventy women presented with a pelvic mass and admitted to hospital for explorative laparotomy. Preoperative platelet count was done for all of them. The results of platelet count and the final diagnosis by histopathology were reviewed and statistical analysis was.

Setting: Department of Obstetrics and Gynaecology /College of Medicine/Al-Mustansirya University.

Results: The difference in the platelet counts of patients with malignancy and benign tumors was significant (P<0.0094). Twenty patients had cancer; of these, eleven (55%) had thrombocytosis. Only ten (20%) patients with benign tumors had thrombocytosis.

Conclusion: High preoperative platelet count in women presenting with pelvic mass may predict a final diagnosis of cancer.

Keywords: Thrombocytosis, Pelvic Mass

Introduction

Anatomically, adnexa consist of fallopian tubes, broad ligaments and ovaries together with the structures within the broad ligament from embryological rest [1].

A pelvic mass has much different potential etiologies and may arise from several different organs and systems, including genitourinary, gastrointestinal and abdominal wall pathologies. Thousands of women undergo surgery each year to rule out malignancy, most of these cases are benign [2].

Many current methods are used in the assessment of a pelvic mass. these are either unable to adequately differentiate a benign from malignant process, or the predictive value is too unreliable to be used solely by the general obstetrician in determining which patients are at significant risk of having malignancy, malignant disease of the ovary, formerly regarded as not so important, now it account for 50-55% of death due to genital cancer[3].In Iraq, ovarian cancer forms 38% of all gynecological malignancy, with an incidence of 0.8 / 100,000 women in 1996 [4].

About 70% of patients with ovarian cancer present with advanced disease at the time of diagnosis thus diagnosis at an early treatable stage could bring about higher survival rates [5].

Specific and sensitive methods for preoperative diagnosis of ovarian cancer would provide a rationale basis for referral before diagnostic laparotomy. Thereby patients with ovarian cancer could be ensured of the benefit of the thorough surgical staging and cytoreduction by skilled surgeon [6].

Platelets:

These are small granulated bodies (2-4) μm in diameter. Their normal life span ranges between 8-14 days. Normal platelet count is 150-350x10^9/L. They can adhere to the wall of damaged vessels and to each others forming aggregates [7]

Thrombocytosis:

It is an elevated platelets count >350–400x10^9/L. This elevation undoubtedly reflects an increase in the rate of thrombocytosis production and release rather than prolongation of the platelet life span. Thrombocytosis may be the clue of an underlying malignancy in some patients in whom the diagnosis is not yet suspected or established [8]

Thrombocytosis as a paraneoplastic symptom was confirmed by a number of subsequent studies [9]. Levin and Conley in 1964 found that between 38-40% of patients with inoperable cancer had platelets count >400x10/L[10]

Thrombocytosis correlate with more aggressive tumor biology in ovarian cancer and a poorer response to treatment, knowing which patients have this disorder in addition to their cancer will enable us to selected the patient who might benefit from experimental and other treatment modalities [11]

The cause for the raised platelet counts in patients with cancer is unclear. It has been postulated that the host response to malignancy, possibly in the form of production of bone marrow-stimulating cytokines, may play a prominent role [10].

Some studies suggest that platelet count should be combined with other blood analysis to predict malignancy like routine blood analysis, LDH and ESR when these were combined all together a high sensitivity and specificity for predicting malignancy can be achieved. Therefore platelet count may help in differentiating malignant from benign disorders [12].

After all this increase in platelets number may be a predictor of carcinoma in women with pelvic mass and may assist the physician in counseling patients [2].

Patients & Methods

This cross-sectional study was done for a period of one year from October 2003 to October 2004 at Al-Yarmouk and Al-Kadhimiya Teaching Hospitals for conducting the significance of thrombocytosis as a predictor of malignancy in patients with pelvic mass.

Seventy women were enrolled in our study including patients referred to the gynecology clinic for further management of a pelvic mass diagnosed by clinical and imaging techniques (US, CT scan and MRI) ,others presented as cases of acute abdomen to the emergency unit of the hospital. All of those patients had no history of surgery for malignant pelvic masses. Those patients were all candidate for laparotomy.

A full history was taken from each woman including (obstetrical and gynecological history, medical history, surgical history, and family history of malignancy (breast, colon, and ovary), any previous personal history of ovarian cyst or malignancy, smoking and drug history (hormonal therapy, COC pills, chemotherapy or radiotherapy). Pregnancy had been excluded in all of those patients.

General examination for any sign suggestive of malignancy (cachexia, anaemia, lymphoadenopathy ... etc.). Thorough systemic examination of the chest and abdomen for any palpable organomegaly, other palpable masses and ascitis. Full gynecological examination was done to assess the mass (size, consistency, tenderness, mobility, nature of the mass, relation to the uterus with the assessment of uterus and adnexa.

Then, review of the ultrasonic reports (transabdominal or transvaginal) and other imaging techniques, was done to exclude non-gynecological causes of the mass and help reaching the diagnosis.

Exclusion criteria for those women were:

1-Any patient with myeloproliferative disease.
2-Any patient had recent or chronic infection.
3-Any patient with autoimmune diseases and SLE.
4-Any patient had medications, chemotherapy or radiotherapy which can affect platelet count. 1-Postpartum or postoperative patients.
2-Those who had recent trauma.
3-Patients who had splenectomy.

Those seventy women were all candidates for laparotomy.

Results

All the studied seventy women were candidates for laparotomy. Preoperative data were collected to be analyzed as follows:

Fifty women of them (71.4%) had benign pathology and twenty of them (28.6%) with malignant pathology. Their ages were ranged from 15-75 years, with the mean age for benign group was (38.74±10.8) years and (50.5±14.9) years for the malignant groups as shown in table (1).

Table 1: The age distribution of patients with benign and malignant tumors

Age(year)	Benign (n=50)		Malignant (n=20)	
	N	%	N	%
< 20	2	4	1	5
20 – 29	5	10	1	5
30 – 39	25	50	4	20
40 – 49	9	18	4	20
50 – 59	5	10	3	15
≥60	4	8	7	35
Mean ± SD	38.74±10.8		50.5±14.9	

Chi square $\chi^2 = 10.52$, P= 0.062 (Not significant)

Table 2 shows benign group cases with thrombocytosis (platelets >350x10^9/L), in which 10 cases (20%) in the whole group of benign disease with high platelets count. While Table 3 shows the cases with malignant pathology and thrombocytosis, in which they were eleven cases (55%), nine of them (81.8%), were due to ovarian epithelial malignancy, one case (9.1%) due to germ

cell tumor while in uterine sarcoma we had one case (9.1%) with thrombocytosis, no cases of endometeroid carcinoma had thrombocytosis.

Table 2: Distribution of thrombocytosis and benign pathology by histopathological diagnosis

Histopathology	Platelet >350 x10^9/L (n=10)		Platelet <350 x10^9/L (n=40)	
	No.	%	No.	%
Functional cyst	1	10	3	7.5
Mucinous cystadenoma	-	-	3	7.5
Serous cyst	2	20	3	7.5
Teratoma dermoid	-	-	9	22.5
Endometriotic cyst	-	-	1	2.5
fibroma	1	10	-	-
Tuboovarian abscess	-	-	1	2.5
Paraovarian cyst	-	-	1	2.5
Ectopic pregnancy	1	10	-	-
Uterine mass (fibroid)	5	50	19	47.5

Table 3: Distribution of thrombocytosis and malignant pathology by histopathological diagnosis.

Histopathology	Platelet >350 x10^9/L (n=11)		Platelet <350 x10^9/L (n=9)	
	No.	%	No.	%
Ovarian epithelial malignancy	9	81.8	7	77.8
Germ cell tumor	1	9.1	1	11.1
Uterine sarcoma	1	9.1	-	-
Endometroid adenocarcinoma	-	-	1	11.1

In our study the ovarian pathology forms most of the cases, its total number was forty two (60%), while uterine pathology was found in twenty five cases (35.7%) and lastly tubal pathology was found in three cases forming (4.3%) of the study group, as shown in table 4.

Table 5 shows the final results of benign and malignant cases and the total number of thrombocytosis. In the benign group, thrombocytosis had been found in ten cases (20%) out of the fifty benign groups while it was found in eleven cases (55%) of the twenty malignant groups. The results for Sensitivity, Specificity, Positive predictive value, Negative predictive value, Efficiency (accuracy rate) were 55%, 80%, 52.4%, 81.6% & 72.9% respectively.

Table 4: Total number of cases according to site of pathology

Final diagnosis	Total (n=70)		Benign (n=50)		Malignant (n=20)	
	No.	%	No.	%	No.	%
Ovarian causes	42	60	23	54.8	19	45.2
Uterine causes	25	35.7	24	96	1	4
Tubal pathology	3	4.3	3	100	-	-

Table 5: Final diagnosis in patients with thrombocytosis and pelvic mass

Final diagnosis	Total (n=70)		With thrombocytosis (n=21)		Without thrombocytosis (n=49)	
	No.	%	No.	%	No.	%
Malignant	20	100	11	55	9	45
Benign	50	100	10	20	40	80

-Chi square χ^2=8.33, P=0.004 (Highly significant)
- Sensitivity=55.0% (95% CI=32.0-76.2%
- Specificity=80.0% (95% CI=65.9-89.5%)
- Positive predictive value=52.4% (95% CI=30.3-73.6%)
- Negative predictive value=81.6% (95% CI=67.5-90.8%)
- Efficiency (Accuracy rate) =72.9%

Discussion

Adnexial masses present a special diagnostic challenge in part because benign adnexial masses greatly outnumber malignant ones. Determination of a degree of suspicion for malignancy is critical and is based largely on imaging appearance [13]. Those patients with a pelvic mass pose a dilemma for the obstetrician/gynecologist. Clinical studies, radiological imaging and laboratory data do not always give a good indication of whether malignancy is present. This makes it difficult to counsel patients and to decide whether referral to an expert gynecologist and / or tertiary care center is necessary [2].

The largest number of cases in the benign group of our study were in the age group of 30-39 years (50%) while the peak age distribution of those with malignant pathology were at >60 years age (30%), this goes with what Morgante *et al* found in a study done in 1999 on 124 patients with pelvic mass that the age distribution for benign pathology of 39 women of 93 cases (42%) was at 39-44 year and malignant pathology for 17 women of 31 cases (58%) was at>55 year age respectively[27]. Hence, it should be taken seriously in those patient present with postmenopausal pelvic mass.

In our study ovarian tumors had been found in forty two patients out of seventy cases (60%) epithelial ovarian tumors account for (71.4%) of them, as it is the commonest type of ovarian tumors. This agrees with what was found in a study done in 2000 by Kerpsack *et al* on 323 patients with pelvic mass, they found ovarian tumors in 227 cases (70%) of the study group and epithelial tumors found in 132 cases (58.1%) of them [2].

In our study of the seventy patients with pelvic mass, there were twenty cases with malignant pathology, of those twenty, eleven cases (55%) discovered to have thrombocytosis, a significantly higher incidence than what had been found in benign group (P<0.05) as thrombocytosis was found in ten patients out of fifty benign tumors (20%). These results were comparable to other studies; in our study we found the sensitivity and specificity of this test were 55% and 80% respectively, which was comparable to the sensitivity and specificity found by Kerpsack & Finan, which was (48.3% and 86.2%) respectively,

and to that found by Chalas *et al* which was (56% and 84%) respectively[2].

In our study thrombocytosis and its prediction to malignancy in a pelvic mass was documented, as its positive predictive value was 52.4% and negative predictive value was 81.6% which is comparable to the results of Kerpsack & Finan, 2000 as their positive and negative predictive values were (57.5% and 81.2%) respectively[2]. This enables us to use this preoperative test as a predictor for malignancy but cannot be used in the screening purposes. This should alert the physician to suspect malignancy and properly counsel the patient. One also may consider referral to a gynaecologic oncologist. Conversely, the absence of thrombocytosis in a patient with a pelvic mass will not help one to predict the presence of a benign tumor.

Conclusions & Recommendations

Preoperative thrombocytosis alone may be used as a predictor of malignancy in patients with a pelvic mass, it is a test that is rapidly available in all of our hospitals, easily obtained, takes no much time and efforts, inexpensive and is usually drawn as part of the basic preoperative workup and also can be used in combination with other modalities (ultrasound, physical examination and CA125) to improve the clinician ability to predict malignancy of pelvic mass.

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