International Journal of Advances in Medicine
Gupta R et al. Int J Adv Med. 2021 May;8(5):662-666
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20211472

Original Research Article

Demographic profile, staging and CA-125 levels in a patient with pelvic lesions of probable ovarian origin at presentation in a tertiary care hospital

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Received: 28 December 2020
Revised: 01 March 2021
Accepted: 02 March 2021

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ABSTRACT

Background: In Indian women, ovarian cancer is one of the most commonly diagnosed cancer. We wanted to analyze the demographic profile, staging, and sensitivity and specificity of CA-125 levels in a patient with ovarian cancer in an indian scenario.
Methods: A retrospective study was performed and information was collected from 250 patients who visited SGRD Hospital, Vallah, Amritsar from 1 April 2016 to 30 April 2020, with pelvic lesions of probable ovarian origin on demographic profile, the staging of the disease and CA-125 levels. Data was collected, analyzed, and presented in frequency tables and figures.
Results: The study comprised of 250 patients. CA-125 was mainly used to investigate a wide range of signs and symptoms and few tests were for follow up or screening of ovarian cancer. In female patients having a CA-125 for very high suspicion of malignancy/ovarian cancer, only 90 (36%) of the abnormal results were caused by ovarian cancer. False-positive results were largely caused by other malignancies. The specificity of CA-125 for ovarian cancer increased with concentrations over 1000 kU/litre. Serous adenocarcinoma was found the most common malignant tumor type of the ovary (53%). In the demographic profile, ovarian cancer was found to be highest in the sikh religious group (75%) and prevalent in the middle socioeconomic status 32% (n=80).
Conclusions: These results confirm the high false-positive rate and poor sensitivity and specificity associated with CA-125 and the most common tumor type. The substantial inappropriate usage of CA-125 has led to results that are useless to the clinician, have cost implications, and add to patient anxiety and clinical uncertainty.

Keywords: Ovarian cancer, CA-125, Retrospective study

INTRODUCTION

Ovarian cancer has become major health issue for women all over the world.[1] It is the sixth most common cancer in females and the seventh most common cause of cancer death. It constitutes 4% of all cancers in women.[2] Ovarian cancers account 16% to 26% of all the primary malignancies in female genital tract.[3] It is the second most common cancer of female reproductive system and is the fourth leading cause of death from gynecologic malignancies.[4,5] Knowledge of histological patterns of ovarian malignancies is important in diagnosis, treatment and its prognosis with nulliparity and family history considered as the risk factors for it. A female's risk of

having ovarian tumor at any time in her life is 7% to 8%, of having ovarian cancer is 1.5% and dying from ovarian cancer is almost 2%.[6] Epithelial cancers are most common among women of all racial/ethnic groups, accounting for 90% of all cases . Epithelial cancers are classified by tumor cell histology as serous, endometrioid, mucinous and clear cell.

In patients diagnosed with pelvic lesions of probable ovarian origin, elevated serum levels of CA-125 aid the physical and ultrasonographic examinations, suggesting principally when in high levels, the presence of a primary ovarian cancer. Although it is the best-known and most widely used tumor marker in the clinical management of patients with ovarian tumors with epithelial differentiation, its specificity seems to be low in benign tumors with or without epithelial differentiation. The limitations include the presence of individual methodological and biological variations; the high serum levels in healthy patients (1% of the cases), in pregnancy (up to 20%), cystic teratoma of the ovary, peritonitis, hepatic cirrhosis, metastases of breast carcinoma and eventually, in primary neoplasms of the liver, colon, lung and pancreas. CA-125 is a high molecular weight glycoprotein, also known as MUC16 (sialomucin), initially identified through antibodies produced by immunized animals with cells of human ovarian serous papillary cystadenocarcinoma. Serum CA-125 levels can also be useful for the monitoring of patients undergoing adjuvant chemotherapy due to ovarian carcinomas, or for the early detection of tumor recurrence after initial treatment.[7-14]

We wanted to analyze the demographic profile, staging, and sensitivity and specificity of CA-125 levels in a patient with ovarian cancer in an Indian scenario.

METHODS

The study is retrospective study performed on 250 patients who visited SGRD Hospital, Vallah, Amritsar between 1 April 2016 to 30 April 2020 with pelvic lesions of probable ovarian origin.

Every patient who had a CA-125 measurement performed between 1 April 2016 and 30 April 2020 was identified and the population was selected by taking the first 250 chronological hospital unit numbers. Data were collected from pathology, radiology, laboratory reports, referral, clinic and discharge letters after ethical approval from committee. Information was collected on population characteristics, including the age, leading sign or symptom, the index CA-125 and staging (through radiological investigations). Patients presenting with common symptoms like abdominal pain, bleeding per vaginum, post-menopausal bleed, abdominal distension were included in the specific symptoms group, whereas non-specific symptoms group includes people with complaints of anemia, nausea, back pain, fracture, shortness of breath or weight loss. The CA-125 assays were performed in the onsite hospital clinical chemistry laboratory, where an abnormal result was taken to be 30 kU/litre or above. Sensitivity was defined as the proportion of patients with ovarian cancer correctly identified by CA-125 and specificity as the proportion of patients without ovarian cancer correctly identified by CA-125.[15] Patients diagnosed with ovarian cancer were differentiated based on TNM staging guidelines and type and stage were determined later. The demographic profile in the form of age and socioeconomic status was found out.[16] The data was analyzed using statistical tests and presented in tabula form.

RESULTS

The study comprised 250 patients, with 200 (80%) of the patients being over 50 years old. CA-125 levels were done of all 250 patients. When the CA-125 concentration was correlated with the final diagnosis in patients having a CA-125 measurement for specific symptoms group, only 90 (36%) of the abnormal results in the female population were the result of ovarian cancer, 30 patients of ovarian cancer were not having raised CA-125 levels and 65 patients not having ovarian cancer were having raised CA-125 levels. The sensitivity of CA-125 for ovarian cancer in female patients in this population was 75% but with a specificity of only 50%. Patients without ovarian cancer had another malignancy in 65 cases (26%). When the CA-125 results over 1000 kU/litre were analyzed the specificity of CA-125 increased to 99.1%. Ovarian cancer was diagnosed in 20 of 26 cases, but there were 6 patients who had a CA-125 concentration above 1000 kU/litre in the absence of ovarian cancer. However, increasing the cut off value to over 1000 kU/litre caused a fall in the sensitivity of CA-125 for ovarian cancer to 55%. The radiological investigations performed on the female population being investigated for specific symptoms group were reviewed. Ultrasonography was the most frequently used modality with 132 patients (53%) having a pelvic ultrasound as their sole investigation and 40 (16%) undergoing this test in conjunction with computed tomography. Urgent (within two weeks) diagnostic laparoscopy was performed in seven cases, five of which were preceded by a transvaginal ultrasound scan. One patient was investigated with magnetic resonance imaging.

Abdominal pain was the most common mode of presentation (42%), followed by bleeding per vaginum (21%), post-menopausal bleed (21%) and others as described in Figure 1. Serous adenocarcinoma was found the most common malignant tumor type of the ovary (53%) followed by mucinous (23%), endometroid (16%) and clear cell (8%) as described in Figure 2, whereas patients diagnosed with stage 3 (65%) were more frequent followed by grade 2 (24%), grade 4 (6%) as described in Figure 3. Most serous carcinomas are diagnosed at stage III (45%) or IV (25%), reflecting the aggressive nature of predominant high-grade serous carcinomas. In contrast, the majority (55%-65%) of endometroid, mucinous, and clear cell carcinomas are diagnosed at stage I, similar to

non-epithelial tumors. The majority of sex-cord stromal (64%) and germ cell (57%) tumors are diagnosed at stage I. The socio demographic profile revealed that 57% (n=142) of patients were from rural areas. Majority of the patients (75%) were from the sikh religious group. About 5% (n=2) of patients were reported to have a family history of ovarian cancer. About 9% (n=22) of patients were from upper socioeconomic status, followed by 13% (n=32) from upper middle, 46% (n=115) from middle, and 32% (n=80) from lower socio-economic status as described in Figure 4.

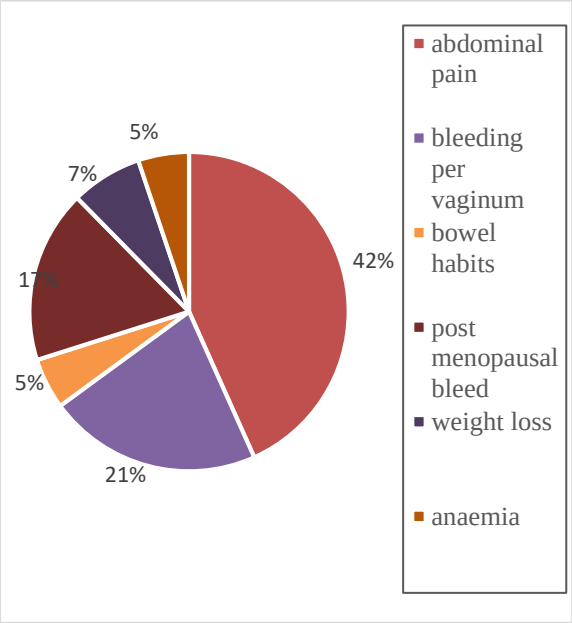

Figure 1: Mode of presentation.

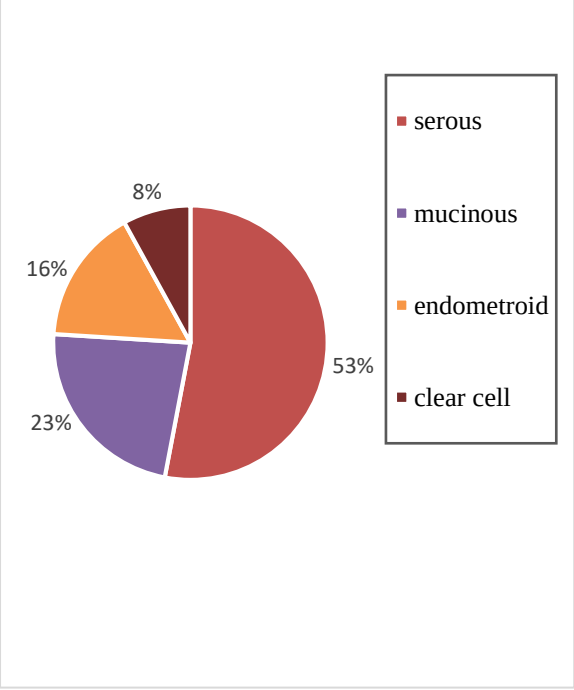

Figure 2: Histological types of ovarian cancer.

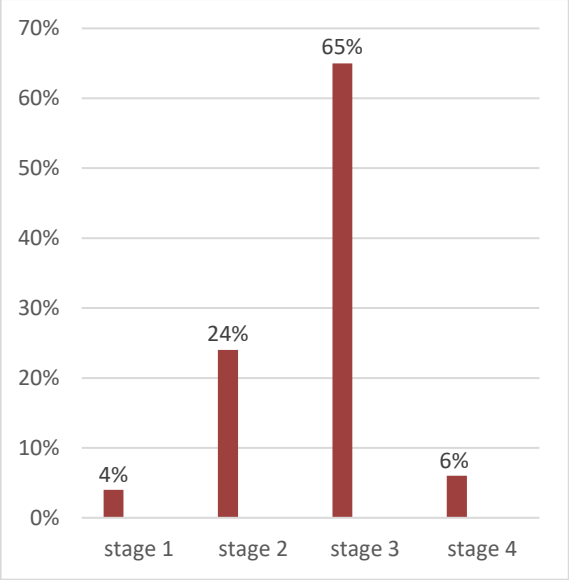

Figure 3: TNM staging.

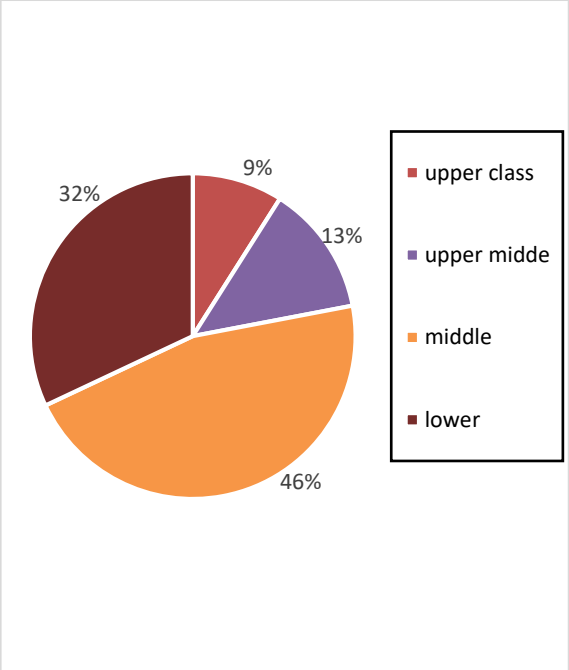

Figure 4: Socioeconomic status.

DISCUSSION

Ovarian neoplasms consists of benign and malignant tumors, affecting mainly women of childbearing age. In general, malignant tumors developed from the surface epithelium (coelomic) which in most of the cases, determine symptoms or signs in advanced stages of the disease. Ovarian carcinomas represent approximately 30% of malignant female genital tract tumors. About 70% of women diagnosed with ovarian carcinoma present tumor extension beyond the pelvis. The malignant ovarian tumors originated from the surface epithelium and/or stroma are graded as well differentiated (grade 1),

moderately differentiated (grade 2) and poorly differentiated (grade 3). This classification is associated with prognostic factors and therapeutic modalities.[17-23] Benign tumors affect women between 20 and 50 years old, while malignant lesions predominate in patients older than 50 years. In the present study, the mean age of patients was 50.24±11.12 years. Serum CA-125 levels ranged from 5 U/ml to 500 U/ml.[24-26] The signs and symptoms of ovarian cancer are known to be vague and non-specific in the early stages of the disease.[27] Therefore a detailed history and examination would have correctly selected these. CA-125 was mainly being used to investigate a broad range of symptoms and was often not used in conjunction with ovarian imaging. Transvaginal ultrasonography has a greater sensitivity and specificity than CA-125 for diagnosing ovarian cancer and this supports the view that CA-125 should be a second line investigation to determine the nature of an ovarian lesion identified on imaging.[28-31] Malignancies at other sites and inflammatory or benign gynaecological disease, were the most common causes for a raised CA-125 concentration as reported previously.[32] The specificity of CA-125 increased with rising concentrations although there were still five false positives with results over 1000 kU/litre, a recognized occurrence.[33-35] The results of this audit confirm the high false positive rate and the poor sensitivity and specificity associated with CA-125. The main limitation of this study is lesser number of patients are being taken.

CONCLUSION

These results confirm the high false-positive rate and poor sensitivity and specificity associated with CA-125 and the most common tumor type. The substantial inappropriate usage of CA-125 has led to results that are useless to the clinician, have cost implications and add to patient anxiety and clinical uncertainty.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Gupta R, Mahajan S, Kaur S, Bansal A, Kumar D, Sodhi JK. Demographic profile, staging and CA-125 levels in a patient with pelvic lesions of probable ovarian origin at presentation in a tertiary care hospital. Int J Adv Med 2021;8:662-6.