

Comparative evaluation of CA 19.9 and CA 125 individually and in combination as tumor marker for ovarian cancer

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Abstract

Aim and objective: To determine the utility of CA125 and CA19.9 in early diagnosis and risk stratification of ovarian cancer alone and in combination

Material and methods: It is a cross sectional study comprising of 100 subjects, 60 patients of ovarian carcinoma and 40 normal healthy volunteers. Serum samples were collected to investigate the level of CA 125 and CA19.9 by CLIA method.

Results: CA 19.9 and CA 125 was significantly elevated in ovarian carcinoma (91.47 ± 52.6 and 189 ± 33.2 U/L). Sensitivity of CA125 was 62.1% and specificity of CA19.9 was 79%. Sensitivity and specificity when both the tumor markers combined was 94.2% and 87.5%

Conclusion: Combination of CA 125 and CA 19.9 can be used as tumor marker for early diagnosis of malignant ovarian carcinoma.

Keywords: CA 125, CA 19.9, ovarian carcinoma, tumor markers

Introduction

Ovarian cancer is the second most common and fatal gynaecological pelvic malignancy [1]. In early stage of ovarian cancer usually there is no sign and symptoms. Patients remain asymptomatic. So malignancy is diagnosed in advance stage. According to some studies only 25% of patients are diagnosed at early stage and 70% are diagnosed at advance stage of cancer [2]. At this time tumor is inoperable with poor prognosis and high recurrence rate. The survival rate is only 20-30%. But if the cancer is diagnosed in its early stage effective treatment is available and 5 year survival rate is 80-90%. [2]. So finding an effective tumour marker is very essential for early diagnosis of malignant ovarian cancer. Tumor marker plays a very important role in diagnosis and prognosis of ovarian cancer. CA125 is one of them. It is also known as mucin 16 or MUC 16 which is a glycoprotein in human coded by MUC 16 gene. It is found that serum CA 125 has been elevated in specific type of cancer and could be a potential biomarker [3]. Several study demonstrated that CA 125 is elevated in 80% of advance malignant ovarian carcinoma [4, 5]. But the sensitivity and specificity of CA125 is known to be poor. It is increased in only 50% of stage 1 epithelial ovarian cancer and 70-90% of ovarian cancer in advance stage. It is also increased in several benign and malignant cases [6, 7]. The elevated level of CA 125 is seen in NHL, breast cancer, leiomyoma, gastric carcinoma [8]. It is also elevated in some benign conditions such as endometriosis [9], pregnancy [10], even in ovulatory cycles [11], and liver disease. CA19.9 is a monosialoganglioside which is associated with various type of tumours in GI tract and has important role in diagnosis of various GI cancer such as pancreatic, colorectal and biliary tract cancer [12, 13]. CA19.9 is a traditional screening criteria for gynaecological pelvic malignancy without high

specificity. There is evidence that combination of tumour marker is superior to single in diagnosis of malignant tumor [14]. So in this study we analyse the diagnostic value of CA125 and CA19.9 alone and the combined use of these tumour marker in diagnosis of ovarian cancer

Aim and Objective

Aim of my study is to estimate efficacy of CA 125 and CA 19.9 in diagnosis of ovarian cancer alone or in combination.

Material and Method

It is a cross sectional study which was conducted in the department of Biochemistry, IGIMS, Patna. Patients were recruited from RCC, IGIMS Patna. 100 subjects were taken out of which 60 were of ovarian carcinoma in different stages. 40 healthy volunteers were recruited as control. Ethical permission was taken from institute ethical committee.

Inclusion Criteria

Patients of ovarian carcinoma in different stages of disease.
Patient willingness to study

Exclusion Criteria

Patients with benign ovarian tumor
Patients with coexisting chronic disease like heart, lung, liver disease.

Sample Collection

Detailed history was taken and venous blood sample was collected after informed consent by patients. Serum was used for analysis of CA 125 and CA 19.9 level by fully automated chemiluminescence method on ACCESS 2. Diagnosis of thyroid disease (AITD) was confirmed by the

presence of thyroid autoantibody in serum. Normal level of CA 125 is 0 – 35 U/ml. The normal level of CA19.9 was defined at a concentration 0-37U/ml.

Statistical Technique

Microsoft excel was used for data storage and analysis the data were expressed as mean ± SD. p<0.05 was considered significant.. Sensitivity and specificity were also calculated.

Result

The mean age of patients is 42±14.3 years. The mean age of healthy control is also 38.2±13.4 year. There is no difference in mean age. The level of CA125 in case of ovarian carcinoma is significantly higher (189.92±33.2 vs 19.1±6.91 U/L).p<0.01.The The level of CA 19.9 is also significantly increased 91.47±52.6 vs 14.6±9.44 U/L) in case of ovarian cancer.(Table 2, Graph 1) The level of CA 125 and CA19.9 is in Stage II & II is lower than stage III and IV. Level is highest in stage IV (table 3)(graph 2)

Table 1: showing cut off values for tumor markers

Tumor marker	Cut off value (U/L)
CA 125	35
CA 19.9	37

Table 2: showing Difference in the mean serum level of Ca19.9 (U/L) and CA125 (U/L) among case and control

	Ovarian cancer patient	Healthy control	P value
CA19.9 (U/ml) (Mean ±SD)	91.47±52.6	14.6±9.44	<0.01
CA 125 (U/ml) (Mean ±SD)	189.92±33.2	19.1±6.91	<0.01

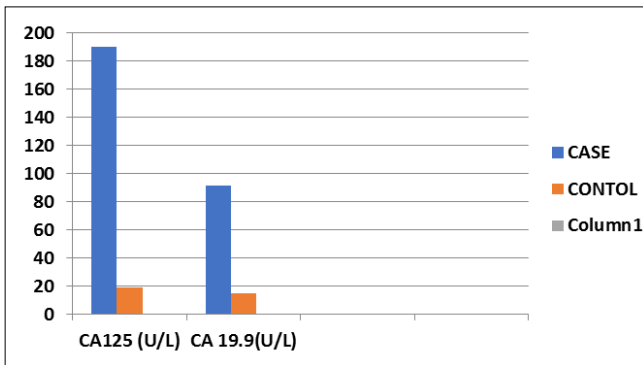


Fig 1: showing mean level of CA 125 and CA 19.9 in case and control

Table 3: Showing difference in the mean of serum 19.9 level (U/L) and serum CA 125(U/L) among patients with different stage of ovarian cancer

	CA 125 (U/L)	CA19.9 (U/L)
Stage I & II	33.7	29.1
Stage III	79.4	59.7
Stage IV	234.1	125.4

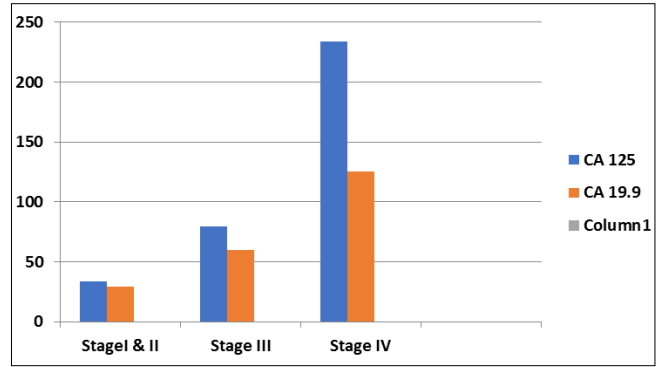


Fig 2: showing mean levels of CA 125 and CA 19.9 in different stages of ovarian cancer

Sensitivity of CA 125 is higher than CA19.9 (62.1% vs 46.1%). While specificity of CA19.9 is higher than CA125 (79.5% vs &70.7%) when there is combination of tumor markers the sensitivity and specificity both are increased. (94.2% and 87.5%) (Table 4)

Table 4: Comparison of Sensitivity and Specificity of CA 125 and CA19.9 alone and in combination in ovarian carcinoma

	sensitivity	specificity
CA125	62.1	70.7
CA19.9	46.1	79.5
CA125 +CA19.9	94.2	87.5

Discussion

CA 125 is used to differentiate between benign and malignant pelvic masses. At it is used as a prognostic marker in response to treatment and early diagnosis of recurrence [15]. CA125 is elevated in some healthy individual also. Some study also demonstrate the role of CA19.9 in malignant ovarian cancer but they document low sensitivity when compared with GI cancer [16]. Although the sensitivity of CA 19.9 is low but specificity is quiet high in diagnosis of ovarian cancer.

As CA125 is elevated in some normal individual also and sensitivity of CA19.9 is low. But its specificity is high. So a combination of these two tumor marker can help in early diagnosis of disease.

Conclusion

The combination of CA 125 and CA19.9 is a reasonable, cost effective, non-invasive approach to establish the diagnosis of ovarian carcinoma. the sensitivity of tumor marker CA 19.9 and CA125 in detection of ovarian cancer was determined and found that CA 125 was more sensitive among the two markers. It was also seen that serum concentration of both markers were increased with advancing stage of disease. When there is combination of both the tumor marker diagnostic accuracy was higher.

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