

Serum CA125, CEA, CA125/CEA ratio and LDH levels in Ovarian Cancer

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Abstract

Aim: To evaluate the diagnostic utility of Serum Cancer Antigen-125 (CA125) and Carcino embryonic antigen (CEA) and LDH levels in patients suffering from Ovarian Cancer.

Study Design: A hospital based cross sectional study was conducted on patients attending the Out Patient Department of Gynecology of SGRR Medical College Dehradun (Uttarakhand) during a period of 8 months from June 2017 to January 2018. A total number of 70 cases of ovarian cancer between the age group 15-75years were selected randomly for the study.

Inclusion criteria: all patients underwent a tertiary transabdominal and transvaginal sonography and 70 cases of ovarian cancer were selected for the study.

Exclusion criteria: was age less than 15 years and more than 75 years, pregnant women, other Gynecological malignancies, TB, Diabetic Mellitus etc.

Methodology: All the selected cases of ovarian cancer were subjected to clinical chemistry analysis of serum CA 125, CEA & LDH which was performed on fully automated analyzer 5600 of Orthoclinical Diagnostics.

Result: The serum levels of CA125, CEA and LDH were found to be very high along with a high CA125/CEA ratio.

Conclusion: Our results show the importance of CA125, CEA, CA125/CEA ratio and LDH in the diagnosis and monitoring the efficacy of treatment. Combination of serum tumour markers in the diagnosis of ovarian malignancy.

Keywords: Ovarian Cancer; CA-125; CEA and LDH.

Introduction

Ovarian malignancy is one of the top 10 leading cancers in Indian women and it account for nearly 25% of all gynecological malignancies in women. This cancer comprises heterogeneous spectrum of different malignant histological cell types. Among different cell types, epithelial ovarian cancer is most prevalent and lethal malignancy in the developed world [1].

The WHO and International federation of Gynecology and Obstetrics (FIGO) have broadly classified ovarian malignancies into;

(a) Common epithelial tumor.

(b) Sexcord stromal tumors and

(c) Germ cell tumors

Patients of ovarian malignancy usually exhibit symptoms of vaginal bleeding, abdominal pain and adnexal mass on abdominal ultrasonography [2]. Tumor markers are biochemical substances liberated by tumor cells either due to cause or effect of malignant or nonmalignant tumors.

Tumor marker CA125, a monoclonal antibody that detects ovarian cancer antigen OC125, is used most extensively in evaluation of patients with adnexal mass. Combining CA 125 with other markers has been shown to increase sensitivity by 5-10%, however specificity is decreased [3]. The best

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available marker for epithelial ovarian cancer is CA 125, reference interval is 0-35 IU/l.

CEA was first described in 1965 as a serum biomarker for mucinous colon cancer [4,5]. The CEA generally increases in patients with mucinous adenocarcinoma, endometroid carcinoma, benign tumors of epithelial origin & benign skin disorders. Most epithelial neoplasms of ovary also express CEA, cut off value in 5ng/ml [6].

Lactate dehydrogenase is an enzyme in the glycolytic pathway & catalyzes the oxidation of lactate to pyruvate, reaction being reversible [7,8]. It is an important serological marker for diagnosis, staging/prognosis, recurrence & monitoring of germ cell tumors. The American joint committee on cancer staging recommends LDH assay as a Tumors marker [9]. However, several articles suggested that concomitant measurement of CA 125 and CEA serum levels can improve ovarian cancer diagnosis [10,11,12].

Data regarding role of tumor markers in detecting ovarian cancer is quite scars, so we thought out undergoing this study for early detection & treatment.

Methodology

All the 70 selected cases of ovarian cancer were subjected to clinical chemistry analysis 5ml blood samples were collected and analyzed for serum CA 125 [13], serum CEA [14] and serum LDH [15].

Results

A total no of 70 cases of ovarian cancer in the age 15-75 years and assayed for serum CA125, serum CEA and serum LDH.

The mean serum levels of CA 125 in patients of Ovarian Cancer were found to be much higher $3748.14 \pm 2003.23 \pm 338.6$ U/ml and of CEA were $39.55 \pm 25.62 \pm 4.33$ ng/ml, both the values were highly significant with $p < 0.0001$. The CA125/CEA

ratio was very high $86.015 \pm 57.34 \pm 9.69$ which was again highly significant with $p < 0.0001$. Serum LDH levels were also high $502.63 \pm 168.08 \pm 28.41$ U/l with $p < 0.0001$. The observations are tabulated in Table 1 and depicted graphically in Figure 1.

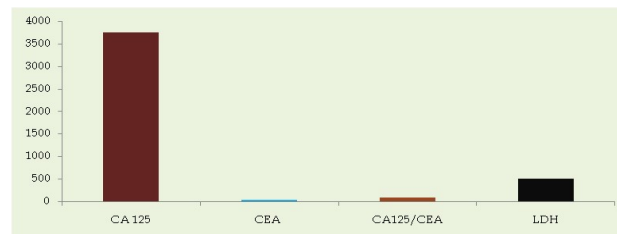


Fig. 1: Serum levels of CA125, CEA, LDH & CA125/CEA ratio.

Discussion

Ovarian cancer in the 2nd deadliest cancer for women & the fifth leading cause of cancer death in women. A wide variety of tumor markers are known to be liberated in excess concentration by the malignant ovarian tissue, however CA125, CEA, α -FP and HCG & LDH have been used as a diagnostic aid, in monitoring efficacy for any type of treatment modality. Serum tumor markers have a major role in screening, diagnosis & monitoring of most of the Gynecological cancers.

CA125 is an excellent marker for epithelial ovarian malignancies. The detection of serum antigens CA125 confirms not only neoplasm of ovary but also some cases of metastatic breast cancer & some malignancies. CEA is also one of the most used tumor markers in clinical application. It has important diagnostic value for gynecology malignant tumor, breast cancer [16], lung cancer etc [17]. In recent clinical trials elevated serum LDH has been shown as an independent predictor of overall survival in advanced or metastatic cancer of ovary [18].

However single detection serum CA125, CEA and LDH have low sensitivity or specificity, several published studies have demonstrated that combination detection of serum CA125 & CEA can provide satisfactory diagnostic value for epithelial

Table 1: Serum levels of CA125, CEA, LDH & CA125/CEA ratio.

S.No.	Parameter	Mean ± SD ± SE	p-value	One sample t test	
				t-value	Degree of freedom
1	CA125 U/ml	3748.14 ± 2003.23 ± 338.6	<0.0001	10.966	34 df
2	CEA ng/ml	39.55 ± 25.62 ± 4.33	<0.0001	7.977	34 df
3	CA 125/CEA ratio	86.015 ± 57.34 ± 9.69	<0.0001	6.296	34 df
4	LDH U/l	502.63 ± 168.08 ± 28.41	<0.0001	14.171	34 df

ovarian cancer [19,20]. Additionally evaluation of tumor marker concentration helps in predicting early biochemical recurrence & in prognostication in different types of ovarian malignancies.

Sorensen and Mosgaard also reported the ability of CEA in combination with CA 125 to differentiate between malignant ovarian & malignant non ovarian disease [21]. They reported that among the patients with CEA levels of more than 5ng/ml, 68% had non ovarian malignancy and in patients with a CA125/CEA ratio of more than 25 was found in 82%. The specificity increased to around 85% when the cutoff value of CA125/CEA ratio was increased from 25 to 100 [21]. Our results are in accordance with the study of Sorensen & Mosgaard. Several plausible mechanisms may underlie between LDH & cancer progression, rapidly proliferating cancer cells requires extreme supplies of energy & chronic hypoxia secondary to tumor growth which activates Hypoxia- inducible factor-1 that regulates glycolysis & angiogenesis [22].

Our results clearly indicate the importance of CA125, CEA & LDH in diagnosis prognosis and in monitoring efficacy of ovarian tumors.

Conclusion

Our results illustrate the importance of CA125, CEA, LDH and CA125/CEA ratio in the diagnosis, and in monitoring the efficacy of different treatments. It is also evident from our study that combination of serum tumour markers is superior to CA125 alone in the diagnosis of ovarian malignancies with relative high sensitivity and specificity.

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