

Correlation of CA-125 with different stages of endometriosis

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Article Info

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Abstract

This study was conducted to evaluate the association of serum cancer antigen (CA-125) level with the severity of pelvic endometriosis. Seventy diagnosed cases of pelvic endometriosis were included in this study. The CA-125 level was estimated in all these patients, cutoff value of the serum CA-125 level was considered 35.0 U/mL. The correlations between serum CA-125 and different stages of endometriosis were evaluated by linear regression analysis. In Stage I of endometriosis, the mean serum CA-125 level was 21.8 ± 15.1 U/mL, in Stage II 26.0 ± 17.3 U/mL, in Stage III 83.2 ± 48.9 U/mL and in Stage IV 117.0 ± 41.6 U/mL. A significant positive correlation ($r = 0.729$; $p = 0.001$) was found between the serum CA-125 and different stages of endometriosis.

Introduction

Endometriosis is an estrogen-dependent condition and mostly affects women in their reproductive age. The prevalence rate of this disease in infertile women is about 20-50% but it can be as high as 80% in women who suffer from chronic pelvic pain.^{1,3} A survey report from multicentric tertiary level infertility care hospitals of Bangladesh shows that patients seeking treatment for infertility, 9.6% suffer from endometriosis.⁴

The pathophysiology of endometriosis is not well understood. Different theories attempted to explain this disease, although none of them have been entirely proven. Most accepted theory include endometriotic implants that are derived from the metaplasia of coelomic epithelium. It is likely that the combination of various factors can cause and determine the severity of this disease.

Many researchers worked on the cancer antigen (Ca-125) to evaluate its sensitivity for the diagnosis of endometriosis but the results were disappointing in minimal and mild disease.⁵⁻⁶

But Ca-125 level was significantly higher in women having moderate and severe endometriosis.⁷⁻¹¹

Basically Ca-125 is a cancer biomarker used for monitoring and follow-up of the ovarian cancer following definitive surgery and chemotherapy and to detect early recurrence.¹²⁻¹⁴

One study shows that the serum CA-125 level was raised in patients having endometriosis and there was a positive correlation between

the Ca-125 level and the advanced stages of the disease.¹⁵ Thus, the clinical value of serum CA-125 level was studied extensively in the diagnosis of endometriosis.¹⁶⁻¹⁹

Some studies have reported that serum CA-125 levels were reduced after surgery of endometriosis followed by medical treatment. Other investigators have shown that the measurement of serum CA-125 was more useful for monitoring the patients who were treated medically than in the diagnosis of the disease.²⁰⁻²¹ Study shows that serum CA-125 levels raised during menstruation about three times than those before menstruation in women suffering from endometriosis.²²

This study was done with the aim to measure the serum CA-125 for the diagnosis and also to evaluate the severity of endometriosis.

Materials and Methods

It is a cross-sectional comparative study. This study was carried out during the period of January 2013 to August 2014. Seventy diagnosed cases of pelvic and ovarian endometriosis were included in this study. Women with the ovarian malignancy established by intra-operative findings or histopathology, fibroid, adenomyosis, pelvic inflammatory disease, or any other malignancy were excluded from the study. All the study subjects were classified into 4 stages according to the revised American Fertility Society Classification. The purpose of this research work was explained elaborately to the patient who fulfilled the enrollment criteria



and informed written consent was taken from all participants of this study. Pre-tested case record form was used to collect the relevant demographic, clinical findings and investigation reports.

Five milliliter of blood sample was drawn from the antecubital vein of each patient with endometriosis. Then the blood sample was centrifuge for 5 min at a rate of 3,000 rpm at 4°C and the supernatant was stored at -70°C until analysis. The serum was not allow to be thawed until the assay was performed.

Serum CA-125 level was measured by IMMULITE 2000 OM-MA (SIEMENS, USA) and was expressed in arbitrary units based on a primary reference standard. This study was choosing 35.0 U/mL as the cutoff value of the serum CA-125 level.

Data were collected from the patient on variables of interest by interview, clinical examination, operative findings, hematological investigations, histopathological report and from the history sheet of the patient.

Data analysis

All data were analyzed using Statistical Package for Social Sciences (SPSS), Windows (version 20.0; USA) and Epi info (version 1.0.3, USD, Stone Mountain, GA). Categorical variables were presented in the form of mean and standard deviation. Statistical difference between the mean CA-125 levels in various groups of endometriosis was obtained from ANOVA test. The p value of <0.05 was considered statistically significant. Linear regression analysis was done to evaluate the correlation of serum CA-125 with different stages of endometriosis.

Results

In this study, it was observed that majority (80.0%) of the patients had dysmenorrhea, 54.3% subfertility, 51.4% lower abdominal pain, 17.1% lump in the lower abdomen, 15.7% dyspareunia, and 14.3% had menorrhagia (Table I). Regarding CA-125, almost three-fourth (74.3%) of the patients had the level of >35.0 U/mL and 25.7% had ≤35.0 U/mL. The mean (± SD) serum CA-125 was found 81.1 ± 54.6 U/mL with range from 5.1 to 197 U/mL. Almost half (32) of the patients were in Stage IV of endometriosis, 17 in Stage III, 14 in Stage II and 7 in Stage I (Table II). Table II shows the serum CA-125 level in different stages of endometriosis among the study subjects. It was observed that in Stage I, the mean (± SD) of CA-125 level was 21.8 ± 15.1 U/mL, in Stage II it was 26.0 ± 17.3 U/mL, in Stage III 83.2 ± 48.9 U/mL and in Stage IV 117.0 ± 41.6 U/mL. The difference was statistically significant (p<0.05) among four groups. A significant positive correlation (Spearman correlation coefficient r=0.729; p=0.001) was found

Table I

Age distribution and chief complaints	
	Number of patients (n = 70)
<i>Age (Years)</i>	
18-24	16
25-30	14
31-45	38
>45	2
<i>Chief complaints</i>	
Dysmenorrhea	56
Subfertility	38
Lower abdominal pain	36
Lump in lower abdomen	12
Dyspareunia	11
Menorrhagia	10

Table II

Serum CA-125 levels in different stage of endometriosis		
Stage of endometriosis	n	CA-125 (mean ± SD)
Stage I	7	21.8 ± 15.1
Stage II	14	26.0 ± 17.3
Stage III	17	83.2 ± 48.9
Stage IV	32	117.0 ± 41.6

between the CA-125 and different stage of endometriosis (Figure 1).

Discussion

In this current study, it was observed that the serum CA-125 level was >35.0 U/mL in almost three-fourth of the patients and whereas in 25.7% of the patients the level was ≤35.0 U/mL and the mean CA-125 was found 81.1 ± 54.6 U/mL varied from 5.08 to 197 U/mL. Similarly, Kurdoglu et al. (2009) showed 48.0% participants had serum CA 125 level of >5.0 IU/mL.²³ In another study, Szubert et al. (2012) found that the mean value of serum CA-125 in the endometriosis group was 34.0 U/mL whereas mean value of CA-125 in peritoneal fluid was 1241.9 U/mL.²⁴ Amaral and colleagues (2006) showed that in the endometriosis group, the serum CA-125 level was raised than those of the control group during menstruation.²⁵ Ramos et al. (2012) reported that the CA-125 serum level was significantly raised in women having infertility due to endometriosis than those who were fertile and who never tried.²⁶ In the current study, the mean CA-125 according to

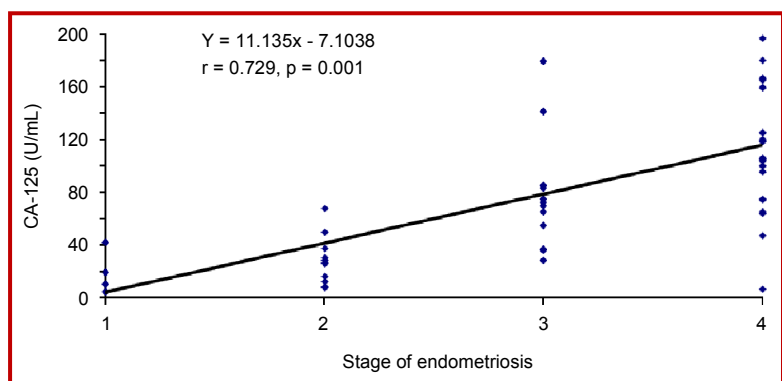


Figure 1: Scatter diagram showing a significant positive correlation (Spearman correlation coefficient $r = 0.729$; $p = 0.001$) was found between CA-125 according to different stage of endometriosis

different stage of endometriosis was found 21.8 ± 15.1 U/mL in Stage I, in Stage II it was 26.0 ± 17.3 U/mL, in Stage III it was 83.2 ± 48.9 U/mL and in Stage IV 117.0 ± 41.6 U/mL. In this study, it was observed that the serum CA-125 level was increased with the grading of endometriosis. This finding is consistent with the findings from the other studies.^{9, 11, 27-29} The mean CA-125 level was significantly ($p < 0.05$) elevated when compared between the different stages of endometriosis. Similarly, Somiglian et al. (2004) found that in Stage I-II, the mean CA-125 level was 13.3 with range from 9.2-23.0 U/mL. In Stage III-IV, the mean CA-125 level was 25.9 with range from 16.8 to 47.4 U/mL.³⁰ In another study, Kurdoglu et al. (2009) mentioned that the serum CA 125 level was not different among the patients having Stage I and II endometriosis but in patients with Stage III and IV endometriosis the level was remarkably higher.²³ In this series, it was observed that there was significant positive correlation ($r = 0.729$; $p = 0.001$) between the CA-125 and different stage of endometriosis. Similar findings was observed by Szubert et al. (2012) where there was significant positive correlation between the stages of endometriosis and CA-125 level ($r = 0.599$, $p < 0.001$).²⁴

Conclusion

The mean level of CA-125 was higher among the patients of endometriosis and the difference was statistically significant ($p < 0.05$) among the four groups. There was significant positive correlation between the different stages of endometriosis and serum CA-125.

Ethical Issue

The research protocol was approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University.

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