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Evaluation of serum ca 125 levels in infertile patients with and without endometriosis

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Abstract

Background: Cancer antigen 125 (CA 125) is a glycoprotein biomarker secreted by celomic epithelium. It is used in women with pelvic masses such as endometriosis and it may be useful in clinical diagnosis of endometriosis.

Objective: The aim of this study was to evaluate level of serum CA 125 in infertile patients with and without endometriosis and association of serum CA125 level with different stages of endometriosis.

Materials and Methods: In a cross –sectional study 60 infertile women who underwent diagnostic hystero laparoscopy for the evaluation of infertility, were included. The presence of endometriosis was evaluated. Women with endometriosis were kept in group-A and women without endometriosis were kept in group-B. Serum CA 125 level was measured in both groups. The comparison of serum CA 125 levels between the two groups was performed, using independent t-test. Serum CA 125 level was also measured according to different stages of endometriosis to find the association between prolactin level and disease severity.

Results: Serum CA 125 levels were significantly higher in endometriosis group compared to control group (46.73 ± 21.69 U/mL v/s 14.32 ± 4.58 U/mL). Statistically significant associations were found between staging of endometriosis and serum CA125 levels (p=0.001).

Conclusion: High serum CA 125 concentration may be associated with endometriosis and its severity.

Keywords: Serum, CA-125, ASRM

Introduction

Endometriosis is an estrogen dependent disease. It is found in approximately 10-15% of adult women aged 25-35 years (1). Endometriosis affect women's fertility, somatic health, and quality of life. Endometriosis occurs when the endometrial tissue including glands and stroma grows outside the uterine cavity in other parts of body. It is responsible for varying degrees of painful symptoms and infertility in affected individuals (2). It is presumed that endometriotic lesions produce peritoneal irritation and inflammation and this leads to an increased shedding of CA-125. Levels of CA-125, a glycoprotein from coelomic epithelium have been found to be significantly higher in women with moderate or severe endometriosis.

It was reported that preoperative serum CA-125 levels could be used as a important predictor for patients with endometrial conditions. Ovarian endometrioma and deeply infiltrating endometriosis are common gynecological conditions associated with high serum CA-125 (3).

However, CA-125 is not a specific marker of endometriosis but it have been studied many times for diagnosis of endometriosis as alone marker or in combination with other markers like CA-19-9, survivin mRNA, urocortin, chlamydia antibody, CD-23, inflammatory cytokines (4).

Several studies have been done to examine use of CA-125 as a blood biomarker for endometriosis (5,6). Studies have demonstrated use of CA-125 for diagnosis of endometriosis and also correlated level of CA-125 with disease severity, especially endometriotic cyst (5).

Material & method

The hospital based comparative cross-sectional study was carried out in department of obstetrics & Gynaecology of SMS Medical college, Jaipur from May 2019 to August 2020. Total 60 infertile women were included in this study, 30 infertile women with endometriosis (group-A) and 30 infertile women without endometriosis (group-B).

Inclusion criteria

- Women with infertility duration ≥1 year.
- Women giving consent for participation in study.

Exclusion criteria

- Women with a previous surgical diagnosis of endometriosis.
- Patient with active pelvic inflammatory disease diagnosed on basis of history and pelvic examination.
- Women who have husband with azoospermia or severe oligozoospermia (<10 million mobile spermatozoa per ml).
- Women who had taken hormonal medication (including combined oral contraception) within previous 3 months.
- Women with previous tubal ligation.
- Women with known contraindication to anaesthesia and surgical intervention like Hyster laparoscopy.

Methodology

After applying inclusion and exclusion criteria informed written consent was taken and women with infertility duration more than one year and willing to participate were recruited from Department of Obst and Gynae, SMS Medical College, Jaipur. Approval from institutional Research, Review Board and Ethical Committee was taken. Standardized data collection on a predesigned study proforma including a full infertility workup, after the initial visit was done. Serum CA 125 level was measured in study group. All infertile women underwent diagnostic Hyster laparoscopy and divided into two groups, women with endometriosis (group-A) and women without endometriosis (group-B). Laparoscopic staging was based on American Society of Reproductive Medicine (ASRM) scoring for endometriosis in which findings were divided into four categories according to severity: stage 1 (minimal disease), stage 2 (mild disease), stage 3 (moderate disease), stage 4 (severe disease).

Statistical analysis

Linear variables were summarized as mean and standard deviation whereas nominal/categorical variables were expressed as proportions (%).

Unpaired t-test and other parametric tests were used for analysis of linear variables while nominal/categorical variables were analysed by using Chi-square test and Fisher-exact test.

p-value <0.05 was taken as significant. Medcalc 16.4 version software was used for all statistical calculations.

Results

The study included infertile women who underwent diagnostic Hyster laparoscopy .60 infertile women were selected for our study ,30 were in group-A and 30 were in group-B.

Table 1: Distribution of Subjects According to Mean Age

Group	Group-A	Group-B	P-value
Mean Age (in yrs)	26.07 ± 3.20	25.50 ± 3.90	0.541

This table shows that mean age in Group–A was 26.07 ± 3.20 yrs and in Group-B was 25.50 ± 3.90 yrs. The difference was not statistically significant

Table 2: Distribution of Subjects According to Disease Stage in Endometriosis Group

Stage	No. of Patients	%
Stage-I	8	26.67
Stage-II	5	16.67
Stage-III	6	20.00
Stage-IV	11	36.00
Total	30	100.00

In this study, 8 (26.67%) patients were diagnosed with stage-I, 5 (16.67%) were with stage-II, 6 (20.00%) were with stage-III and 11 (36.66%) patients were diagnosed with stage-IV of endometriosis.

Table 3: Comparison of serum CA-125 level Among Study Groups

Variable	Group-A		Group-B		t-test	p-value
CA 125 (U/mL)	46.73	21.69	14.32	4.58	64.15	0.001

Serum CA-125 level was significantly higher in Group-A (46.73 ± 21.69 U/mL) as compared to Group-B (14.32 ± 4.58 U/mL)

Table 4: Serum CA-125 Level in Endometriosis Group According to Disease Stage

Variable	Stage-I (n = 8)		Stage-II (n = 5)		Stage-III (n = 6)		Stage-IV (n = 11)		F-value	p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
CA 125 (U/mL)	18.71	1.77	37.51	13.33	51.95	8.76	68.46	6.78	66.27	0.001

The above table shows serum CA-125 concentration in endometriosis group according to disease stage.

In our study CA-125 levels were significantly associated with severity of disease. In patients with stage-I CA-125 level was 18.71 ± 1.77 U/mL, in stage-II 37.51 ± 13.33 U/mL, in stage-III 51.95 ± 8.76 U/mL and in stage-IV 68.46 ± 6.78 U/mL.

Discussion

CA- 125 is derived from coelomic epithelium including ovary, fallopian tube, endometrium, and peritoneum and it is a well-established marker for epithelial call ovarian cancer. Endometriosis stimulate coelomic epithelium, it leads to shedding of CA 125, so level of CA 125 rises in endometriosis. We conducted a study to assess CA-125 levels in infertile women with and without endometriosis. Mean age was slightly higher in group of infertile women with endometriosis as compared to group of infertile women without endometriosis. Mean Serum CA-125 level was significantly higher in endometriosis group (46.73 ± 21.69 U/mL) as compared to group without endometriosis (14.32 ± 4.58 U/mL). Barbosa JS et al (2014) also found serum CA-125 level to be significantly higher in infertile women with endometriosis (23.98 ± 2.34 U/mL) than infertile women without endometriosis (23.98 ± 2.34 U/mL v/s 14.45 ± 1.86 U/mL) (7).

Elevated level of CA-125 was significantly associated with clinicopathological parameters including stage of

disease. In this study we found strong association between raised CA-125 level and advanced stage of disease. In patients with stage-I CA-125 level was 18.71 ± 1.77 U/mL, in stage-II 37.51 ± 13.33 U/mL, in stage-III 51.95 ± 8.76 U/mL and in stage-IV 68.46 ± 6.78 U/mL.

Results of our study were comparable to study done by Maiorana A et al (2007) in which they found significantly increased levels of CA-125 in severe disease. CA-125 level in stage-I was 48.8 ± 34.2 U/mL, in stage-II 45.4 ± 29.5 U/mL, in stage-III 57.0 ± 44 U/mL and in stage-IV 64.0 ± 50 U/mL in their study (8).

Laila R et al (2018) (9) also conducted a study to find correlation of CA-125 with different stages of endometriosis and they concluded that serum CA-125 levels had significant positive correlation with higher stages of endometriosis. It is presumed that in women with endometriosis elevated level of CA125 is because of its higher concentration in ectopic endometrium. It may also be due to inflammatory reactions that causes increased endothelial permeability which leads to increased circulatory level of CA125. Amaral et al found CA 125 level higher in both serum and peritoneal fluid of women with advanced stage of endometriosis (10). Therefore, serum CA125 assessment should be considered in patients with suspected endometriosis and it can be used as an adjunct in prediction of stage of endometriosis.

Conclusion

Serum CA 125 is an important predictor of endometriosis and it should be taken into consideration for diagnosis of endometriosis and staging of disease. As compared to laparoscopy it is less expensive and less invasive so in patients with clinically suspected endometriosis it could be proposed as diagnostic parameter in routine for selection of patients for laparoscopy.

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