



Examining CA 19-9 Tumor Marker in Ovarian Dermoid Cysts; A Retrospective Study

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ABSTRACT

Aims Tumor markers are very applicable for examining differential diagnoses of adenosine masses. Increases in CA 19-9 have been reported in epithelial ovarian and endometrial tumors. Dermoid cysts are the most prevalent ovarian germ cell tumors. The aim of the present study was to examine Cancer Antigen 19-9 (CA 19-9) tumor marker in ovarian dermoid cysts.

Information and Methods This descriptive-analytic study was conducted using hospital records. By referring to archives of a Imam Khomeini Hospital, Ahvaz, Iran in 2016, the information of 73 patients with ovarian dermoid cysts were extracted that include their demographic information, cyst size, the location of involvement, the presence of symptoms of malignancy in sonography reports, and CA 19-9 serum levels prior to surgery. A pathologic report was used for the final mass diagnosis and determining the type of mass extracted from the patients' bodies. Data were analyzed by SPSS 22 software using independent-sample t-test, chi-square test and Pearson correlation coefficient.

Findings All patients under study were diagnosed with dermoid cysts. In 9 patients (12.85%), symptoms of malignancy were reported in their sonography reports. The mean serum levels of CA 19-9 tumor marker was 46.13 ± 11.65 U/ml. There was a direct correlation between mass size and CA 19-9 serum concentrations ($r=0.24$). In 20% of the patients, the concentrations of CA 19-9 were normal.

Conclusion The CA 19-9 serum concentration is related to tumor size in cases of mature cystic teratoma. In most cases of unilateral mature cystic teratomas, the right ovary is mainly preferred to involve.

Keywords Ovarian Neoplasms; Biomarkers Tumor; CA 19-9; Dermoid Cyst

CITATION LINKS

[1] Relative frequency of primary ovarian neoplasms: A 10-year review [2] Adnexal masses in pregnancy: A review of 130 cases undergoing surgical management [3] Imaging of dermoid cysts with foci of immature tissue [4] Parthenogenic origin of benign ovarian teratomas [5] An intense clinicopathologic study of 305 teratomas of the ovary [6] Ovarian teratomas: Tumor types and imaging characteristics [7] Biomarkers in pancreatic cancer: Diagnostic, prognostic, and predictive [8] The clinical value of serum CEA, CA19-9, and CA242 in the diagnosis and prognosis of pancreatic cancer [9] CA19-9 as the most significant prognostic indicator of metastatic colorectal cancer [10] CA19-9 may have clinical significance in mature cystic teratomas of the ovary [11] Elevated CA 19-9 levels in mature cystic teratoma of the ovary [12] Tumor markers panel and tumor size of ovarian dermoid tumors in reproductive age

Introduction

Germinal ovarian tumors, categorized into dermoid cysts, monodermal teratomas, struma ovarii, and immature teratomas, they have various histological origins. Among these tumors, dermoid cysts or mature cystic teratomas have the highest prevalence rate [1, 2]. Dermoid cysts originate from pluripotent germ cells after the first meiotic division [3, 4], and contain at least two types of ectodermal differentiated tissues (e.g., skin and brain), mesoderm (e.g., muscle, fat, bone, and cartilage), and endoderm (e.g., bronchial epithelium and/or digestive system and thyroid) [3, 5, 6]. Cancer Antigen 19-9 (CA 19-9) is a monosialoganglioside associated with different types of mucinous tumors of the digestive tract, including pancreas and bile ducts, such that the CA 19-9 serum levels play key roles in diagnosing and determining the prognosis of colorectal, pancreatic, and biliary cancers [7-9]. Studies have shown the CA 19-9 serum level may be a useful marker for the diagnosis of benign dermoid cysts [10, 11].

The aim of the present study was to examine CA 19-9 tumor marker in ovarian dermoid cysts.

Information and Methods

This descriptive-analytic study was conducted using hospital records. By referring to archives of a Imam Khomeini Hospital, Ahwaz, Iran in 2016, records of all patients who underwent a surgical procedure due to having adenosine masses and, according to pathology reports, had ovarian dermoid cysts in 2016 were extracted which included 73 cases. These patients' information including their age, cyst size, the location of involvement, sonography reports, and CA 19-9 serum levels before having a surgery were considered. In a case where the information required to carry out this study was not mentioned in a patient's hospital record, the patient was excluded from the study.

Among 73 patients, 2 patients were excluded from the study due to having incomplete records and 1 patient was excluded from the study due to lack of a pathologic response. In total, the present study was conducted on 70 patients.

An independent-sample t-test and chi-square test were used to determine the relationship between the variables under study. The correlation between the variables and CA 19-9 serum concentrations was determined by Pearson correlation coefficient. After data collection, all obtained data were analyzed via SPSS 22.

Findings

The patients' mean age was 32.16 ± 8.64 years, with a minimum of 16 years and a maximum 58 years.

Most of the patients (24.3%) were in the age range of 26-30 years.

Forty-one percent of the patient showed right ovarian involvement (Table 1). The pathologic reports of all biopsy samples taken from the patients indicated mature cystic teratomas.

A mean serum concentration of CA 19-9 tumor markers was 46.13 ± 11.65 U/ml.

Compared to patients who did not have a solid component, the mean CA 19-9 concentration was higher in patients in whose sonography reports the presence of a solid component was reported and this difference was statistically significant ($p < 0.05$).

The mean mass size was 70.5 ± 17.99 mm and the mean was higher in patients with right ovarian involvement compared to those with left ovarian involvement. However, there was no statistically significant difference in the mass size based on ovarian involvement ($p > 0.05$). The highest mass size was in patients in the age range of 15 to 20 years and the lowest mean mass size was in patients with the age range of 36 to 40 years. This is while there was no statistically significant difference in mass size considering different age ranges ($p > 0.05$). The mean tumor size of the patients who did not have a solid component but had an irregular margin was higher than other patients. This difference was significant ($p < 0.05$).

The mean CA 19-9 concentration was higher in patients in whose sonography reports the simultaneous existence of a solid component and an irregular margin was reported in comparison with those who had one of the mentioned or none of these sonographic results (61.7, 50.1, and 45 U/ml, respectively) and this difference was statistically significant (Table 2; $p < 0.05$).

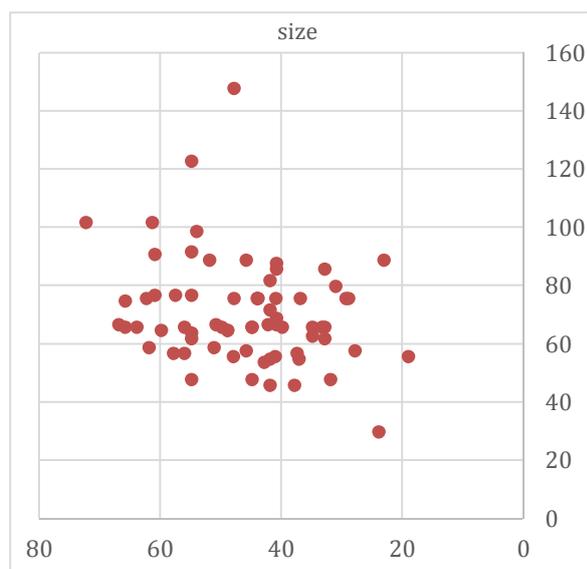


Diagram 1) The dispersion distribution between tumor size and CA 19-9 concentration

Table 1) Clinical information of the patients under study

Specifications	No. (percent)
Ovarian involvement	
Right	41 (58.6)
Left	29 (41.4)
Symptoms of malignancy in sonography	
Presence of ascites	0
Irregular margin	3 (4.3)
CA 19-9 serum concentration	
Normal	14 (20.0)
Increased	56 (80.0)
Menstrual status	
Non-menopausal	66 (94.3)
Menopause	4 (5.7)

Table 2) CA 19-9 serum concentration according to clinical characteristics of the patients

Clinical characteristics	CA 19-9 serum concentration (U/ml)	P-value
Ovarian involvement		
Right	45.7	>0.05
Left	46.6	
Solid component in sonography		
With	54.4	<0.05
Without	45.0	
Irregular margin in sonography		
With	57.1	<0.05
Without	45.6	
Menstrual status		
Non-menopausal	38.2	>0.05
Menopause	41.7	

Discussion

The aim of the present study was to examine CA 19-9 tumor marker in ovarian dermoid cysts.

The mean age of the patients under study was 32.16 years, with a minimum of 16 years and a maximum 58 years. Most of the patients (24.3%) were in the age range of 26-30 years. In a study conducted by Var *et al.* the mean age of the subjects under study was 29.01 ranging from 17 to 42 years. In another study carried out by Cho *et al.* the mean age of the patients was 33.4 years ranging from 5 to 73 years. Moreover, in a study conducted by Dede *et al.* the mean age was 33.1 years ranging from 15 to 69 years. The mean ages of the patients with mature cystic teratomas in these studies were similar to that of the current study which indicated the incident of this disease in young people.

In this study, the right ovaries of 41 patients (58.6%) were involved and the left ovaries of 29 patients (41.4%) were involved. None of the patients studied had bilateral involvement [12]. In the study carried out by Cho *et al.* 84.5% of the patients had unilateral involvement and 15.5% had bilateral involvement. Given the results obtained from the current study, ovarian involvement in this disease occurred with a preference for the right side and in a small

percentage of the patients, both ovaries were involved.

The results of sonographic examinations conducted in this study to examine symptoms of malignancy, the presence of irregular margins was reported in 3 patients (4.3%); however, none of the patients had ascites. In addition, in sonography examinations, the presence of solid components was reported in 8 patients (11.4%).

The mean serum concentration of the CA 19-9 tumor marker was 46.13U/ml, with a minimum of 19.1U/ml and a maximum of 72.5U/ml. In the current study, 14 patients (20.0%) had normal CA 19-9 serum concentrations (less than 37U/ml). The lowest mean CA 19-9 concentration was in the age range of 56 to 60 years. The highest mean CA 19-9 concentration was in the age range of 15 to 20 years. In the present study, there was no significant relationship between the patients' age and CA 19-9 serum concentrations ($p>0.05$). In this study, 4 patients (5.7%) were menopause. The mean CA 19-9 concentration was 38.2 in menopausal patients and was 41.7 in non-menopausal patients. This difference was not statistically significant ($p>0.05$).

In the study conducted by Var *et al.* the mean CA 19-9 serum concentration was 87.7U/ml. In a study carried out by Kawai *et al.* the mean CA 19-9 serum concentration in patients with mature cystic teratomas was 38.3U/ml. This difference in the CA 19-9 serum levels in various studies may be due to the use of different evaluation kits and also because of differences in the patients' mass size.

In the present study, the mean CA 19-9 concentration in patients with right ovarian involvement was slightly more than that in patients with left ovarian involvement. However, the mean CA 19-9 concentration was not significantly different considering the ovarian involvement ($p>0.05$). Additionally, the mean CA 19-9 concentration in patients diagnosed with a solid component using an abdominal sonography was not more than that of patients without any solid components. In this study, the mean CA 19-9 concentration in patients with a solid component was significantly different from that in patients without any solid components ($p<0.05$).

In the present study, the mean CA 19-9 concentration was higher in patients in whose sonography reports the existence of an irregular margin was reported in comparison with those who did not have such an irregular margin. In the current study, the mean CA 19-9 concentration in patients whose mass had an irregular margin was not significantly different from those whose mass did not have any irregular margins ($p>0.05$).

In this study, the mean mass size was 70.5mm and the mean was higher in patients with right ovarian involvement compared to those with left ovarian

involvement. However, there was no statistically significant difference in the mass size based on ovarian involvement ($p>0.05$). The highest mass size was in patients in the age range of 15 to 20 years and the lowest mean mass size was in patients with the age range of 36 to 40 years. This is while there was no statistically significant difference in mass size considering different age ranges ($p>0.05$). The mean tumor size of the patients who did not have a solid component but had an irregular margin was higher than other patients. This difference was significant ($p<0.05$). In the study conducted by Var *et al.* the mean tumor size was 6.65cm, with a minimum of 2 and a maximum of 22cm. In the study carried out by Cho *et al.* the tumor size was between 2 and 30cm, with a mean of 7.6cm. In addition, in a study done by Dede *et al.* the tumor size was between 3 and 20cm, with a mean of 7.2cm. Given the results of this study and the results of previously studies, the mass size was significant at the time of diagnosis. This is due to lack of specificity of the initial symptoms of the disease which results in the late diagnosis of the disease as well as the late referral of patients to gynecologists for examining the symptoms.

In this study, there was a direct relationship between mass size and CA 19-9 serum concentrations ($r=0.24$). Var *et al.* studied the direct relationship between CA 19-9 serum levels and tumor size in sizes greater than 10cm. In Cho *et al.* increasing the CA 19-9 serum concentration was significantly related to an increase in tumor size and an increase in the probability of ovarian torsion.

In the study of Dede *et al.* although in cases where CA 19-9 serum levels were elevated, there was a significant increase in mass size in comparison with those have normal CA 19-9 serum concentrations, this difference was not statistically significant.

Totally, in the present study and other studies, there was a direct relationship between mass size and CA 19-9 serum concentrations.

The present study have not limitations.

Conclusion

The CA 19-9 serum concentration is related to tumor size in cases of mature cystic teratoma. In most cases of unilateral mature cystic teratomas, the right ovary is mainly preferred to involve.

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