

# CA 19-9 can be a useful tumor marker in ovarian dermoid cysts

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## Summary

**Purpose:** To evaluate the importance of CA-19-9 as an aiding tool in the diagnosis of mature cystic teratomas. **Methods:** We found 43 cases of dermoid cysts that were operated on at our clinic, and whose tumor marker CA 19-9 was studied before the operation.

**Results:** Thirty-seven of 43 patients (86%) had elevated CA 19-9 levels. Using Pearson's correlation, the average diameter and weight of the tumor had a strong positive correlation with the level of CA 19-9 ( $p < 0.01$ ). Thirty-one out of the 43 (72%) cases had a dermoid cyst in the right ovary, nine (20.9%) in the left ovary, and three (7%) had bilateral dermoid cysts. Right predominance was very high among the patients ( $p < 0.05$ ). **Conclusion:** We suggest that besides ultrasonography and computed tomography, serum CA 19-9 level could be a useful tumor marker in the diagnosis of dermoid cysts.

**Key words:** Dermoid cyst; CA 19-9 level; Gynecological tumors.

## Introduction

Mature cystic teratoma (MCT), also called dermoid cyst, is the most common ovarian tumor, which is composed of well-differentiated tissues derived from the three germ cell layers (ectoderm, mesoderm, and endoderm) [1]. MCTs account for about 10-20% of all ovarian tumors and are mainly found in young women of reproductive age [1, 2].

The Lewis histo-blood group antigens Lewis a ( $Le^a$ ) and Lewis b ( $Le^b$ ) are carbohydrate structures that form epitopes on glycolipids and glycoproteins. The tumor marker, CA 19-9, which recognizes the sialylated  $Le^a$  carbohydrate structure [3], has been used mainly for serological diagnosis and follow-up of gastrointestinal and pancreatic malignancies [4-7]. Currently, CA 19-9 is regarded as the most sensitive and specific marker in the diagnosis and follow-up of pancreatic cancer [4]. Additional associated malignancies are biliary tract, colon, esophageal, and hepatic cancers. However, the interpretation of CA 19-9 can be difficult because about 5-7% of the population that are Lewis-negative do not produce CA 19-9 and have undetectable concentrations of CA 19-9 regardless of the tumor mass, and several nonmalignant diseases like pancreatitis, biliary disease, cirrhosis have been associated with increased serum concentrations of CA 19-9 [4]. The level above which benign disease is unlikely is  $> 1.000$  units per ml [4].

The relationship of CA 19-9 with ovarian dermoid cysts is not well established. The current data are insufficient and include few trials and mostly case reports [1, 8-10].

The aim of our study was to investigate the clinical value of CA 19-9 in ovarian dermoid cysts and to evaluate the average size, weight, and bilaterality of the tumor.

## Materials and Methods

We found 43 cases of dermoid cysts that had been operated on at the Obstetrics & Gynecology Department of Kahramanmaraş Women's and Children's Hospital between January 2004 and September 2007, and whose tumor marker CA 19-9 was studied before the operation. CA 19-9 was analyzed with Immulite 2000 autoanalyzer (USA). This method depends on a solid-phase, two-site sequential chemiluminescent immunometric assay procedure. Test interassay precision was 5.8% (CV).

We noted data from the reports of the patients as age, gravida, parity, average diameter and weight of the tumor, the site of the tumor (right or left ovary), bilaterality, and the level of CA 19-9. The cutoff value for serum CA 19-9 was accepted as 37 U/ml and tumor size and weight were determined by the pathology reports. Dermoid cyst cases whose CA 19-9 level was not measured were excluded from the study. Data were classified by using the SPSS 11.0 statistical package program and Pearson's correlations were made.

## Results

Forty-three patients were included to the study. Mean age at the time of operation was  $32.3 \pm 8.1$ . Mean and median gravida and parity numbers, average tumor diameter, average tumor weight and CA 19-9 levels are shown in Table 1.

Thirty-seven out of the 43 patients (86%) had elevated CA 19-9 levels. Using Pearson's correlation, the average diameter (cm), and weight (g) of the tumor had a strong positive correlation with the level of CA 19-9 ( $p < 0.01$ ).

Thirty-one out of the 43 (72%) cases had a dermoid cyst in the right ovary, nine (21%) in the left ovary, and three (7%) had bilateral dermoid cysts (Table 2). Right predominance was very high among the patients ( $p < 0.05$ ).

CA 19-9 levels were elevated in patients who had bilateral MCTs (3/3). Elevation was observed in 85% of the unilateral dermoid cyst cases (34/40). This rate was

Table 1. — Patient characteristics, size and weight of tumors, and CA 19-9 levels.

	Mean	Median	Std. Deviation	Minimum	Maximum
Age (years)	32.3	32.0	8.1	18	49
Gravida	3.2	3.0	2.0	0	7
Parity	2.5	2.0	1.7	0	7
Average diameter (cm)	7.7	6.6	2.8	5.2	15.1
Weight (g)	196.2	130.0	155.1	40.0	579.0
CA 19-9 (U/ml)	109.1	81.0	91.9	5.2	366.0

Table 2. — Relation of CA 19-9 level and the site of the dermoid cyst.

Laterality of the dermoid cysts	Right ovary	Left ovary	Bilateral	Total
No. of all dermoid cyst cases (%)	31 (72%)	9 (21%)	3 (7%)	43 (100%)
No. of cases with elevated CA 19-9 (%)	27 (87 %)	7 (78 %)	3 (100 %)	37 (86%)

higher in bilateral cases than unilateral ones (100% vs 85%), but the difference was not statistically significant ( $p > 0.05$ ).

Elevation rate of CA 19-9 for right and left side tumors was similar ( $p > 0.05$ ) (Table 2).

## Discussion

Dermoid cysts are the most common ovarian tumor, but there are few reports about tumor markers which are useful in the preoperative diagnosis [1]. Case reports of dermoid cysts of the mediastinum [11-16], adrenal gland [17], greater omentum [19], brain [20], and cervical area [21] with elevated serum or cyst fluid CA 19-9 levels have been published.

In some gynecologic tumors, especially ovarian dermoid cysts, elevated levels of CA 19-9 have been shown in a few trials [1, 8, 21, 22].

The mean age of the patients in the present study was 32.3 years which was similar to the literature [22].

In our study 31 (72%) cases had a dermoid cyst in the right ovary, nine (21%) in the left ovary, and three (7%) had bilateral dermoid cysts. Right predominancy was significantly high in our study ( $p < 0.05$ ). Dede *et al.* [22] found the bilaterality rate to be 27.5% (22/80) which was higher than in our study.

Comerci *et al.* analyzed 517 cases of MCT and reported that the mean tumor size was 6.4 cm [23]. Kikkawa *et al.* reported the mean size of 92 MCTs as 8.8 cm [1]. Dede *et al.* found the mean tumor size of 80 cases to be 7.2 cm [22]. In our study the mean tumor diameter was 7.7 cm.

Kikkawa *et al.* found the mean level of CA 19-9 in ovarian dermoid cysts to be 217.6 U/ml in their trial which included 71 cases [1]. Incec *et al.* reported a case of huge fallopian tube teratoma with elevated CA 19-9 [24]. Kikkawa *et al.* investigated 92 patients with MCT, and found that CA 19-9 was the only marker with the mean level above the cutoff value [1]. The ratio of CA

19-9 elevation among patients was found as 59% (42/71). Kawai *et al.* and Mikuni *et al.* both reported elevation of CA 19-9 in nearly half of their patients [10, 25].

Ito *et al.* measured serum levels of CA 19-9 in 250 patients with MCTs, and they found 31 patients with serum CA 19-9 levels over 101 U/ml [26]. Dede *et al.* found CA 19-9 elevation in 31 out of the 80 patients (38.8%). The mean value of CA 19-9 was 101.2 in their report [22]. In our study the mean level of CA 19-9 was 109.1 and the ratio of the patients with elevated CA 19-9 was 86% which is the highest value reported in the English literature. Our study supports the findings of Dede *et al.* in the similarity of mean CA 19-9 levels, but we found a higher ratio of patients with elevated CA 19-9 which might be related to the geographical and socio-economical differences between the regions where the studies were conducted.

Dede *et al.* [22] found an elevated ratio of CA 19-9 in bilateral cases of 73% (16/22), but we found this ratio to be 100% (3/3). However our sample size was not sufficient enough to comment on this data.

## Conclusion

Being the most common ovarian tumor, mature cystic teratoma is a real problem for women of reproductive age. The preoperative diagnosis of this entity is an important issue and may give some clinical points to the surgeon before the surgery. Our study showed that serological preoperative diagnosis of this disease is possible. We suggest that in addition to ultrasonography and computed tomography, serum CA 19-9 levels could be a useful tumor marker in the diagnosis of dermoid cysts as a supporting diagnostic tool.

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