

Letter to the Editor

The effect of abdominal surgery on serum CA-125 levels

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Dear Editor,

In a recent study, we investigated the relationship between serum CA-125 levels and peritoneal irritation during physical examination [1]. We observed that either abdominal or pelvic examination or transvaginal ultrasonography did not change the levels of CA-125 in the first 24 hours. We concluded that serum CA-125 levels were not affected by short and indirect mechanical pressure and the detected levels before or after these examinations in outpatient clinics did not differ statistically [1].

In this study, we searched for the answer to the question whether abdominal surgery affects the levels of CA-125 or not. Fourteen patients were enrolled in the study (7 males and 7 females), aged 37.8 ± 17.1 years, who were admitted to General Surgery Clinic for cholecystectomy (n:7) and acute appendicitis (n:7). Serum CA-125 levels were determined prior to surgery and at the 6th and 24th hour after surgery and on the postoperative 7th day.

CA-125 was determined by Immulite OM-MA, Diagnostic Products Corporation (DPC, Gwynedd, United Kingdom) which was a solid-phase, chemiluminescent enzyme immunoassay. It was used with the Immulite, DPC automated analyser. Statistical analysis was done by SPSS® statistical software. Data are presented as the means \pm standard deviations. The comparisons were done using the Mann-Whitney U and Kruskal-Wallis tests, $p < 0.05$ was considered as statistically significant.

Two of the important sources of CA-125 are epithelium of the ovary and peritoneum [2]. However, there is also a contribution of the pleura, pericardium, cervix, endometrium, fallopian tube, colon, kidneys, and epithelial cells of the stomach. During peritoneal irritation (hyperstimulation, salpingitis, ruptured ectopic pregnancy, laparotomy), peritoneally derived CA-125 significantly contributes to circulating CA-125 concentrations, giving elevated CA-125 values. The use of the CA-125 serum assay as a single diagnostic tool is restricted by the fact that the antigen CA-125 is produced by normal epithelia of the peritoneum, endometrium and benign ovarian cysts and not only by the ovarian cancer cell. It is now widely accepted that CA-125 is a very sensitive marker for the monitoring of ovarian cancer, but like all other cancer markers it has restricted diagnostic value. Elevated serum CA-125 levels have been demonstrated in a number of benign gynaecologic as well as benign and malignant non-gynaecologic conditions. High serum CA-125 levels may also be encountered in cirrhosis, peritonitis, pancreatitis, endometriosis, uterine leiomyomas, benign ovarian cysts, and in pelvic inflammatory disease other than ovarian tumours [3]. In a recent article, we observed elevated serum CA-125 levels in hemodialysis patients with peritoneal, pleural, or pericardial fluids [4]. In addition, ascites seems to be directly responsible for the elevated serum CA-125 levels in patients with hepatitis [5]. Serum CA-125 levels were reported to be elevated after diagnostic applications such as laparoscopy or laparotomy [2]. Normal serum CA-125 levels before the operation were detected to be elevated postoperatively in 62 to 82% of cases. The highest levels were recorded at the second and fourth hours postoperatively. The elevations of serum CA-125 levels were frequently detected to be more than 35 U/ml. It was also concluded that preoperative normal levels might be reached three months later [6, 7].

In all of the patients in our study group, serum CA-125 levels were found to be lower than 35 U/ml. Mean serum CA-125 levels were 19.06 ± 6.91 U/ml (Table 1). When the results were compared with the age- and sex-matched control group (8.14 ± 4.95 U/ml), there was a significant difference ($p = 0.005$). At the postoperative 6th

Table 1. — Preoperative and the postoperative serum CA-125 levels in patients and the control group.

Control group (U/ml)	Prior to surgery (U/ml)	6 hours after surgery (U/ml)	24 hours after surgery (U/ml)	7 days after surgery (U/ml)
8.14±4.95	19.06±6.91	29.50±7.15	30.20±7.35	10.24±5.26

hour, nine (64.2%) patients had elevated levels of >35 U/ml. The mean serum CA-125 levels were 29.50 ± 7.15 U/ml at the 6th hour postoperatively. These levels were compared with the preoperative values ($p=0.025$) and the control group ($p<0.001$). At the postoperative 24th hour, eight of the nine patients still had elevated levels of >35 U/ml and only one patient had normal value. The mean serum CA-125 levels at the 24th hour was 30.20 ± 7.35 U/ml which was significantly different both from the preoperative levels ($p=0.02$) and the control group ($p<0.001$) but not different from the 6th hour levels ($p>0.05$). Mean serum CA-125 levels on the 7th day postoperatively were 10.24 ± 5.26 U/ml and no statistically significant difference was detected when compared with the control group. All of the elevated levels of serum CA-125 became normal at the 7th day. There was no statistical difference when males were compared with females and the cholecystectomy group was compared with the acute appendicitis group.

In conclusion, serum CA-125 levels were detected to be elevated in patients who underwent abdominal surgery. This elevation was more pronounced at the 24th hour postoperatively and decreased slightly over time and reached normal values by the 7th day. In our previous study, the cause of stable serum CA-125 levels before and after abdominal and pelvic physical examination and transvaginal ultrasonography was probably due to an insufficient peritoneal irritation unlike abdominal surgery. The possible causes of elevated serum CA-125 levels were mainly due to peritoneal irritation in which an increased amount of fluid in the peritoneum or an incision-induced CA-125 production would be the mechanism. As it can give false positive values (>35 U/ml), an early postoperative serum CA-125 value may be misleading. On the other hand, the etiology of preoperative elevated serum CA-125 levels should be clarified. New studies are needed to highlight the pathophysiologic basis of CA-125 and its relation to peritoneal irritation.

References

- [1] Sari R., Buyukberber S., Sevinc A., Ates M., Balat O., Hascalik S., Turk M.: "The effects of abdominal and bimanual pelvic examination and transvaginal ultrasonography on serum CA-125 levels". *Clin. Exp. Obst. & Gyn.*, 2000, 27, 69.
- [2] Bischof P.: "What do we know about the origin of CA-125?". *Eur. J. Obstet. Gynecol. Reprod. Biol.*, 1993, 49, 93.
- [3] Jacobs I., Bast R. C.: "The CA-125 tumor-associated antigen: A review of the literature". *Hum. Reprod.*, 1989, 4, 1.
- [4] Sevinc A., Buyukberber S., Sari R., Kiroglu Y., Turk H. M., Ates M.: "Elevated serum CA-125 levels in hemodialysis patients with peritoneal, pleural, or pericardial fluids". *Gynecol. Oncol.*, 2000, 77(2), 254.
- [5] Sevinc A., Buyukberber S., Sari R.: "Elevated serum CA-125 levels: Hepatitis or Ascites?". *Gynecol. Oncol.*, 2000, 76(1), 141.
- [6] Talbot R. W., Jacobsen G. J., Nagorney D. M., Malkasian G. D., Ritts R. E. Jr.: "Temporary elevation of CA-125 after abdominal surgical treatment for benign disease and cancer". *Surg. Gynecol. Obstet.*, 1989, 168, 407.
- [7] van der Zee A. G., Duk J. M., Aalders J. G., Boontje A. H., ten Hoor K. A., de Bruijn H. W.: "The effect of abdominal surgery on the serum concentration of the tumour-associated antigen CA-125". *Br. J. Obstet. Gynaecol.*, 1990, 97, 934.

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