

Does the copper intrauterine device affect serum cancer antigen 125 levels?

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Summary

Purpose: This study aimed to reveal the effect of the copper IUD, if any, on serum CA-125 levels in patients who use the device as a contraceptive. **Methods:** Blood samples were obtained two times from 20 healthy volunteers before and after IUD insertion, and sera were isolated. The sera, centrifuged at 2000 G and kept at -70°C in a deep freezer until analyzed, were processed for CA-125 levels by the CA-125 kit using VIDAS PC analyzer (Biomérieux, France) and results were compared.

Results: The CA-125 level of the serum obtained from the first blood samples was significantly higher than that of the second sample (24.63 ± 25.40 mIU/ml and 14.44 ± 10.08 mIU/ml, respectively) ($p < 0.05$).

Conclusion: The results of this study indicate that the serum level of CA-125 may be lower in patients using copper IUDs which may be helpful in evaluation of ovarian masses in women in reproductive age.

Key words: CA-125; Copper IUD.

Introduction

In gynecological practice, serum level of the cancer antigen 125 (CA-125) has been extensively used as an aid to indicate whether an ovarian mass is malignant or benign in nature [1, 2]. Studies [3, 4] have suggested that an increase in the level of the serum CA-125 may be used for confirmation of the diagnosis of ovarian cancer in women with pelvic masses. The level may also increase in other non-malignant conditions including endometriosis, ascites, pregnancy, and menstruation. Alternatively, the rate of increase in the CA-125 level differs greatly among the diseases, and the increase is not always seen in every case either.

The intrauterine device (IUD) is widely used all over the world as a reversible contraceptive method in women. Indeed, the United Nations report in 2005 indicated that nearly 13.6% of the women in the world use IUDs as a contraceptive method [5]. Hence, recent reports have documented more and more frequent usage of the more efficient copper IUD [6]. Today, the serum CA-125 level in women, some of whom use copper IUDs as a contraceptive method, is controlled routinely in clinics in order to reveal the nature of an ovarian mass. One study determined reductions in the levels of CA-125 in patients with endometriosis who had a levonorgestrel-releasing intrauterine device inserted [7] which is another contraceptive method used with less frequency. Likewise, this study aims to reveal the effect of the copper IUD, if there is one, on serum CA-125 levels in healthy women of reproductive age who use copper IUDs as a contraceptive method.

Materials and Methods

After approval of the local ethical committee and obtaining written informed consent from participants, this study was conducted on 20 healthy volunteer women in reproductive age who applied for family planning via IUDs at a state family planning center. First, blood samples were obtained from individuals before copper containing IUD (TCu 380 A, SMB Corp., India) insertion just after the physical and gynecological examination on the second or third day of menstruation. Then blood samples were obtained nearly 30 days later on the second or third day of the following menstruation. The sera were acquired immediately at 2000 G and kept at -70°C in a deep freezer until analyzed. The serum levels of CA-125 were determined by an automatic analyzer using a CA-125 kit (VIDAS PC, Biomérieux, France).

Serum levels of CA-125 were analyzed statistically using SPSS 10.0 statistics software program (SPSS Inc., Chicago, IL, USA). The Wilcoxon signed-rank test was applied to determine any statistical significance, $p < 0.05$ was considered statistically significant.

Results

The average age of the women was 27.7 ± 6.42 years. No complication occurred during IUD insertion. The mean CA-125 level of the first blood samples was 24.63 ± 25.40 mIU/ml, and that of the second was 14.44 ± 10.08 mIU/ml. The difference between the two samples regarding the levels of the CA-125 was statistically significant ($p < 0.05$).

Discussion and Conclusion

CA-125 is widely used for the diagnosis and follow-up of tumors of the ovary as a tumor marker, particularly for serous tumors. A report on the detection of malignancy in 106 patients, indeed, documented that serum levels of

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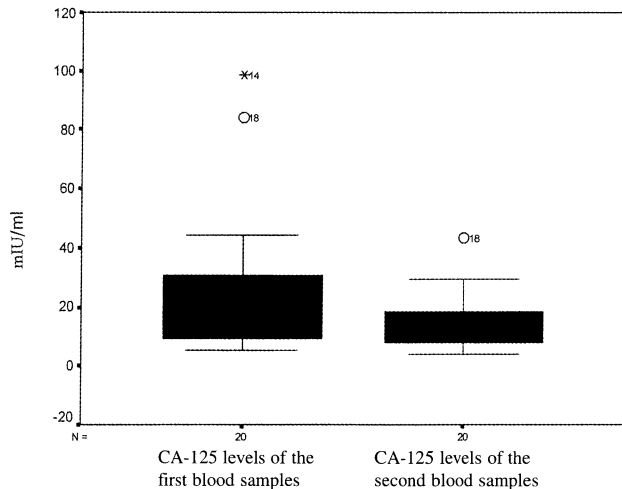


Figure 1. — Levels of serum CA-125 in two periods.

CA-125 increased with a sensitivity of 50%, and a specificity of 69% in the premenopausal period, and had a sensitivity of 78%, and a specificity of 97% in the postmenopausal period [8]. Additionally, the increase in the serum levels of CA-125 has also been determined in other malignant conditions, along with tumors of the ovary, such as cystic struma ovarii and epithelioid sarcoma [9]. Several non-malign diseases have also been reported to be associated with increased CA-125 serum levels including pelvic inflammatory disease, endometriosis, cirrhosis, adnexal torsion, benign ovarian cysts, ectopic pregnancy, ovarian hyperstimulation syndrome, fibroids, chronic renal and heart failure. Moreover, the increase has been indicated in some physiological states like pregnancy and menstruation [3, 4, 10]. Adversely, some studies done on different conditions including a hysterosalpingography procedure [11] and pelvic examination found no increase in the serum levels of CA-125 while one report [7] revealed that the levonorgestrel-releasing intrauterine device lowered the serum levels of CA-125 in patients with endometriosis. This report raises the concern of how another IUD, in this case TCu 380 A, affects or may affect the serum levels of CA-125 in clinically healthy women. Our study found that TCu 380 application significantly decreased the mean level of the serum CA-125 ($p = 0.006$).

The precise mechanism of the decrease in serum CA-125 levels in our study is unclear at this stage. Silva *et al.* [7] have speculated regarding the lowering mechanism of the levonorgestrel-releasing intrauterine device on the serum levels of CA-125 in patients with endometriosis stating that this device heals endometriosis and reduces

endometriotic lesions in size and number, resulting in a decrease in CA-125 levels. Healing also decreases vascular permeability, thereby leading to lower absorption of this component into the bloodstream. Likewise, we suggest that the release of copper ions from the IUD in the uterine cavity may somehow inhibit production, release, or absorption into the blood of CA-125. The exact mechanism of this process is yet to be revealed.

The results of this prospective study revealed a decrease in serum CA-125 levels of healthy reproductive women using copper IUDs, which as we conclude, may be used in the differential diagnosis of ovarian masses in this group of patients.

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