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A case study of assessment of CA-125 levels in the rural population of Kanpur

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Abstract

The aim of this study was to assess the incidence of ovarian cancer in the industrial hub of Uttar Pradesh. A total of 50 samples were collected and estimated for CA-125 by Sandwich Method. CA-125 [Cancer antigen 125 or carbohydrate antigen 125 or Mucin 16] is a high molecular mass glycoprotein recognized by the monoclonal antibody OC 125 and encoded by MUC 16 gene. It contains 24% carbohydrate and it is expressed by epithelial ovarian tumours. CA-125 is the most frequently used biomarker for ovarian cancer detection. The study was done to create awareness among the female industrial workers of the rural population of Kanpur.

Keywords: CA-125, Ovarian cancer, Rural population, Kanpur.

INTRODUCTION

Ovarian cancer has emerged as one of the most common malignancies affecting women in India. In the recent years, it is ranked third in frequency (4.1%) among all cancers in women, with an estimated 2,04,499 new cases occurring in the world. In India, during the period 2004-05, ovarian cancer varied from 1.7% to 8.7% of all female cancers in various urban and rural population based registries [1].

CA-125 is the most frequently used biomarker for ovarian cancer detection [2]. Monitoring CA-125 blood serum levels is also useful for determining how ovarian cancer is responding to treatment and for predicting the patients prognosis after treatment [3,4]. The most common type of ovarian cancer is the epithelial ovarian cancer usually seen in adult women in the age group of 55-64 years.

The risk of ovarian cancer is higher in women who ovulate more. Thus nulliparous are at more risk than multiparous women [5]. Other risk factors include hormone therapy after menopause, fertility medication and obesity [6,7]. A very strong evidence of ovarian cancer is found in women exposed to asbestos industries [8] and perineal use of talcum powders [9].

This study was conducted to find out the incidence of ovarian cancer in this rural population of Kanpur; one of the major industrial hub in the state of Uttar Pradesh.

CASE REPORT

The study was conducted in the multi-speciality tertiary care hospital of Rama Medical College [RMCH], Kanpur in the Department of Biochemistry.

CA-125 test is often ordered to monitor the progression of ovarian cancer. Patients reporting to the O&G dept. of RMCH with chief complaints of bloating, abdominal or pelvic pain, difficulty in eating, fatigue, indigestion, heartburn, constipation, nausea, early satiety and possibly urinary symptoms were investigated for CA-125.

These symptoms were mostly referred symptoms caused by a mass pressing on the other abdomino-pelvic organs [10].

The samples were collected in plain vacutainers and run in Cobas e-411 for estimation of CA-125. The principle of the test was Sandwich ELISA method. Levels more than 35 U/ml were identified to be elevated levels. A total number of 50 blood samples came to Biochemistry lab for estimation of CA-125 and among them; 15 people had significant level of >35U/ml.

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This showed 30% of cases to be positive for Ca-125. This assay is indicated as an aid in the detection of residual or recurrent ovarian carcinoma.

DISCUSSION

Ovarian cancer is one of the most common cancer affecting women in India and worldwide. Among all the cancers, ovarian cancer ranks 7th in number and 8th most common cause of death from cancer in women. In 2012, ovarian cancer occurred in 2,39,000 cases and resulted in 1,52,000 deaths worldwide [5]. The most common type of ovarian cancer is the high grade serous carcinoma. Less common type include germ cell tumours and sex cord stromal tumors .These tumors are believed to start in the cells covering the ovaries, though some may form from the fallopian tubes [11].

The risk of ovarian cancer is higher in the people who ovulate more. Other risk factors include postmenopausal hormone therapy, fertility medication and obesity [1, 6]. The factors that decrease the risk include hormonal birth control, tubal ligation and breast feeding [6]. The typical symptoms of ovarian cancer include bloating, abdominal or pelvic pain, fatigue, indigestion, heartburn, constipation, nausea and early satiety. These symptoms usuallyoccur due to mass pressing on the other abdomino-pelvic organ or from peristalsis [10].

Women with gene mutation at BRCA1 or BRCA2 have about 50% chance of developing the disease. One of the latest risk factor in ovarian cancer is exposure to asbestos and asbestos related particles like perineal use of talc which contains formulations of asbesti form or talc mineral fibres [12-16]. Occupational exposure to asbestos also plays a major role in the development of ovarian cancer. The pathophysiological mechanism behind this correlation is the persistent presence of asbestos fibres in the ovarian tissue which cause chronic inflammation [17]. Alternatively blood borne or lymph borne fibres could also penetrate to the ovary through the mesothelium causing inflammation.

Diagnosis of ovarian cancer starts with pelvic examination, a trans-vaginal ultrasonography, a complete blood count, serum electrolytes and a blood test for a marker molecule CA125 [10]. All the investigations were done and CA125 levels where analyzed in the department of biochemistry.

Biochemically, CA125 [Cancer antigen 125 or carbohydrate antigen 125 or Mucin 16] is a high molecular mass glycoprotein recognized by the monoclonal antibody OC 125 and encoded by MUC 16 gene [18,19]. It contains 24% carbohydrate and it is expressed by epithelial ovarian tumors [20].

90% of women with advanced ovarian cancer have elevated levels of CA-125 making CA-125 a useful tool for detecting ovarian cancer [21]. Monitoring CA-125 blood serum levels is also useful for determining how ovarian cancer is responding to treatment and for predicting a patients prognosis after treatment [22,23].

In a healthy population, the upper limit of CA125 level is 35 IU/L. A pre-operative value >65 U/ml suggests poor prognosis. CA125 level may be also elevated in endometrial, fallopian tubes, pancreatic, lung, breast and colorectal tumors [24]. In ovarian carcinoma CA125 is elevated in 50% patients with stage I disease, 90% with stage II & more than 90% in stage III & IV. Thus emphasizing that CA125 is a strong tumor marker for ovarian carcinoma.

This study was conducted in the suburban areas of Kanpur, the major industrial hub of the state of Uttar Pradesh. In our study population 30% women had very high levels of CA125 establishing the diagnosis of ovarian cancer. Although a very low percentage, this study may be of importance due to its geographical distribution. The populations in this region are mostly factory workers who are exposed to industrial pollutants, more commonly asbestos. Perineal use of talc is also quite common in this population. Number of studies support the fact of exposure of asbestos to be a risk factor for ovarian cancer. Perineal use of talc contain asbestiform or talc mineral fibres which has also been associated with ovarian cancer in a number of studies.

CONCLUSION

This study was thus done to create awareness among the female industrial workers, to take special precautionary measures while in such industries and on the prohibition of use of talcum powders in the perineal regions. The present study was a pilot study but still showed good results. Further study for a longer period and larger number of samples should be done.

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