The Biological Behaviour of CEA During Pregnancy

Thesis
Submitted In Partial Fulfillment of
Master Degree In "Obstetrics and Gynecology"

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1993

Acknowledgment

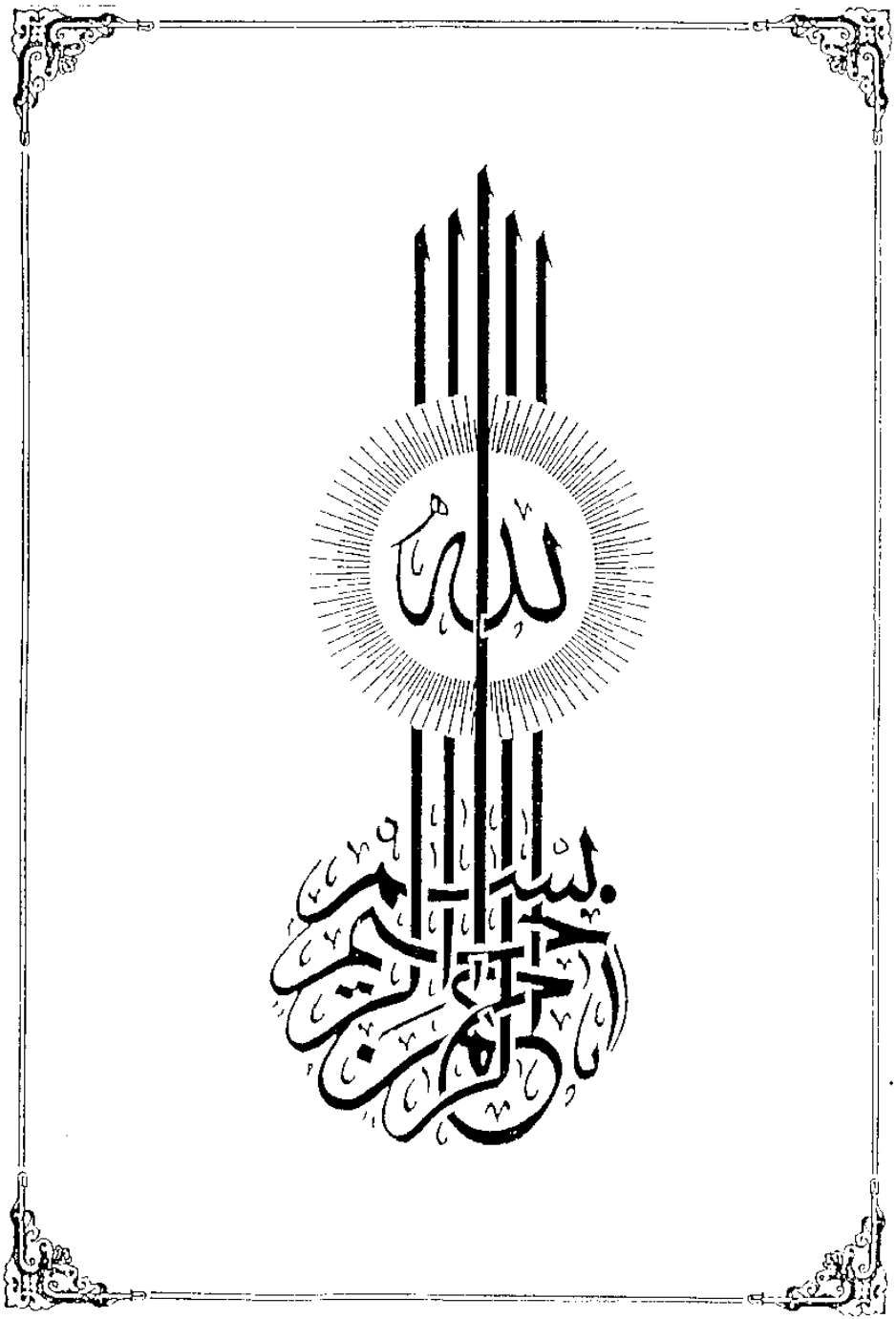
*Thanks for **God** who offered me the ability to perform the work of this thesis.*

Sincere thanks and gratitude are aimed to acknowledge all those who helped this thesis to attain its present form.

*I would like to express my sincere appreciation and my deepest gratitude to **Professor Dr. Saied M. Tohamy,** Professor of Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University, for his fatherly guidance, kind supervision, continuous help and encouragement which facilitated the ability to perform this thesis.*

*Also, I want to express my grateful thanks to **Professor Dr. Ali Khalifa Ali,** Professor of Biochemistry, Faculty of Medicine, Ain Shams University, for his expertise supervision and helpful advice during the work of this thesis.*

*I would like to express my cardinal thanks and my sincere gratitude to **Dr. Adel M. Sabbagh,** Assistant Professor of Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University, for his kind supervision and fruitful advice .*



*Also, I want to express my profond gratitude to Dr. **Moustafa El Rasd**, Assistant professor of Biochemistry, Faculty of Medicine, Ain Shams University, for his valuable cooperation and kind help in laboratory procedures and supervision which facilitated the performance of this work.*

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Introduction

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Introduction

The search for sensitive and specific tumor markers has frequently involved the clinical laboratory.

Early detection of tumors and appropriate therapeutic intervention could ideally hinge on the measurement of unique markers of specific neoplastic processes.

However, most of the currently used laboratory tests suffer from low sensitivity or low specificity and frequently both ***(Drummond, et al., 1982)***.

Thus it has been increasingly evident that a battery of markers appropriately chosen for a particular tumor, rather than a single marker may be more useful in the diagnosis and monitoring of cancer ***(Drahovsky, et al., 1981)***.

In ***1965, Gold and Freedman*** in Canada discovered carcino-embryonic Antigen (CEA) and they suggested that CEA was produced only by colon cancer cells and fetal colonic mucosa.

In *1972*, ***Reynosa, et al.,*** reported elevation of CEA levels in patients with other types of cancers including those of the female genital tract using radioimmunoassay method; developed by ***Zur Hassen, et al., (1977).***

CEA is still, probably the most useful non specific tumor indicator substance available and it has a definite role in follow up and surveillance (***Mackay and Khoo, 1981***).

CEA was also found to be elevated in a group of non neoplastic conditions e.g. obesity, osteoarthritis, hypertension, heart disease healthy smokers etc. ... ***(Tormey et al., 1982)***.

So long as CEA may rise in conditions not related to neoplasia it is reasonable to suspect its possible rise in non neoplastic conditions representing a possible precancereous lesion.

There are many reports discussing the biological behaviour of CEA among patients with non malignant gynecologic disorders including endometriosis and during menses ***(Donald, et al., 1987)***.

Other reports discussed the biological behaviour of CEA among patients with pelvic inflammatory disease ***(Halila, et al., 1986)***.

Aim Of The Work

Aim of Work:

This study will deal with the estimation of the serum level of CEA during different stages of pregnancy. The aim is to investigate the biological behaviour of this marker during pregnancy.

The results may be of help to assess female patients with elevated CEA level due to various malignant and non malignant lesion.

Review Of Literature

Tumor Markers

Definition:

Tumor Markers are substances present in serum or plasma, produced by the malignant tissue in response to the presence of a tumor. They may be altered in form or amount and thus indirectly allow laboratory detection.

During past years a great deal of information has been accumulated regarding sensitivity and specificity of tumor markers, their relation to tumor burden and their predictive value and usefulness in leading to more effective treatment.

At the present time, the limited ability to detect small tumor masses represents one of the most formidable barriers to progress in cancer treatment. Fortunately tumor cells are known to express cytoplasmic cell surface substances or secreted products that are sufficiently different in quantity or quality from products of normal cells to act as tumor markers; most of which consist of excessive production of a normal product or production of a material normally produced during development, but not present at all or only in very low quantities in adult ***(Benjamini, et al., 1982)***.

According to ***Mackay, et al. (1981)*** the term tumor Marker means any identifiable change in a body component that is an indication of presence of cancer.

A tumor marker is defined also as any substance present in body fluid which reflects either quantitatively or qualitatively the presence of malignant disease ***(Tormey, et al., 1982)***.

In a more specific meaning tumor markers are components which occur in cancer tissue as well as in the serum of cancer patients where they can be detected by different techniques in either sites ***(Kalvins, 1985)*** Cancer is associated with abnormalities in gene regulation expressed in multiple molecules at the cell surface membranes, glycolipids are one of these molecules; these glycolipid tumor marker are hardly immunogenic to the host and are shared with various types of tumors, they are therefore distinctive from classical tumor associated antigen and the term tumor is more appropriate ***(Hakamori and Kannagi, 1983)***.

According to ***Bates and Lango, et al., (1985)***, the ideal tumor marker should fulfill certain criteria which are:

1. The marker should be produced by the tumor cells and be readily detectable in body fluids.
2. It should be detected in the earliest growth phase of the tumor allowing screening of asymptomatic individuals.
3. It should not be present in health or benign diseases.
4. It should indicate not only the presence of cancer but also its site of origin.
5. It should be present frequently enough in the development of malignancy to be used in screening for that cancer.

6. The quantity of the tumor marker should directly reflect the bulk of malignancy and be detectable even when there is no clinical evidence of the tumor.
7. The level of the ideal marker should correlate with the results of anti-cancer therapy.
8. The marker assay should be inexpensive and readily acceptable to the individual.

However, no marker described to-date meets all of these criteria ***(Bates and Lango 1985)***. There are multiple biological factors which may influence the level of a particular tumor marker in any body fluid:

1. Number of tumor cells present and the kinetics of cancer cell proliferation and death ***(Bates and Lango 1985)***.

2. Proportion of tumor cells synthesizing the marker and the synthetic rate per cell. Only certain cell within a tumor may make a marker and production may vary with the phase in the cell cycle and with the stage of differentiation of the cell ***(Drummond and Silverman, 1982)***.

3. Location of the tumor marker within the tumor cell and the mechanism for release from cells and entry into circulation. Some tumor markers are cell membrane constituents or secretory products. Other marker may be intracellular constituents which would only be released when tumor cells lose viability ***(Mackay, et al., 1981)***.
4. The half life of the marker in the circulation can vary considerably depending on the size and nature of the substance and the rate of

marker catabolism and excretion by the host and the specific interactions between cancer cells and normal tissues ***(Tormay et al., 1982)***.

Sugawara T, et al., 1991, found that there is a change in serum levels of gynecological tumour markers throughout the period from early gestation to puerperium. Eight tumour markers were measured: Cancer antigen 125 (CA 125), Tissue polypeptide antigen (TPA), Squamous cell carcinoma antigen (SCC), Alpha fetoprotein (AFP), haptaglobin Ferritin, cancer antigen (CA 19-9) and carcinoembryonic (CEA) in 17 healthy women with normal course of pregnancy delivery and puerperium and obtained the following results:

(1) Profiles of change in serum levels of CA125, SCC, haptoglobin and Ferritin were similar during pregnancy, with those levels being the highest at 4 - 15 weeks of gestation and declining gradually from 16 to 27 weeks. Serum levels of these four markers decrease significantly ($P<0.01$) at 16 to 27 weeks and 28 - 40 weeks.

(2) A significant ($P<0.01$) increase in CA125 and SCC was observed 2 hours after delivery compared with the levels in the first stage of delivery. These two markers decreased to the normal range after the fifth day postpartum.

(3) Serum TPA decreased significantly ($P<0.05$) at 16 - 27 weeks of gestation comparing with those of 4 - 15 weeks. Serum CA 19 - 9