

## Significance of Alpha Fetoprotein Levels for Fetal Growth and Tumor Monitoring

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### Abstract

This study investigates the level of alpha fetoprotein (AFP) in female blood Serum living in Islamabad and Rawalpindi areas. Retrospective study will be taken as well as see how the diagnosis test will be taken. Data was collected from national institute of health Islamabad NIH. After collection data was arranged in tabulated form and will be subjected to appropriate statistical analysis. Level of AFP in female used as fetal growth marker and as tumor marker. Serum was tested by using Elecsys2010, (Roche diagnostics) that is an automatic diagnostic machine. This study will help in learning diagnosis of cancer and fetal growth with help of tumor marker AFP. It was concluded that AFP is an intermediate marker for abdominal and pelvic tumor detection. The study also suggested a relation between the fetal development and maternal serum AFP level.

**Keywords:** Alpha fetoprotein; Fetal growth; Tumor

### Introduction

Cancer is a disease in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread through the blood stream and lymphatic system to other parts of the body. There are several main types of cancer; Carcinoma, Sarcoma, Leukemia, Lymphoma and multiple myeloma. Tumor markers are measurable biochemical secreted by the neoplastic cells in the body. They are either produced by tumor cells (tumor-derived) or by the body in response to tumor cells (tumor-associated). They can be detected in circulation, urine or body fluids or on and within the tumor cells. The tumor markers are macromolecules whose appearances and changes in concentration are related in a certain way to the genesis and growth of the tumors in the individuals. An affectivity criterion of tumour marker is their specificity and sensitivity. AFP is a glycoprotein produced in high amounts by fetal tissue and is elevated during pregnancy. It is most widely used as a marker for hepatocellular carcinoma, testicular cancer and ovarian cancer. In adults having elevated serum AFP levels, the malignant diseases requiring differential diagnosis include liver cancer, germ cell tumors and metastatic lung cancer [1-3]. Seventy percent of people with liver cancer have increased AFP levels. AFP levels indicate the extent of cancer. AFP levels >400 ng/ml should strongly confirm the presence of HCC by a tissue diagnosis [4]. AFP major foetal serum protein, resembles albumin, exists in a number of isoforms which can be separated by their differential binding to lecithin. Measurement of maternal serum and amniotic fluid levels play an important role in the screening for fetal growth monitoring. After birth AFP usually falls, within 8 to 12 months of delivery to a very low concentration of 10 mcg/ml and persists at this low level throughout life. In the fetus, the production and secretion of AFP into the serum begins with the differentiation of the fetal liver. Early in gestation the yolk sac and the mucosa of the gastrointestinal tract synthesize AFP, but by the eighth week the liver surpasses the yolk sac in size and becomes the major site of AFP synthesis [5-7]. This study will aim at following objectives:

- AFP as a tumor marker in female and
- As fetal growth monitoring

### Methods

Data was collected from national institute of health Islamabad

NIH. After collection data was arranged in tabulated form and will be subjected to appropriate statistical analysis. Level of AFP in female used as fetal growth marker and as a tumor marker, serum was tested by using Elecsys2010, (Roche diagnostics, Indiana, United states) that is an automatic diagnostic machine.

### Results

One hundred and eleven blood samples of patients being evaluated for abdominal and pelvic tumor, through serum alpha fetoprotein analysis, were received in the National Institute of Health Islamabad (NIH) from 2013 to 2016. Seventy-nine (71%) individuals had normal (<8.6 ng/ml) and thirty-two (28.8%) individuals exhibited pathological levels. Z-Test was applied to analyze the data, and differences in the AFP levels were non-significant ( $p>0.05$ ). It can be concluded that AFP is an intermediate marker for abdominal and pelvic tumor detection. A high value of standard deviation (SD) for pathological group indicated that AFP levels were scattered widely about the mean, and since levels of normal group were close to the mean, they had a low SD. As a fetal growth monitor, AFP levels in the serum of twenty-six pregnant females was analyzed in relation to the fetal age, and a positive correlation ( $p<0.01$ ) was found between the two variables, suggesting a relation between the fetal development and maternal serum AFP level.

### Discussion

AFP-producing lung cancer was first reported by Corlin [8]. AFP has been reported to account for about 2% of all lung cancers [9]. Adenocarcinoma and large-cell carcinoma account for nearly all cases of AFP-producing lung cancer [10]. Alpha-fetoprotein (AFP) is a

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serum glycoprotein produced at high levels during fetal life by the liver and the visceral endoderm of the yolk sac and at lower levels by the developing gastrointestinal tract [11,12]. AFP expressed by the embryo is transferred to the maternal blood circulation. Abnormal levels of embryonic AFP in the maternal serum are indicative of spina bifida or Down's syndrome in the fetus [13,14]. The synthesis of AFP decreases dramatically after birth, and only scarce amounts are detected in the adult [12]. In normal pregnancy, serum AFP concentration is affected by gestational age and maternal characteristics, including maternal weight, racial origin and cigarette smoking [15-21]. Because AFP is synthesized during the cell cycle G1 and S phases, it has been hypothesized that it affects cell growth [22,23] as our study indicates a positive correlation between serum alpha protein and fetal growth. Because of its high level of expression during embryonic development, AFP has been assumed to be essential for fetal development.

## Conclusion

AFP is the major serum protein in the embryonic stage and in the early fetal stage. Measurement of serum AFP may be useful in screening for aneuploidies, neural tube defects and normal fetal growth. However alpha fetoprotein plays an intermediate role as a tumor marker. Further studies need to be done on this issue.

## Conflict of Interest

There is no conflict of interest.

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