

**Significance of serum heat stable alkaline phosphatase as a marker in lung cancer**

Received : 9\6\2013

Accepted : 26\9\2013

**Jasim Mohammed H. Al-jassani**  
**Technical institutes \ university al-kufa**  
**Alggsm @yahoo.com**

**Abstract:**

The objective of this study is the evaluation of serum levels of heat stable alkaline phosphatase(HSAP) as marker in lung cancer. The study include 44 lung cancer patients with and without metastases and 30 matched healthy individuals. It has been found a significant elevation ( $p<0.001$ ) in patients with metastase and( $p<0.01$ ) in patients without metastases for biomarker, in sera of patients in comparison to the health subjects. A decrease in the levels of the biomarker was apparently significant after removal of the malignant tumor. However multiple post-operative determinat of HSAP showed continuing elevation of the biomarker above the normal value in patients who developed metastases. The results indicate that the HSAP can be used as a marker in the detection and prediction of metastases in lung cancer.

**Keyword: HSAP , lung cancer**

**Introduction**

Three different anti-type of human HSAP, one from placenta,Second from liver and third from other tissues like bones, neutrophils, kidney and intestine are described (1) in patients with bronchogenic carcinoma. The properties of this isoenzyme in patients' serum were indistinguished form the isoenzyme derived from human placenta able wich is found in the serum of pregnant woman during the third trimester(2). It is a non-specific once-developmental marker(3), and has shown some promise as a tumor market for patients with cancer(2). Elevated serum levels of HSAP are reported in various malignancies(4,5,6). The present investigation is to measure HSAP lavalns in sera of lung cancer patients and compare with age matched controls to assess their efficacy as malignancy.

**Materials and methods:**

44 patients were suffering from lung cancer and 30 age matched healthy controls studied. All patients were admitted for treatment to AL-SADER hospital in AL-Najaf and Baghdad lung cancer patients were treated by surgery and clinically stage according to the gewall-marshall-strong method(7,8).

**Specimens collected:**

Prior to administration of any treatment of patients, venous blood samples (5 ml) were collected. The sera kept at -20°C till analyzed. 14 followed up to 18 months post surgery to examine whether they had developed any metastases. To assess the efficacy of the markers during follow up were compared with the patient pretreatment levels.

**Determination of heat stable alkaline phosphatase :**

The protocol assay was performed after the complete inactivation of all ALP isoenzymes by heating the sample for 15 min, at 55°C in a water bath. Immediately after incubation, serum was cooled at ice-temperature. The activity of alkaline phosphatase of heat sample was measured using p-nitrophenyl phosphate as substrate. Liberated p-nitrophenol was measured per Bessey et al (9).

**Statistical analysis:**

The results were analysed statistically using student's test (for comparison of different groups with controls). when  $P \leq 0.05$  was the difference between the two categories considered significant.

**Results:**

The result of serum HSAP are summarized in table (1) the HSAP level ranged between 0.00-0.36 unit/ml with a mean value of 0.178 units/ml in control group and 0.11-1.80 units/ml with a mean value of 0.495 units/ml in patients without metastases and 1.9-3.1 units/ml with a mean value of 1.1 units/ml in patients with metastases.

The elevation in the biochemical marker were statistically significant ( $p < 0.001$ ). The variations in the levels of the biomarker during the period of follow up (18 month) were demonstrated in Fig -1-. A decrease in the levels of the biomarker was apparently significant after the removal of the malignant tumors.

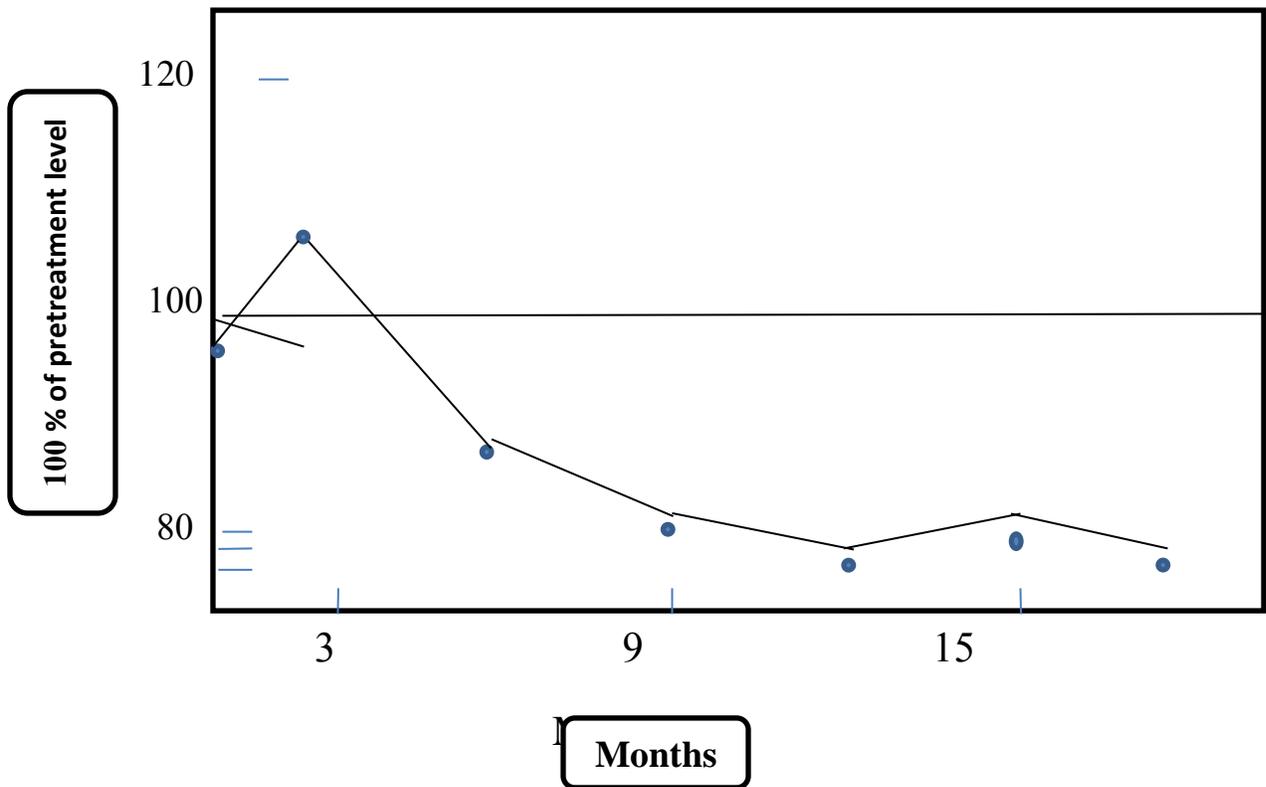
**Discussion:**

Heat treatment method is simplest and the most effective to differentiate HSAP from the other isoenzymes. The biochemical, electrophoretic of HSAP in the cancer cells and also in the serum of patients with bronchogenic carcinoma (10). Very few reports are available on HSAP levels in lung cancer patients. The present study has revealed statistically significant elevated levels ( $p < 0.001$ ) of HSAP in lung cancer patients. The increased levels of HSAP are also being demonstrated in different types of malignancies indicators for lung cancer.

After surgery, lung cancer patients were followed up for 18 months. I was able to follow only 14 patients for the total period because of the irregular visits to the hospital. Considering their pretreatment levels as base line, elevations in the values of HSAP were evident earlier than clinical manifestations of recurrence. These elevations indicating that persistent growth of malignant cells were taken place. The present study thus suggests that the measurement of the marker may be useful diagnosis of lung cancer.

**Table: serum heat stable alkaline phosphatas levels in control and lung cancer patients**

	No.of individuals studied	Range	Mean	+SD	Statinal Significate
Hsap(u/l) Healthy controls	30	0.00-0.36	0.178	0.0846	P<0.01
Lung cancer patients without metastases	24	0.11-1.80	0.495	0.495	
Lung cancer patients with metastases	20	1.9-3.1	1.1	2.1	P<0.001



**Fig-A- Decrease in the levels of the biomarker after the malignant tumors**

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تقييم انزيم الفوسفاتيز القاعدي المستقر حرارياً في المصل كمؤشر في سرطان  
الرئة

تاريخ القبول: 2013\9\26

تاريخ الاستلام: 2013\6\9

جاسم محمد حسن الجصاني

المعهد التقني/كوفة

Alggsm@yahoo.com

الخلاصة:

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ان الهدف من هذه الدراسة هو تقييم مستوى انزيم الفوسفاتيز القاعدي المستقر حرارياً (HSAP) كمؤشر في سرطان الرئة تضمنت الدراسة (44) مصاب بسرطان الرئة الموقعي والمنتشر و(30) من غير المصابين . وجد احصائياً ( $P<0.001$ ) للمصابين في الحالة المنتشرة و ( $P<0.01$ ) لغير المنتشر بمقارنة مصول المصابين بالأصحاء. النقصان في مستوى المؤشر الحيوي ظهر بعد ازالة الأورام. كما وجد ان (HSAP) سوف يرتفع كمؤشر حيوي فوق القيمة الطبيعية في حالة ازدياد الانتشار. ان النتائج اظهرت بإمكانية استخدام (HSAP) كمؤشر لأستئصال او انتشار الأورام السرطانية في الرئة.

الكلمات المفتاحية : انزيم الفوسفاتيز القاعدي ، سرطان الرئة .