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# Study of some liver function tests in patients with breast carcinoma during chemotherapy treatment at oncology center in sebha city

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**Abstract** Breast carcinoma is the most common invasive carcinoma in all women worldwide, and it is also the leading cause of women dying in developing countries. This study aims to evaluate the effect of chemotherapy treatment effect on liver function tests in Libyan breast carcinoma patients. In this study, 40 cases of which 30 are in various stages of breast carcinoma (28 female and 2 male) and the rest without carcinoma (group control) were selected from Oncology Centre in Sebha city. Liver function tests including; total bilirubin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) activities were performed using the spectrophotometric technique. The cases were grouped according to their age (30 to 70 years, with an average age of 50 to 40 years). The mean values of AST, ALT, alkaline phosphatase and total bilirubin in breast carcinoma patients during chemotherapy treatment were 32.1 ± 13.6 U/L, 11.9 ±7.21 U/L, 631 ± 54.3 U/L, 2.34 ± 1.73 mg/dl, respectively. These values were compared with those for group control, and no significant statically differences observed. In conclusion, the present study suggested that liver function tests of breast carcinoma patients during their chemotherapy treatment might be not an acceptable biochemical parameter for diagnosis and monitoring breast carcinoma.
**Key words:** breast carcinoma, liver, Chemotherapy, enzyme, serum.

# دراسة بعض اختبارات وظائف الكبد للمرضى مع سرطان الثدي اثناء العلاج الكيماوي في مركزعلاج الأورام بمدينة سبها

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**الملخص** سرطان الثدي هو أكثر انواع السرطانات الغازية شيوعا بين جميع النساء في جميع انحاء العالم، كما انه المسبب الرئيسي للوفاة بالسرطان بين النساء في البلدان النامية.هدفت هذه الدراسة الحالية لتحديد اختبارات وظائف الكبد في مصل مرضى سرطان الثدي الليبين اثناء أحد العلاج الكيماوي. 40 حالة؛ 30 حالة بمراحل مختلفة من سرطان الثدي( 2 ذكور و 28 انثى) و 10 حالات من الاصحاء (غير مصابين بسرطان الثدي) استخدمت كمجموعة ضابطة من مركز علاج الاورام في مدينة سبها. تم قياس البيلروبين الكلي و نشاط الانزيمات,ALT, AST و ALP لمرضى سرطان الثدي الليبين كمؤشرات على وظيفة الكبد بواسطة جهاز الطيف الضوئي 40 40. كان متوسط عمر مرضى سرطان الثدي 50.40 سنة، ومعدل عمر من 30 إلى 70 سنة. كنت نتائج المتوسط الحسلبي والانحراف المعياري لانزيم GOT، GPT، ALP و البيلروبين الكلي هي 13.6 U/L ± 32.1 ,7.21 U/L ±11.9 ,54.3 U/L ± 631 و 1.73 ± 2.34 mg/dl على التوالي اثناء اخد العلاج الكيماوي لمرضى سرطان الثدي و تم مقارنتها مع القيم المتوسطة والانحراف المعياري لانزيم ALT, GOT ، ALP و البيلروبين الكلي للمجموعة الضابطة.عدم وجود فروق معنوية في جميع اختبارات وظائف الكبد بين مجموعة مرضى سرطان الثدي و المجموعة الضابطة. في الخلاصة ، هده الدراسة الحالية تشير الي ان اختبارات وظائف الكبد لمرضى سرطان الثدي الدين خضعوا للعلاج الكيماوي ، قد لا تكون دات دلالة كيميائية حيوية مقبولة لتشخيص سرطان الثدي ومراقبته اثناء العلاج الكيماوي.

**الكلمات المفتاحية:** سرطان الثدي، الكبد، العلاج الكيماوي، انزيم، مصل.

## Introduction

Breast carcinoma is one of the prevalent diseases and most common malignancy tumours after lung carcinoma and the highest cause of death in women worldwide [1]. In 2012, approximately1.7 million new carcinoma cases were diagnosed and 522,000 deaths were recorded [2]. According to the world health organization (WHO), approximately 50% of the carcinoma of breast patients will develop distant metastasis [3]. Carcinoma of breast with metastatic diseasewill have liver involvement at some point more than half of all carcinoma of breast patients [4].

Chemotherapy is the most widely used as an effective treatment in most various types of malignancies [5]. By this treatment, the cancerous cells are destroyed. However,

some normal cells may also get damaged owing to their sensitivities to this type of treatment. Besides, some carcinoma treatments may also interfere with blood cells production in the body [6]. Patients receiving chemotherapy have relatively good overall prognoses, with many surviving for a median of 13 months [7].

During chemotherapy treatment, all biochemistry profiles of blood are routinely performed along with other breast carcinoma treatments to check the chemicals that released or produced from body tissues during the breakdown (metabolism) of certain substances [8];[9]. The blood chemistry analysis provides valuable information about the function of the kidneys, liver and other organs.

The abnormal results of blood chemistry also suggest the spread of breast carcinoma to the bone, kidney or liver [10];[11]. The Liver function tests are mainly based on bilirubin and enzymatic level of aspartate aminotransferase (AST), alanine aminotransferase (ALT) and alkaline phosphatase (ALP) [12] and [13]. Many several studies about liver functions in carcinoma of breast are mainly in metastasis and chemotherapy [14].

To the best for our knowledge, there is no report on biochemical blood profiles of breast carcinoma patients at oncology centres in Libya [15]. Therefore, the main aim of the present study is to perform liver function tests to analyze the liver enzymes levels (AST, ALT and ALP) and total bilirubin in Libyan breast carcinoma patients undergoing chemotherapy treatment.

**Materials and Methods**

**Collection of blood samples**

This study was carried out at biotechnology department, Faculty of Science, Sebha University and the Oncology Centre, branch of Sebha during the period from October 2019 to December 2019. Patients were informed about the study using a questionnaire to collect data.

In this study, 40 cases; 30 cases with various stages of breast carcinoma and 10 cases without breast carcinoma were selected from Oncology Centre in Sebha city to study variations level of liver function in Libyan breast carcinoma patients. The cases were divided into two groups; group A includes 30 breast carcinoma patients who were during chemotherapy treatment. Group B, a group control, included 10 people without breast carcinoma.

For biochemical analyses blood specimen were collected in to test tubes without anticoagulant from both groups A and B and were centrifuged at 4500 rpm for 5 min; the serum was collected and kept at – 20°Cuntil analysis. Serum contents of Total bilirubin and the activities of the enzymes alanine aminotransferase (ALT), aspartate aminotransferase(AST), and alkaline phosphatase (ALP) were measured by photometer4040 following the procedure defined in the commercial test kits (*Fortress Diagnostic, France*).

**Data Statistical Analysis**

For statistical analysis, the tests were carried out many times, and the results were reported as a mean value ± SD. These results were applied to analyse the differences between the mean value ± SD using Microsoft Excel Windows 7. Critical P-value was considered statistically significant at $p < 0.05$ [16].

**Results and Discussion**

Breast cancer becomes the mostlethal carcinoma of varioustypes in patients [17] and the second common malignancyfor female carcinoma in the world. The probability, breast carcinoma has a clear tendency to systemicspread which increases with lymph node metastasis tumour size for different stages of the malignancy tumours [7].

As known, chemotherapy treatment for breast carcinoma may result in increasing or decreasing the level of biochemical components of blood and hence affecting the organ system [18]. However, the liver function test was used to screen liver infection, to monitor disease progression and possible side effects of medication of Breast carcinoma patients when used chemotherapy [19].

The current study focused on the determination of serum biochemical profile like tests of liver function in breast carcinoma undergoing chemotherapy treatment. As shown in Table (1), the obtained results revealed that the prevalences of breast carcinoma patients according to gender were 6.66 % in male and 93.33 % in female in group A. These results are similar to those reported by others. for example, Akinsegun et al., (2013) [20]. found out that 1% of breast cancer was in males. In other studies, Gomez-Raposo et al. (2010) [21]. and Oluwole et al. (1987) [22]. reported higher prevalence among males (3.9 %) of breast cancer male population in Nigeria and also Korde et al. (2010) [23]. reported 98% female prevalence and only 2% of males.

**Table 1: Prevalence of breast carcinoma according to gender in this study.**

| Gender | Group A : Carcinoma of Breast | | Group B: Control | |
|---|---|---|---|---|
| | No of cases | Prevalence(%) | No. of cases | Prevalence (%) |
| **Male** | 2 | 6.66 % | 3 | 30 % |
| **Female** | 28 | 93.33 % | 7 | 70 % |
| **Total** | 30 | 100 % | 10 | 100 % |

Table (1) shows the obtained results of Libyan breast carcinoma patients undergoing chemotherapy treatment according to their age (40-50 and 30-70 years). As shown, the biochemical parameter results were in good agreement with those reported by others. Akinsegun et al. (2013) [20] found out that 79% of patients were in the age between 31-60 years, 2% aged between 21-30 years and 19% were older than 61 years and the mean age was 50.38±12.19 years. In another study, Ihekwaba (1992) [24] found out that 70% of breast cancers patients in Nigeria aged between 26-50 years with a peak age in the range of 36-45 years.

of the group control was estimated be 19.1 ± 13.5 U/L, while that of carcinoma of breast patients (during chemotherapy treatment) was about 32.1 ± 13.6 which is within the normal reference range (5-40 U/L). No significant statistical difference (p = 0.995) in the AST activity between breast carcinoma patients and group control was observed (Table.2 and Figure.1). Besides, the mean value of glutamate pyruvate transaminase (ALT) level for carcinoma of breast patients during chemotherapy treatment was about 11.9 ±7.21 U/L for which is within the normal reference range (7-56 U/L), while that for group control was 5.47 ± 11.20U/L. No significant statistical difference (p = 0.781) in the ALT activity between breast carcinoma patients and group control was observed (Table.2 and Figure.2).

**Table 2: levels of serum liver function tests in carcinoma of breast group and group of control in this study.**

| **Parameters** | **Group A** Breast Carcinoma Mean ±S.D N=30 | **Group B** Control Mean ±S.D N=10 | **t- test p - value** |
|---|---|---|---|
| **Age** | 50.40±9.70 | 31.20±7.02 | P=0.000 |
| **AST U/L** | 32.1 ± 13.6 | 19.1 ± 13.5 | P=0.995 |
| **ALT U/L** | 7.21 ± 11.9 | 5.47 ± 11.20 | P=0.781 |
| **ALP U/L** | 630 ± 54.3 | 129 ± 73 | P=0.545 |
| **Total bilirubin mg/dl** | 2.34 ± 1.73 | 0.644 ± 0.48 | P=0.106 |

Significant at P< 0.05values are given as Mean ± S.D.

These results are similar to these reported others (Chauhan et al., 2016 [18] , Devi et al., 2015 [25], Damodar et al., 2014 [26] and Thangaraju et al., 1998) [13] in which the levels of AST and ALT were within the normal range.

As shown in Table.2 and Figure 3, the level of alkaline phosphatase in carcinoma patients during chemotherapy treatment was about 631 ± 54.3 U/L which is higher than the normal range (44-147 IU/L), while that of group control was 129 ± 73 U/L (with the normal range). Besides, no significant statistical difference (p=0.545) in the ALP activity between breast carcinoma and control group was observed. These results are in good agreement with those reported by other research groups (Chauhan et al., 2016 [18], Ramaswamy et al., 2000 [27] and Mishra et al., 2004 [28] ). Progressive increase in ALP activity in breast carcinoma patients is an indication of metastasis.

However, no significant difference in ALP levels in non-metastatic breast carcinoma patients was also observed by others (Stieber et al., 1992 [29] and Vanhoof et al., 1992 [29]). Furthermore, the mean value of total bilirubin in group control was found to be 0.644 ± 0.48 mg/dl, and that of breast carcinoma (during chemotherapy treatment) and was about 2.34 ± 1.73 mg/dl which is higher than the normal range (up to 1.0 mg/dl). Also, no significant statistical difference (p=0.106) in total bilirubin between breast carcinoma and group control was observed, as shown in Table 2 and Figure 4. These results are similar to those others who observed that the total bilirubin level increased during the first and fifth courses of chemotherapy treatments (Chauhan et al., 2016 [18] , Liu et al., 2014 [30] and Damodar et al., 2014 [26] ). However, according to Chhabra et al. (2015) [31], there is no correlation between bilirubin levels and chemotherapy treatment courses. Thus it may conclude that bilirubin level in women surfer from breast carcinoma during their chemotherapy treatment courses depended on the patient population.

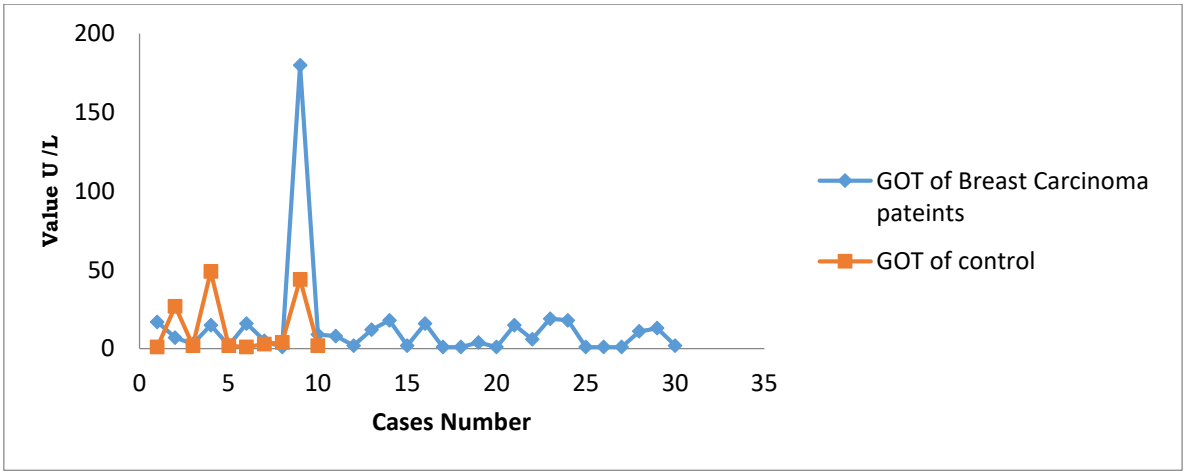


**Figure 1:** Variation of GOT or AST of carcinoma of breast patients during treatment of chemotherapy

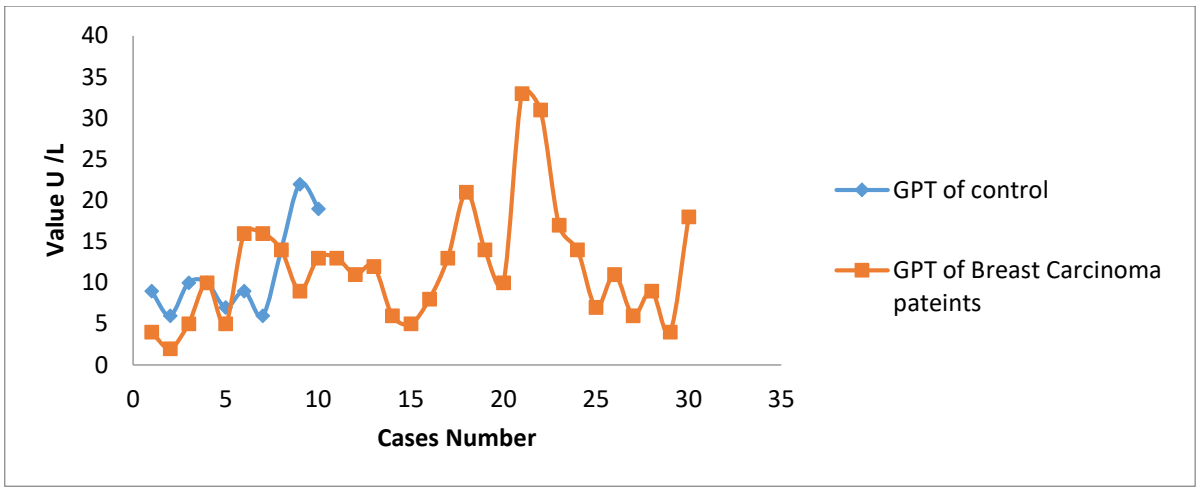


**Figure 2:** Variation of GPT or ALT of breast carcinoma patients during chemotherapy treatment

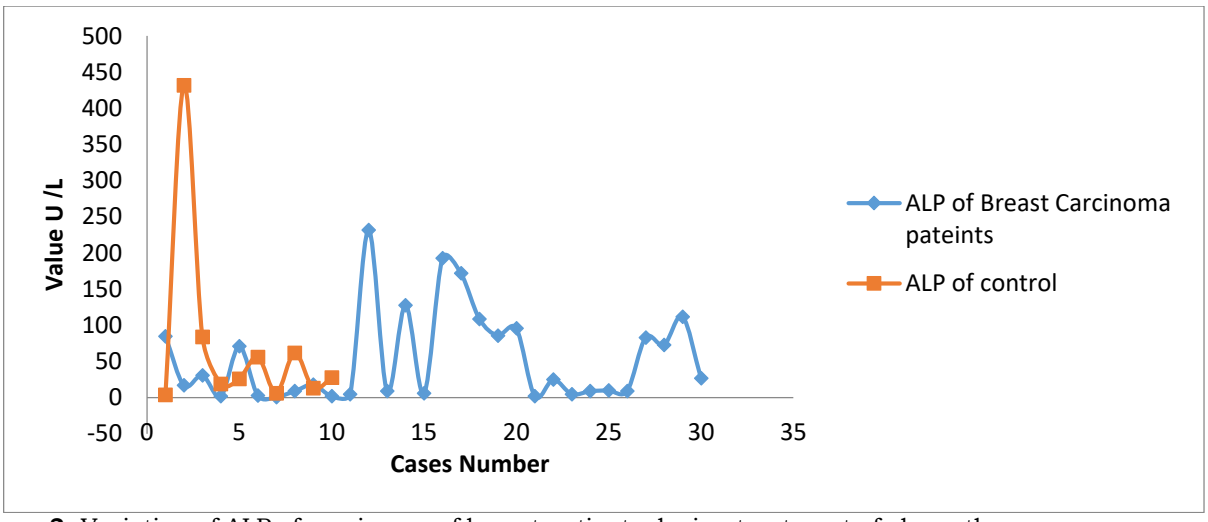


**Figure 3:** Variation of ALP of carcinoma of breast patients during treatment of chemotherapy

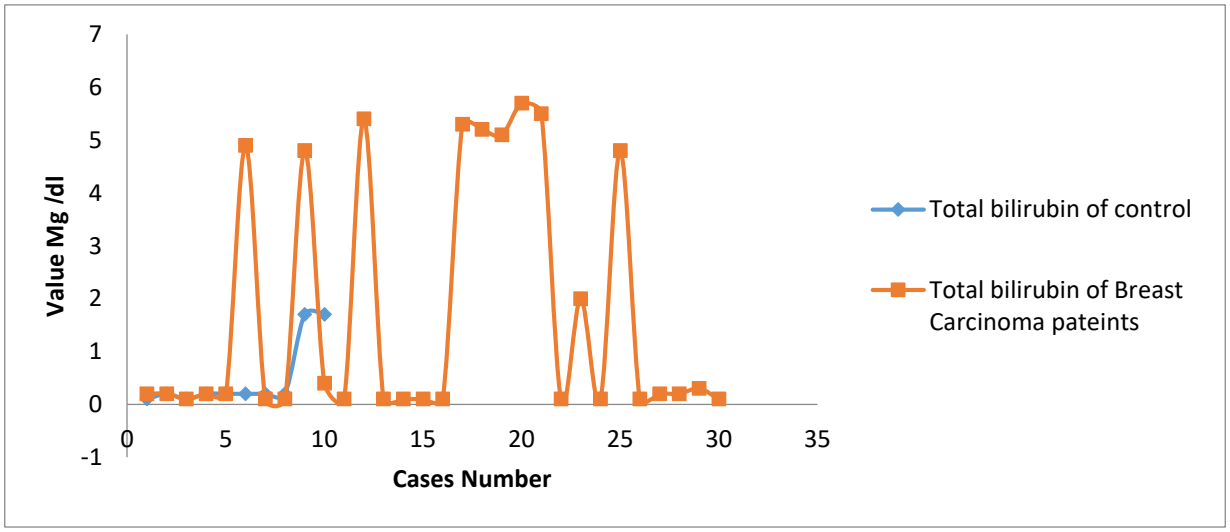


**Figure 4:** Variation of Total bilirubin of carcinoma of breast patients during treatment of chemotherapy

**Conclusion**

In summary, from our observations in the current study, the liver function tests might be a helpful diagnostic tool in the monitoring of breast carcinoma disease in different treatment strategies, but not an acceptable biochemical parameter for diagnosis and monitoring of breast carcinoma during chemotherapy treatment.

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