Comparative study between primary and metastasis liver cancer among Iraqi patients according to the liver function tests

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Abstract:

Background: Primary liver cancer is the 12th most common cancer in Iraq and the 7th most common cause of cancer related death. Liver is also the most common site for metastasis of a variety of tumors. Tumors development in the liver affects its function and the level of its enzymes. This study aimed to compare the changes in liver function between primary and metastasis liver cancer among Iraqi patients. Subject and Methods: This is a cross section study was conducted during the period between November-2019 and February/2020. Serum levels of liver GOT, GPT, ALP, TSB direct and indirect, 37 patients with primary liver cancer, 63 patients with metastasis and 50 healthy controls. Patients’ demographics were collected by interviewing and filling a questioner. Results: Patients with both primary metastasis liver cancer showed significant increased levels of serum GOT (primary, 44.32±23.30 U/L vs. metastasis 17.13±5.42 ), serum ALP (primary, 184.88±93.40 U/L vs. metastasis 144.46±78.79 U/L), TSB (primary, 2.05±1.89 mg/100ml vs. metastasis, 1.31±0.85 mg/100ml ), direct bilirubin (primary, 0.38±0.24 mg/dl vs. metastasis, 0.33±0.22 mg/dl), and levels of indirect bilirubin (primary, 0.83±0.64 mg/dl vs. metastasis, 0.72±0.57 mg/dl), respectively as compared to healthy control. Whereas serum GPT was only significantly increased in primary liver tumor (primary, 31.01±17.09 vs. metastasis, 17.51±16.06). Conclusions: Liver function is significantly altered in patients with liver malignancy. High level of GPT is associated with primary liver tumor.

Keywords: Primary liver cancer, Metastasis, liver function tests.

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Introduction:

Liver is the largest glandular organ in the body and performs various critical functions to keep of the body free of the toxins and harmful substances. Malignant liver tumors are classified to primary and secondary. Primary malignant liver tumors begin in the cells of the liver such as hepatocellular carcinoma, cholangiocarcinoma, biliary cystadenocarcinoma, angiosarcoma and hepatoblastoma. In the USA, 42,810 new cases were reported in 2020 with an expected 2% annual increase \(^{(1)}\). In Iraq primary liver cancer is the 12\(^{th}\) most common cancer and the 7\(^{th}\) most common cause of cancer related death \(^{(2)}\). Secondary liver tumors or metastatic tumors are the most common malignant liver tumors, approximately 70% are adenocarcinoma and gastrointestinal colorectal tumors are the most common primary origin \(^{(3)}\). Primary liver cancer is much more common in Sub-Saharan Africa and Southeast Asia whereas liver secondary cancers are most common in Europe and North America \(^{(4)}\). Unlike primary liver tumors, liver parenchyma in secondary liver cancer is non cirrhotic. As a result of the substantial development of imaging modality such as contrast-enhanced computed tomography (CT), magnetic resonance imaging (MRI), contrast-enhanced ultrasound, and positron emission tomography CT (PET-CT), regular follow up of tumor patients allows early detection of liver metastasis. By contrast, primary liver tumors presentation is usually late \(^{(5)}\). Liver enzymes are important indicators of liver function. Although they cannot diagnose liver cancer on their own, they are informative step in liver tumor workup. Many studies have shown that derangement in liver function indicators expression frequently contributes to poor patient outcome, therefore, in this study we have incorporated a whole set of liver function parameters to compare their expression in primary and secondary liver cancer.

Patients and Methods:

A total of 150 patients have been recruited for three centers: oncology teaching hospital, poisoning consultation center and ministry of science and technology. Between November 2019 and February 2020, after giving an informed written consent. Patients were divided to 3 groups. The first one included 37 patient with primary liver tumors and 63 patients with secondary liver tumors and the third included 50 healthy that have normal liver without any previous history of any systemic diseases. A detailed background data on all studied groups with the assistance of a physician in oncology teaching hospital. Each patient filled a questionnaire case sheet. Five ml of
venous blood was collected between 9:00 A.M. to 1:00 P.M. from each patient, centrifuged at 300rpm for 10 min. serum levels of GOT, GPT, ALP, T.S.B. direct and indirect was evaluated by correspondent kits were purchased from (ASCO, Jordan) and assessed using Cecil spectrophotometer (England).

**Results and discussion:**

Liver cancer is the sixth most commonly diagnosed cancer \(^{6}\). Cancer incidence among Iraqi people is relatively high and tendency of it are up going in interval of quantity and variables concerning to age, sex, etc. Management and prevention of cancer are still inadequate. The result in present study showed 55.46±14.15 years aged for primary liver cancer and 51.36±13.50 years for metastasis liver cancer (table 1).

Table (1): Mean± Std. values of age (year) and gender of study groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Healthy Control</th>
<th>Primary liver cancer</th>
<th>Secondary liver cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean±SD)</td>
<td>32.65±11.89</td>
<td>55.46±14.15</td>
<td>51.36±13.50</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>14</td>
<td>33</td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>23</td>
<td>30</td>
</tr>
</tbody>
</table>

Figure (1): Mean± Std. values of age (year) and gender of study groups
The levels of aspartate aminotransferase (AST/GOT) and alanine aminotransferase (ALT/GPT) in serum can help people diagnose body tissues especially the heart and the liver are injured or not. Data demonstrated in Table 2 showed the compare of (GOT) among study group. These results were compatible with the study serum levels of (GOT) in patients with liver cancer done by Durazo et al. which showed that the level of serum (GOT) was significantly increased in the patients with liver cancer in comparison with the healthy controls. (Durazo et al. 2008). In the present study the results showed that serum levels (GOT) is significantly higher compared to the liver cancer. The results agreed with Li-Xiang Zhang, et al, 2019. Aspartate aminotransferase (AST), also has important clinical significance in the diagnosis of some cancer (7,8).

Also the same table showed the comparison of (GPT) among study group. These results were agreement with the study serum levels of (GPT) in patients with liver cancer done by Durazo et al. and Lopez et al. In the present study the results showed that the level of serum GPT has statistically significant difference between the liver cancer and healthy controls (9). In the present study the results showed that the GPT level increased in the patients with liver cancer, GPT is a well-known significant of inflammatory necrosis in the liver (10,11).

Alkaline phosphatase (ALP) is a hydrolyase enzyme responsible for removing phosphate group from many types of molecules, including nucleotides, proteins, and alkaloids. The process of removing the phosphate group is called dephosphorylation (12).

In humans, alkaline phosphatase (ALP) is found in many tissues, including bone, liver, intestine, kidney, and placenta (10). High (ALP) usually means that the bone or liver been damaged (13).

Data demonstrated in (table 2) showed the compare of (ALP) among study group. These results were compatible with the study serum levels of (ALP) in patients with liver cancer done by Jong Man Kim, et al, which showed that the level of (ALP) highly significant in patients with liver cancer comparison with healthy controls (14). In the present study the results showed that the ALP level is higher and statistically significant compared to the liver cancer with healthy controls. The results are consistent with (15). ALP high levels independently predict poor prognosis in patients with unrespectable advanced gastric cancer, indicating that such levels could be used to reflect clinical prognosis. These results support previous studies that proposed
ALP or LDH as prognostic markers in hepatocellular carcinoma, esophageal squamous cell carcinoma, nasopharyngeal carcinoma, and pancreatic carcinoma (16,17).

Bilirubin is excreted in bile and urine, and elevated levels may indicate certain diseases (18).

HCC patients with abnormal bilirubin levels had worse prognosis than patients with normal bilirubin. They also had increased incidence of PVT and tumor multifocality and higher AFP levels, in patients with both small and larger tumors (19).

Data of our study (table2) showed the compare of TSB, Direct & Indirect bilirubin (mg/100ml) between study groups. The result showed elevated of TSB, Direct and Indirect Bilirubin in serum of liver cancer patients in comparison with healthy control the result showed highly significant (P<0.1).

Table (2): Compare of GOT, GPT, ALP, TSB, Direct and Indirect among study groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Healthy control (mean±SD)</th>
<th>Primary liver cancer (mean±SD)</th>
<th>P-value</th>
<th>Secondary liver cancer (mean±SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.GOT(U/L)</td>
<td>17.13±5.42</td>
<td>44.32±23.30</td>
<td>&lt; 0.01  (HS)</td>
<td>17.13±5.42</td>
<td>&lt; 0.01  (HS)</td>
</tr>
<tr>
<td>S.GPT(U/L)</td>
<td>22.85±10.36</td>
<td>31.01±17.09</td>
<td>&lt; 0.01  (HS)</td>
<td>27.51±16.06</td>
<td>&gt; 0.05  (NS)</td>
</tr>
<tr>
<td>S.ALP(U/L)</td>
<td>74.18±11.92</td>
<td>184.8±93.40</td>
<td>&lt; 0.01  (HS)</td>
<td>144.4±78.79</td>
<td>&lt; 0.01  (HS)</td>
</tr>
<tr>
<td>TSB(mg/dl)</td>
<td>0.74±0.18</td>
<td>2.05±1.89</td>
<td>&lt; 0.01  (HS)</td>
<td>1.31±0.05</td>
<td>&lt; 0.01  (HS)</td>
</tr>
<tr>
<td>Direct TSB(mg/dl)</td>
<td>0.19±0.06</td>
<td>0.38±0.24</td>
<td>&lt; 0.01  (HS)</td>
<td>0.33±0.22</td>
<td>&lt; 0.01  (HS)</td>
</tr>
<tr>
<td>Indirect TSB(mg/dl)</td>
<td>0.48±0.16</td>
<td>0.83±0.64</td>
<td>&lt; 0.01  (HS)</td>
<td>0.72±0.57</td>
<td>&lt; 0.01  (HS)</td>
</tr>
</tbody>
</table>
Figure (2): Compare of GOT, GPT, ALP, TSB, Direct and Indirect among study groups

**Conclusions:** Increased serum levels of liver function tests can be associated with a higher risk of some cancer development.

**References:**

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