ULTRASOUND: EVALUATION OF HEPATOBILIARY SYSTEM

INTRODUCTION
Hepatobiliary disorders are one of the most frequent illnesses encountered in medical practice. The spectrum of Hepatobiliary diseases is quite vast and affects all age groups. It includes some of the common problems like Cholecystitis, Cholelithiasis, Viral hepatitis, Cirrhosis & Chronic liver disease and malignancies e.g. Hepatocellular Carcinoma, Gallbladder Carcinoma and Metastatic foci in liver, to include a few among spectrum. The rising prevalence and Quality of life issues associated with Hepatobiliary disorders make them an important problem of our population 1-3.

In our region i.e. the province of Khyber Pakhtunkhwa Hepatitis C is reported as the leading cause of cirrhosis, chronic liver disease and Hepatocellular carcinoma. A similar picture is seen in other regions of Pakistan as well. Among pediatric population of the region, viral hepatitis, enteric hepatitis, drug induced liver injury and extrahepatic biliary atresia are common Hepatobiliary diseases 4-16.

A number of imaging modalities like Fluoroscopy (Cholangiography), Gray scale and Doppler Ultrasound, Contrast enhanced Ultrasound (CEUS), Endoscopic Ultrasound (EUS), Computed Tomography, Magnetic Resonance Imaging and Elastography are currently in use in evaluation of Hepatobiliary disorders. Ultrasound has the advantage of being a quick, safe and cost effective modality with no involvement of ionizing radiations. It has been shown to be the preferred initial investigation in acute abdominal pain and cholecystitis. Color Doppler ultrasound is an additional tool for evaluating liver pathologies like circulatory changes in metastasis and portal hypertension. Moreover ultrasound of liver surface is a useful tool in screening patients at risk of developing Chronic Liver Disease and Hepatocellular Carcinoma 13,17-24.

The sensitivity and specificity of ultrasound varies in different Hepatobiliary disorders. It is reported to be 23-95% and 40-95% in Acalculus Cholecystitis, 81-100% and 60-100% in Acute Cholecystitis, 73.3-90.5% and 69.6-85.2% in hepatic steatosis. >95% of sensitivity and specificity in Cholelithiasis, and a sensitivity of 46% in Hepatocellular carcinoma & 96% for Amoebic liver...
abscess. Its overall accuracy in diagnosis of Hepatobiliary diseases is reported to be 86%.

The objectives of this study were to have an insight into common presenting features of Hepatobiliary diseases in our region and to assess the role of ultrasound in evaluation of Hepatobiliary disorders.

MATERIALS AND METHODS
This study is a record based cross sectional study carried out from August 2010 to December 2010. The site for this study was Khyber X Rays, Khyber Medical Centre, Peshawar. Most of the patients were referred by General Surgeons, Internists and Gastroenterologists. A detailed history of presenting complaints was obtained prior to conducting ultrasound examination. All patients were evaluated transabdominally by Toshiba Nemio 20® Doppler ultrasound scanner with 4.2MHz frequency transducer. Color Doppler was frequently used in evaluating liver masses and portal hypertension. Results were recorded in a standardized Microsoft Excel spreadsheet and analyzed accordingly.

Chi-square test of independence was used for statistical analysis. All results were considered significant when p < 0.05 (α = 5 %).

Inclusion / Exclusion Criteria
Patients of all age groups presenting for evaluation of Hepatobiliary system including children and pregnant women were made part of the study. Patients with pancreatic & upper abdominal issues other than Hepatobiliary disorders were excluded from this study.

RESULTS
A total of 197 cases were analyzed. Overall patient population ranged from age of 3 months to 70 years. Total number of male and female patients was 87 and 110 respectively with a male to female ratio of 1:1.26. The age wise categorization included pediatric population (15 years and less) with 12 cases (6.1%), adult population (16 years to 64 years) with 172 cases (87.3%) and geriatric population (65 years and above) with 13 cases (6.6%). Data also analyzed in relation to gender distribution across various presenting features and finding on evaluation.

Overall Upper abdominal pain was the most common presenting complaint with 119 (60.4%) cases followed in order by Dyspepsia with 84 (42.6%), Nausea & Vomiting with 52 (26.4%) history of Hepatitis with 14 (7.12%) and Jaundice in 8 (4.1%) cases. Few patients presented with more than of the above mentioned complaints and were categorized according to their chief presenting complaint (Table I).

### Table I. Common presenting features of hepatobiliary diseases

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Overall n (%)</th>
<th>Male n (%)</th>
<th>Female n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper abdominal pain</td>
<td>119 (60.4%)</td>
<td>42 (48.3%)</td>
<td>77 (70)</td>
</tr>
<tr>
<td>Dyspepsia</td>
<td>84 (42.6%)</td>
<td>26 (29.9%)</td>
<td>58 (52.7)</td>
</tr>
<tr>
<td>Nausea &amp; Vomiting</td>
<td>52 (26.4%)</td>
<td>23 (26.5%)</td>
<td>29 (26.4)</td>
</tr>
<tr>
<td>History of hepatitis</td>
<td>14 (7.1%)</td>
<td>7 (8.0%)</td>
<td>7 (6.4%)</td>
</tr>
<tr>
<td>Jaundice</td>
<td>8 (4.1%)</td>
<td>6 (7.1%)</td>
<td>2 (1.8%)</td>
</tr>
</tbody>
</table>

Overall Cholelithiasis was the most common finding with 118 (59.9%) patients, followed in order by fatty changes of liver with 25 (12.7%), Hydatid liver cysts with 24 (12.2%), Liver parenchymal disease with 24 (12.2%), Metastatic foci in liver with 5 (2.5%), Obstructive Jaundice with 5 (2.5%), Primary liver tumors with 4 (2.0%), Hemangioma of liver with 4 (2.0%), Ascities secondary to liver disease with 4 (2.0%) and Medical Jaundice with 3 (1.5%) cases. One case (0.5%) was found to have pneumobilia (Figure 1).

Among males upper abdominal pain was the most common presenting complaint with 42 (48.3%) cases followed in order by Dyspepsia with 26 (29.9%), Nausea & Vomiting with 23 (26.5%) history of Hepatitis with 7 (8.0%) and Jaundice with 6 (6.9%) cases.

Ultrasound findings in males included Cholelithiasis with 41 (47.1%) patients, followed by Liver parenchymal disease with 16 (18.4%), Hydatid liver cysts with 12 (13.8%), Fatty changes of liver with 9 (10.3%), Primary liver tumors with 3 (3.4%), Hemangioma of liver with 3 (3.4%), Obstructive Jaundice with 3 (3.4%), Metastatic deposits in liver and Medical Jaundice with 2 (2.8%) patients each.
Among female patients included in the study, the presenting complaints included upper abdominal pain with 77 (70%) cases followed by Dyspepsia with 58 (52.7%) Nausea & Vomiting with 29 (26.4%), History of hepatitis with 7 (6.4%) and Jaundice with 2 (1.8%) cases respectively.

Findings upon ultrasonographic evaluation in female patients included Cholelithiasis with 77 (70%) cases, Fatty changes of liver with 16 (14.5%), Hydatid liver cysts with 12 (10.9%), Liver parenchymal disease with 8 (7.3%), Metastatic deposits in liver with 3 (2.7%), Obstructive jaundice with 2 (1.8%), Hemangioma of liver, Primary liver tumors and pneumobilia with 1 (0.9%) case each respectively.

For a total number of 12 cases in pediatric population Upper abdominal pain was the most common presenting feature with 6 (50%) cases followed by Nausea & Vomiting with 3 (25.0%), Dyspepsia with 2 (16.7%), History of hepatitis and active jaundice with 1 (8.3%) case each. Ultrasound findings included Cholelithiasis in 3 (25%), Liver parenchymal disease in 3 (25%), and Pyloric Stenosis in 1 (0.9%).

Among Geriatric patients (n = 13), Upper abdominal pain was presenting feature in 2 (15.4%) cases, Nausea & Vomiting in 2 (15.4%) and history of hepatitis in 1 (7.7%). The most common ultrasound finding was Cholelithiasis with 6 (46.2%) cases.

No statistically significant difference was found in either presentation or ultrasound findings across gender (p = 0.074 and 0.087 respectively). Similarly no significant difference was noted in presentation or ultrasound findings of pediatric population with overall results (p = 0.195).

DISCUSSION
The male to female ratio observed in our study was 1:1.26, which was a good reflection of data available from Peshawar(1:2).  

Upper Abdominal pain was the most common presenting complaint in our study population. Various studies report Hepatobiliary disorders especially cholecystitis to be among one of the most frequent cause of acute abdomen.
History of hepatitis was present in 7.1% of cases. In our region as well as in other parts of Pakistan Hepatitis C is more frequent cause of Cirrhosis and Hepatocellular Carcinoma than Hepatitis B. Same findings were also reported in data from Japan.  

CONCLUSIONS
Hepatobiliary diseases are among common medical problems of our region. Gray scale & Doppler Ultrasound is a safe, cost effective and sensitive tool for evaluation of Hepatobiliary system. Further research is needed from our region comparing use of ultrasound with other available imaging modalities.

ACKNOWLEDGMENTS
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REFERENCES
4. Mehmood K, Muhammad N. Frequency of hepatitis B and C virus infections in cases of hepatocellular carcinoma. The male to female ratio of Hepatocellular carcinoma in our study was 3:1 which was in good agreement with available data from Lahore(5.4:1). 


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