Utility of MRCP in 3T MRI For Diagnosis of Pancreatic Duct Injury and Assessment of Pancreatic Leak

INTRODUCTION
Though Pancreatic injuries are uncommon, early diagnosis is important, as delayed complications like fistula, abscess, sepsis, and hemorrhage may lead to significant mortality, up to 20% of cases (2). CT is routinely used as first-line imaging in the acute trauma patient and can be helpful in defining injuries to the pancreas and associated complications. The integrity of the pancreatic duct is the main factor determining outcome following pancreatic injury and is used to guide therapy, evaluation of the duct is essential. In the past, ERCP was the only method available for evaluating pancreatic duct integrity. Recently, MR pancreatography has emerged as an attractive alternative for direct imaging of the pancreatic duct (5). MR pancreatography has the advantage of being noninvasive, fast, and more readily available than ERCP. MR pancreatography may also demonstrate abnormalities not visible at ERCP, such as fluid collections upstream of the site of duct transection, and is helpful in assessing parenchymal injury (6).

MATERIALS AND METHODS
This prospective study done in a period of one year from march 2015 to march 2016 was approved by our institutional review board. Nine hemodynamically stable patients with clinically suspected pancreatic injury underwent MRCP and findings are studied for the presence or absence of pancreatic duct trauma and pancreas-specific complications such as pseudo cysts. MRCP findings were correlated with ERCP, surgical findings, computed tomography, and with clinical, biochemical or imaging follow-up.

RESULTS: 3D SPACE MRCPs were obtained in each of the 9 patients. Pancreatic duct injuries were detected in five patients; pseudocysts were detected in four of these patients. In one patient, disruption of the distal pancreatic duct diagnosed with MRCP was not detected with ERCP but confirmed surgically. The information derived from the MRCPs was used to guide clinical decision-making in all patients.

AIM: The aim of this study was to determine the utility of MRCP in the evaluation of pancreatic duct injury and its complications.

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KEYWORDS: MRCP, pancreas, trauma, duct injury

<table>
<thead>
<tr>
<th>AGE (years)</th>
<th>SEX (M/F)</th>
<th>PARENCHYMAL FINDINGS</th>
<th>DUCT ANATOMY</th>
<th>FOLLOW UP</th>
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<tr>
<td>12 /M</td>
<td>Bulk, hyperintense Body and tail of the Pancreas</td>
<td>Complete transection of main pancreatic duct at the level of distal body</td>
<td>Distal pancreatectomy, Well at 3 months</td>
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<tr>
<td>23 /M</td>
<td>3cm collection in lesser sac communicating with main pancreatic duct</td>
<td>Main pancreatic duct at the level of body communicating with collection</td>
<td>External drainage, well at 9 months</td>
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<tr>
<td>16/M</td>
<td>10cm Collection in and around pancreatic head and neck</td>
<td>Duct communicating with collection</td>
<td>Pancreatic stent insertion Imaging changes resolve; well at 8 month</td>
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</table>
45/F 4cm collection and peripancreatic inflammation Mild focal duct narrowing External drainage, well at 7 months

34/M Peripancreatic inflammation Normal duct anatomy Conservative, well at 3 months

54/M Parenchymal atrophy, no peripancreatic collections. Fistulous tract extending from head of pancreas up to left pleural cavity. Left hydropneumothorax Main pancreatic duct grossly dilated measuring 11mm External drainage, well at 9 months

17/M Peripancreatic inflammation Normal duct anatomy Conservative, well at 3 months

33/M 4 cm Collection in and around pancreatic head and body. duct transection at the level of proximal body of pancreas Pancreatectomy Well at 9 months,

27/M 4 cm collection and peripancreatic inflammation Normal duct anatomy External drainage, well at 7 months

Case 1. 12-year-old boy who sustained blunt trauma to abdomen. T2 axial and MRCP images shows peripancreatic mild collection and transection of main pancreatic duct at the level of proximal body of pancreas.

Case 2. 33-year-old male who sustained blunt trauma to abdomen. T2 axial and MRCP images shows hypertensive distal pancreas and complete transection of main pancreatic duct at the level of distal body.

DISCUSSION

Injury to the pancreas is relatively uncommon, occurring in less than 2% of blunt abdominal trauma patients associated with high morbidity and mortality, particularly if diagnosis is delayed(1). Most pancreatic injuries are minor and can be treated by external drainage. So early diagnosis is critical. Also the prognosis of pancreatic injuries largely depends upon the integrity of the pancreatic duct, evaluation of the duct is essential. In the past, ERCP was the only method available for evaluating pancreatic duct integrity. More recently, MRCP has emerged as an attractive alternative non-invasive diagnostic tool for direct imaging of the pancreatic duct and it is being used more frequently to assess injury to the ductal components. MRCP may compete with ERCP in diagnostic accuracy.

MRCP provides information about discontinuity of main pancreatic duct and collections. The advantages of MRCP include it being noninvasive, faster and more readily available than ERCP, and it can illustrate the entire pancreatic parenchymal and ductal anatomy, as well as pathologic fluid collections and ductal disruptions (4). For assessing the parenchyma, fat-suppressed T1, T2-weighted and DWI sequences are performed. Magnetic resonance pancreatograms are acquired by using heavily T2-weighted breath-hold or non-breath-hold sequences. Fast spin-echo (two-dimensional or three-dimensional) and rapid acquisition with relaxation enhancement sequences performed in the coronal and axial planes are usually sufficient. The main pancreatic duct (MPD) can be identified by MRCP within the pancreatic head in up to 97% of cases and within the pancreatic tail in up to 83% (5). In addition, MRCP may demonstrate abnormalities not visible at ERCP, such as fluid collections upstream of the site of duct transection, and is helpful in assessing parenchymal injury (6).

CONCLUSION

Magnetic resonance cholangiopancreatography is excellent non invasive technique to delineate pancreatic duct anatomy. Our study showed excellent correlation with operative findings with specificity, sensitivity of 100% and 84% respectively. MRCP accurately demonstrates pancreatic ductal abnormalities associated with pancreatic trauma such as duct dilatation, disruption, or leakage, communication of pseudocyst with pancreatic duct. MRI was useful in the follow-up studies of parenchymal damage and minor ductal injuries, providing high-quality images of the pancreatic duct and biliary tract.

References;


3. Diagnosis of Duct Disruption and Assessment of Pancreatic Leak with Dynamic Secretin-Stimulated MR Cholangiopancreatography A. R. Gillams 1, C. Lucey, MD, and Jorge A. Soto, MD Blunt Trauma of the Pancreas and Biliary Tract: A Multimodality Imaging Approach to Diagnosis
