Blunt Injuries of the Pancreas and Duodenum in Kuwait

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The hospital records were reviewed of all patients treated for traumatic injuries of the duodenum and pancreas over a 10-year period in two hospitals in Kuwait. A total of 15 records were available for analysis and none was omitted because of inadequate information. All injuries were due to blunt trauma mostly in road traffic accidents (nine cases); four of the 15 were children. Isolated duodenal injuries (four) were treated by primary closure and drainage, while isolated pancreatic injuries (nine) were treated by drainage in three patients, distal pancreatectomy in three patients, cystogastrostomy in one patient and non-operative methods in the remaining two cases. In one patient with pancreatico-duodenal injury a pancreatico-duodenectomy was performed. In another similar patient the proximal pancreatic duct was closed and the distal duct was drained into the jejunum. Two patients died.

Keywords: Pancreas, Duodenum. Trauma. Blunt trauma. Abdominal trauma. Kuwait.


Blunt injuries to the duodenum and the pancreas may present challenging problems to the surgeon. An overlooked or underestimated injury may lead to potentially lethal complications. The aim of this paper is to discuss presentation, investigations and results of treatment in all patients with blunt pancreatico-duodenal trauma in two hospitals in Kuwait.

Patients and Methods

During the period from June 1981 through July 1990 the hospital records of all patients with pancreatico-duodenal injuries treated at Mubarak Al-Kabeer and Adan hospitals in Kuwait were reviewed. There were 15 patients including 13 males and two females. Their ages ranged from 3.5 years to 39 years with a median age of 22.6. Four of the 15 patients were children. The cause of injury was road traffic accidents in nine patients (seven car drivers, one motorcycle, and one pedestrian) while in the remaining six patients injury resulted from direct trauma to the abdomen by a variety of heavy objects.

Clinical Findings

Fourteen patients complained of abdominal pain; one patient was in a coma because of an associated head injury and six had suffered vomiting. All 14 patients who presented with abdominal pain manifested some degree of tenderness and guarding. Bowel sounds were absent in three.

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Abdominal examination of the comatose patient was initially unremarkable, but the nasogastric aspirate was bloody. A peritoneal lavage was initially negative, but 5 days later it was positive for blood when he became hypotensive.

**Diagnosis and Treatment**

A significant intra-abdominal injury was immediately obvious in five patients, became obvious within 24 hours in five patients and was rather obscure in the remaining five either because of late presentation or paucity of findings. Diagnostic peritoneal lavage (DPL) was performed in five patients and was positive for blood in all of them. Two out of fifteen chest X-rays showed air under the diaphragm.

A CT scan of the abdomen was performed in four patients. In one it was done within 24 hours of admission and revealed a large haematoma of the head of the pancreas (Fig. 1) which was treated conservatively. Repeat CT scan after 2 months revealed significant reduction in size (Fig. 2) and the patient was asymptomatic.

In the second patient who presented to the hospital 10 days after injury, CT scan revealed enlargement of the pancreatic head with resolving haematoma (Fig. 3).

In the third patient who presented 45 days after the injury, CT scan showed a large pancreatic pseudocyst which was managed by cystogastrostomy with an excellent result.

In the fourth patient exploration within 24 hours of admission was essentially negative except for a pancreatic contusion. Three days later when the patient was not improving a CT scan was performed and revealed a collection in the right subhepatic and subphrenic areas. Endoscopic retrograde cholangiopancreatography (ERCP) revealed a pancreatic fistula which required a second laparotomy and drainage. Twelve associated injuries were encountered in eight patients (Table I). The diagnosis of pancreaticoduodenal injury was achieved within 24 hours in five, 48 hours in one, 1 week in one and more than 1 week in three.

Four patients had isolated duodenal injuries and were treated by simple closure with or without duodenal debridement.
Table 1

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Sex</th>
<th>Injuries</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33</td>
<td>M</td>
<td>2 duodenal perforations in the second part of duodenum</td>
<td>Primary closure and gastrostomy, feeding, jejunostomy and drainage</td>
<td>Survived</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>M</td>
<td>Duodenal perforation. Right femoral fracture</td>
<td>Primary closure and drainage</td>
<td>Survived</td>
</tr>
<tr>
<td>3</td>
<td>3.5</td>
<td>F</td>
<td>Pancreatic transection and crush injury of the duodenum</td>
<td>Pancreatico-duodenectomy</td>
<td>Survived</td>
</tr>
<tr>
<td>4</td>
<td>33</td>
<td>M</td>
<td>Pancreatic tear between head and body, serosal tear of the 3rd part of duodenum laceration of transverse mesocolon and bleeding from the middle colic artery</td>
<td>Distal pancreatico-jejunostomy and ligation of the proximal duct. Re-exploration and distal pancreatectomy</td>
<td>Died</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>M</td>
<td>Complete transection of the body of the pancreas, subcapsular haematoma of the (Lt) lobe of the liver</td>
<td>Distal pancreatectomy and splenectomy</td>
<td>Survived</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>M</td>
<td>Pancreatic head haematoma</td>
<td>Conservative treatment</td>
<td>Survived</td>
</tr>
<tr>
<td>7</td>
<td>29</td>
<td>M</td>
<td>Laceration of the pancreas at the neck, rupture (Lt) diaphragm, torn splenic pedicle, multiple liver tears, haemopneumothorax</td>
<td>Distal pancreatectomy and splenectomy repair of bleeding liver tears</td>
<td>Died</td>
</tr>
<tr>
<td>8</td>
<td>39</td>
<td>M</td>
<td>Pancreatic head haematoma</td>
<td>Conservative treatment</td>
<td>Survived</td>
</tr>
<tr>
<td>9</td>
<td>19</td>
<td>M</td>
<td>Duodenal perforation, fracture base of the skull and brain oedema</td>
<td>Primary closure of the duodenal perforation and drainage</td>
<td>Survived</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>M</td>
<td>Pancreatic pseudo cyst 1.5 months following motor vehicle trauma</td>
<td>Cystogastrostomy</td>
<td>Survived</td>
</tr>
<tr>
<td>11</td>
<td>17</td>
<td>M</td>
<td>Perforation of the 4th part of the duodenum + multiple small bowel perforations and splenic injury</td>
<td>Closure of duodenal perforations, splenectomy and resection of 40 cm of the small bowel</td>
<td>Survived</td>
</tr>
<tr>
<td>12</td>
<td>30</td>
<td>F</td>
<td>Pancreatic head contusion</td>
<td>Laparotomy and drainage</td>
<td>Survived</td>
</tr>
<tr>
<td>13</td>
<td>20</td>
<td>M</td>
<td>Complete transection of body of pancreas and traumatic abdominal wall disruption</td>
<td>Distal pancreatectomy and splenectomy, repair of disrupted abdominal wall</td>
<td>Survived</td>
</tr>
<tr>
<td>14</td>
<td>18</td>
<td>M</td>
<td>Pancreatic and colon contusion + mesenteric tears</td>
<td>Laparotomy and drainage</td>
<td>Survived</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>M</td>
<td>Pancreatic fistula at head of pancreas</td>
<td>Laparotomy and drainage</td>
<td>Survived</td>
</tr>
</tbody>
</table>

Nine patients had isolated pancreatic injuries. Two were treated conservatively, three by pancreatic debridement and drainage, one by cystogastrostomy and three by distal pancreatectomy.

Two patients had combined pancreatico-duodenal injuries. One was treated by a Whipple's resection while the other had distal pancreatico-jejunostomy and ligation of the proximal duct in addition to closure of duodenal tears.

Results

Thirteen patients survived. Complications (Table 2) included pulmonary infections in four patients, pancreatic fistula which healed in 3–6 weeks in two, acute renal failure in one, wound infection in three, partial duodenal obstruction in one, and disruption of a distal pancreatico-jejunostomy resulting in intra-abdominal sepsis and disseminated intravascular coagulation (DIC) in one patient who died following a second laparotomy. The death of the other patient was attributed to other injuries (patient no. 7, Table 1)

The mean hospital stay was 21 days.

Discussion

It has been estimated that 94% of trauma in Kuwait is due to automobile accidents and falls
from heights.1 All patients in this study sustained blunt abdominal trauma in comparison with other studies2–7 which showed a high incidence of penetrating injuries. Several mechanisms of pancreatico-duodenal injuries have been postulated including crushing of the duodenum and the pancreas against the vertebral column, laceration from tangential and shearing forces, and perforation of a closed duodenal loop.5,8 In this study four patients were children while other series9,10 have showed these injuries to be uncommon in childhood. The retroperitoneal location of the duodenum and pancreas, the neutral pH of luminal contents, and the low bacterial count of the normal small intestine2,11,12 reduce the peritoneal signs of pancreatico-duodenal injury. Serum amylase levels are of doubtful diagnostic significance4,5,11 and were not performed routinely in our patients. Positive DPL improves detection of pancreatico-duodenal injuries2,4,5,11 and was positive in five of our cases. Two patients were managed conservatively and CT scans in both detected pancreatic head haematomas not obstructing the duodenum as shown by contrast studies. CT scanning has a role to play especially in patients who do not require immediate surgery.13,14 A combined injury to the pancreas and duodenum is associated with increased morbidity and mortality. Wynn et al.15 reported a mortality of 64% in patients with combined pancreatico-duodenal injuries compared with 7% and 13% for the pancreas or duodenum alone. Cogbill et al.3 stressed that mortality following duodenal injuries is primarily related to associated vascular and hepatic injuries. Although early surgical intervention results in better survival,7,9 this was not the case in two of our patients (patients no. 4 and 7 in Table 1).

Four of our patients with isolated duodenal injuries were treated by closure and drainage with a successful outcome. Gastrostomy and feeding jejunostomy was used on two occasions. Simple closure and drainage were found to be effective by others.2,3,5–7,16,17 Complex duodenal injuries or combined injuries to the duodenum and pancreas are sometimes treated by pyloric exclusion which consists of closure of the pylorus with sutures or staples and gastrojejunostomy without vagotomy. Duodenal diverticulization on the other hand consists of vagotomy and antrectomy with Billroth II gastroenterostomy, duodenostomy and choledochostomy with drainage. It excludes the flow of gastric secretion and chyme from injured duodenum and is a valid alternative to pancreaticoduodenectomy with remarkable improvement in survival.18 If the pancreatic duct is intact, drainage (+ debridement) is sufficient2,7,16,19 and this was shown in case no. 12. Distal pancreatico-jejunostomy was used in one of our patients (patient no. 4) who subsequently died from intraabdominal sepsis resulting from disruption of the anastomosis. Distal pancreatectomy with splenectomy was reported to be the safest procedure if the pancreatic duct was involved2,4,7,15,19 and this was the case in two of our patients (patients no. 5 and 13). Another patient treated similarly (patient no. 7) died because of other associated injuries. If the patient is haemodynamically stable and does not have significant multiple associated injuries then splenic preservation is advised.20

Pancreatico-duodenectomy was necessary in one patient (no. 3) who had a severe crushing injury to the head of the pancreas and the duodenum. This procedure should be reserved for selected cases in whom salvage of the pancreatic head and duodenum is not possible.21,22

In conclusion high clinical suspicion is the clue to early diagnosis of pancreatico-duodenal injuries. A CT scan of the abdomen is a useful diagnostic tool in haemodynamically stable patients. Most isolated duodenal injuries can be treated with debridement and primary closure with or without drainage. Pancreatic contusion with an intact ductal system requires drainage alone, while ductal injuries do better with distal pancreatic resection. Pancreatico-duodenectomy should be reserved for those in whom salvage of the head of the pancreas and the duodenum is not judged possible.

References