Spontaneous intramural duodenal haematoma (IDH) is a rare disease in which there is haematoma formation within the wall of the duodenum. It was first described by MacLauchan at autopsy in 1838. Around 70–75% of IDH are due to blunt abdominal trauma. For spontaneous IDH, it is more related to the use of anticoagulant treatment or coagulation disorders such as haemophilia and Von Willebrand disease. Spontaneous IDH of pancreatic origin has seldom been reported. Various pancreatic conditions are shown to be associated with this disease, including acute or chronic pancreatitis, pancreatic tumour and ectopic pancreas. Till now, the exact mechanism of pancreatic-induced IDH is still unclear and the associated prognosis is poorly defined when compared with that of IDH due to other causes. The clinical diagnosis relies on accurate radiological studies and a high index of suspicion. The disease course can be life-threatening and serious complications may occur, including upper gastrointestinal tract obstruction, jejunal intussusception, duodenal perforation and subsequent septicaemic shock. We report a patient with IDH as a result of chronic alcoholic pancreatitis. A literature review was carried out regarding the current trend of management for this rare condition.

**Case report**

A 32-year-old man complained of acute onset of epigastric pain which radiated to the back. He was a chronic alcohol drinker and had a known history of chronic pancreatitis. He developed repeated bilious vomiting soon after admission. Physical examination was unremarkable. Blood test revealed elevated serum amylase level (758 U/L). Otherwise, complete blood count, liver and renal function tests were normal. Abdominal ultrasonography revealed a large complex cystic mass close to the head of the pancreas and there was no dilatation of the biliary system. Contrast-enhanced computed tomography (CT) scan of the abdomen found a 6 × 4 cm hyperdense lesion extending from the second
part of the duodenum to the duodenojejunal flexure with the presence of intramural gas in the duodenum. The radiological feature suggested a diagnosis of IDH (Figure 1). The patient was managed conservatively with continuous nasogastric aspiration and vigilant intravenous fluid replacement. Because of the clinical picture of upper gastrointestinal tract obstruction, barium contrast study was performed via nasogastric tube and complete obstruction was found at the level of the second part of the duodenum (Figure 2).

The patient’s clinical condition deteriorated after conservative treatment for 2 days. He developed tachycardia and fever. Repeated blood test showed leucocytosis (white cell count, $16 \times 10^9/L$). There was persistent high output (around 1,000 mL daily) from the nasogastric tube. Emergency laparotomy was then performed. Intraoperatively, the duodenum was grossly distended and there were patches of gangrenous change over the second and third parts of the duodenum, suggesting nonviability of the bowel. Pancreateicoduodenectomy was performed. The patient recovered uneventfully and he was discharged 2 weeks after the operation.

Gross examination of the resected specimen revealed a large haematoma formation ($9 \times 4.5$ cm) dissecting the duodenal wall (Figure 3). The pancreas was fibrotic with no evidence of tumour formation. Microscopic examination of the affected duodenum showed extensive haemorrhage in the muscularis propria. Fibrinous materials were found within the haematoma. The haematoma split the muscle layers and in some areas the muscle showed necrosis (Figure 4).

**Discussion**

IDH of pancreatic origin was rarely described in the past. The Table shows the clinical presentation and management for pancreatic-induced IDH in previously published case reports. The first reported case of such disease was described by Oppenheimer in 1938. The associated pancreatic pathologies include acute or chronic pancreatitis, pancreatic tumours and ectopic pancreas. Compared with traumatic IDH, which usually occurs at the subserosal layer of the duodenum, the anatomical location of pancreatic-induced IDH is mostly underneath the duodenal mucosa or, in some situations, the haematoma dissects the muscular wall of the duodenum. The most common presenting...
symptoms are abdominal pain and vomiting, which occurred in our patient. Occasionally, patients may present with jaundice due to bile duct compression by the haematoma. Clinical signs of dehydration may be present, depending on the severity of vomiting. In general, a high index of clinical suspicion should be contemplated since the disease course could be life-threatening in the presence of complications. Laboratory tests are of limited value for clinical diagnosis. As shown in our patient, elevated serum amylase level provides no definite clue to the diagnosis of IDH. It is postulated that pancreas compression by the haematoma could explain the hyperamylasaemia.

At present, the accurate diagnosis of IDH relies on radiological studies, of which contrast-enhanced CT and magnetic resonance imaging (MRI) are the mainstay investigations of choice. These two imaging techniques are the most sensitive methods to prove the diagnosis and show the extent of the duodenal haematoma. Moreover, some indirect radiological signs for IDH can be evaluated, which include abnormal dilatation of the stomach and duodenum. More importantly, the pancreas can be examined in detail to evaluate the pancreatic origins of the IDH. In the case of conservative measures being applied for IDH, CT or MRI is a good technique for the follow-up reassessment of the pathology. For patients with spontaneous IDH, some researchers have advocated abdominal angiography to exclude vascular abnormalities such as duodenopancreatic aneurysm. Nonetheless, conclusive evidence of the pancreatic origin of IDH can never be certain in every patient just by radiological investigations unless histological examination of the resected specimen is carried out, as in our patient.

Till now, the exact mechanism of pancreatic-induced IDH is uncertain. There are two hypotheses that have been postulated. First, the presence of ectopic pancreatic tissue within the wall of the duodenum may develop acute inflammation and subsequent necrosis, and haematoma formation. Second, leakage of pancreatic enzymes in pancreatitis can injure duodenal blood vessels, namely anterior and posterior pancreaticoduodenal arcades. It may cause local necrosis and haematoma formation.

The current recommended management for IDH is medical treatment at the time of diagnosis. This includes continuous nasogastric decompression, adequate intravenous fluid resuscitation and total parenteral nutrition to rest

**Table.** Clinical presentation and management of pancreatic-induced intramural duodenal haematoma in previously published case reports

<table>
<thead>
<tr>
<th>Sex/Age (yr)</th>
<th>Type of pancreatitis</th>
<th>Presentation</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Spreeuwel et al³</td>
<td>Male/45</td>
<td>Chronic</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Giraud et al⁸</td>
<td>Male/40</td>
<td>Chronic, alcoholic</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Archer et al²</td>
<td>Male/35</td>
<td>Chronic</td>
<td>Septicaemia</td>
</tr>
<tr>
<td>Fesenmyer &amp; Nelson⁷</td>
<td>Male/71</td>
<td>Chronic</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Bellens et al³</td>
<td>Male/40</td>
<td>Chronic</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Bodnar et al⁴</td>
<td>Male/33</td>
<td>Acute necrotizing</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Dugernier &amp; Breuskin⁶</td>
<td>Male/32</td>
<td>Acute</td>
<td>Gastric outlet obstruction</td>
</tr>
<tr>
<td>Dubois et al⁵</td>
<td>Male/55</td>
<td>Chronic</td>
<td>Abdominal pain</td>
</tr>
</tbody>
</table>

![Figure 4. Microscopic examination of the duodenum shows the presence of haematoma (H) splitting the muscularis propria (arrow) with extensive haemorrhage.](image)
the bowel. Careful monitoring of patients’ vital signs is crucial for the early detection of severe complications, such as bowel ischaemia and perforation. The rationale of these conservative measures is based on the fact that spontaneous local absorption of haematoma can occur in most circumstances. It is generally recommended that reassessment radiological study is essential to assess the progress of disease after a 2-week treatment of conservative measures. Image-guided drainage of haematoma is generally not recommended due to the technical difficulty in view of the deep-seated pathology and the possibility of bowel perforation. Surgical interventions are reserved for patients with signs of early complications or failed medical treatment as evidenced by imaging studies.

Evacuation of blood clot by laparotomy or laparoscopy has been suggested as the best surgical treatment for IDH. Nevertheless, such procedures may leave an intramural pouch or a false channel that may communicate with the digestive lumen. Subsequent extraluminal rupture or infection of this “pseudodiverticulum” may lead to a disastrous clinical outcome. Bypass surgery is reserved for patients with severe duodenal perforation and multiple comorbidities precluding resectional surgery. Surgical resection of the affected duodenum (pancreaticoduodenectomy) is the most radical way to alleviate the pathology. It is indicated when there is evidence of bowel nonviability, as in our patient. However, the high complication rate associated with this procedure is a major drawback and careful preoperative patient assessment is crucial.

IDH of pancreatic origin is a rare disease entity. A high index of clinical suspicion and prompt radiological study are necessary for accurate diagnosis. Conservative measures are the initial treatment of choice. In the presence of early complications or failed medical treatment, surgical intervention should be considered as the definitive treatment.

References