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Olgu sunumu / Case report

PNEUMORETROPERITONEUM DUE TO TRAUMATIC DUODENAL PERFORATION; CASE REPORT.

Travmatik duodenum perforasyonuna bağlı pnömoretroperiton; Olgu sunumu.

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ABSTRACT

Duodenal perforation following blunt trauma to abdomen is a rare clinical entity and isolated injury to duodenum is rarer. Symptoms are usually insidious and non specific, so only a high degree of clinical suspicion would lead to appropriate imaging study and management. CT scan was invaluable in diagnosing the site, extent and nature of lesion. On initial inspection of peritoneal cavity no abnormality was obvious. After ample mobilisation of duodenum, a perforation was found on the lateral wall of the junction of 2nd and 3rd part of duodenum which was leaking bile abundantly. Diversion of contents by duodenojejunostomy and drainage, feeding jejunostomy was made on the perforation site, and augmented by post operative parenteral nutrition were the key points of management. We present a case of isolated duodenal perforation with pneumoretroperitoneum and abscess that presented with symptoms of fever and generalised abdominal pain.

Key words: Duodenum, perforation, pneumoretroperitoneum, and duodenojejunostomy.

ÖZET

Künt travmayı takiben gelişen izole duodenum perforasyonu nadir rastlanan bir durumdur. Klinik belirtiler nonspesifik ve rastlantısaldır. Tanısal radyolojik görüntüleme tedavi yaklaşımları için öncelikle perforasyondan şüphelenilmesi gerekmektedir. Bilgisayarlı tomografi lezyonun yeri, sebebi ve natürü hakkında yeterli bilgi vermedi. Yapılan laparotomide ilk bakışta bir anormallik gözükmüyordu. Duodenal ampullanın mobilizasyonu sonrasında duodenum 2. ve 3. parçalar arasında perforasyon saptandı ve buradan safranın retroperitona sızdığı ve apse oluşturduğu saptandı. Duodenojejunostomi, drenaj, feding jejunostomi ile postoperatif parenteral nutrisyon tedavinin temelini oluşturdu. Burada yüksek ateş ve şiddetli karın ağrısı şikayeti ile gelen, izole duodenum perforasyonu ve apse saptanan bir olgu sunulmuştur.

Anahtar kelimeler: Duodenum, perforasyon, pnömoretroperiton ve duodenojejunostomi.

Case

An 18-year-old male with multiple injuries mostly to the abdomen and back was admitted to a local hospital and was managed conservatively. He started to have high grade fever and pain all over the abdomen and was referred to our hospital for further management after 6 days of admission. At the time of admission he was febrile with tender abdomen. His leukocyte count was 13.400 with marked neutrophilia and haemoglobin level was 11.9 g/dL. Rest of the parameters were unremarkable.

Ultrasonography revealed contusion at the upper pole of right kidney with moving echoes and bilateral pleural effusion. The patient was managed conservatively, but the fever and pain did not subside. An intravenous and oral contrast enhanced computed tomography of abdomen was done after 4 days of admission which showed retroperitoneal abscess and air pockets in the lumbar region suggestive of pneumoretroperitoneum (Figure 1 and 2). Decision for immediate exploratory laparotomy was taken.

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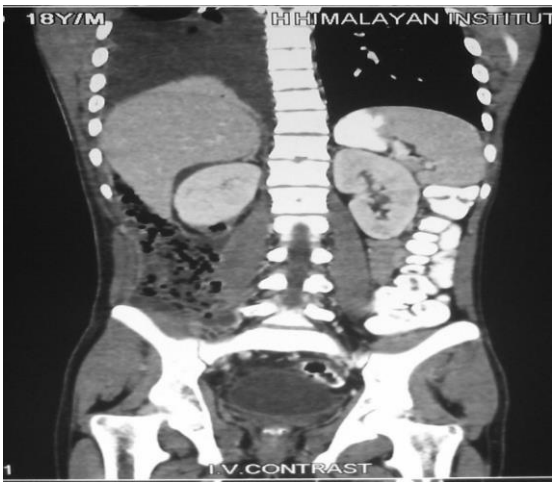

Figure 1: CECT abdomen showing retroperitoneal abscess and air pockets in the lumbar region suggestive of pneumoretroperitoneum.

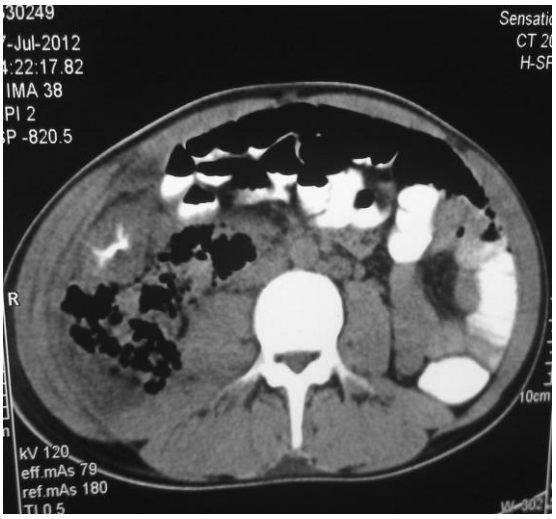

Figure 2: CECT abdomen showing retroperitoneal abscess and air pockets in the lumbar region suggestive of pneumoretroperitoneum.

On exploration peritoneal cavity was apparently normal. Only a loop of ileum was seen adhering to parietal peritoneum medial to the upper 3rd of ascending colon. On gently releasing it, a tear of size 2 cm x 1 cm was found in the parietal peritoneum and thick yellow pus extruding through it. The ascending colon was mobilised completely and a retroperitoneal abscess was found containing about 50 ml of thick pus and slough. Duodenal mobilisation was done by cutting the lateral ligaments (kocherisation). A perforation was found on the lateral wall of the junction of 2nd and 3rd part of duodenum which was leaking bile abundantly. Surrounding retroperitoneal tissues were stained with bile (Figure 3).

Side to side Roux-en-Y duodenojejunostomy was made on the perforation site. The cavity was cleaned of pus and slough and a drain put in. A feeding jejunostomy was constructed (Figure 4).

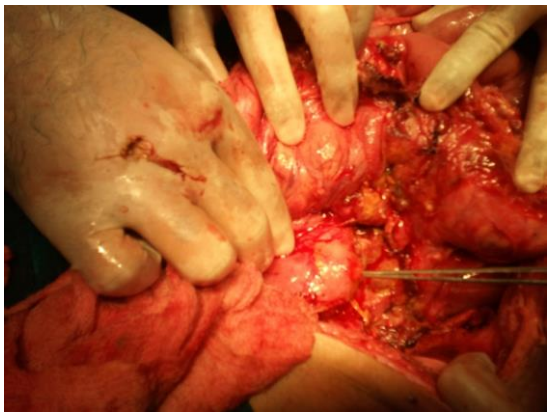

Figure 3: Perforation in the lateral wall of the junction of 2nd and 3rd part of duodenum.

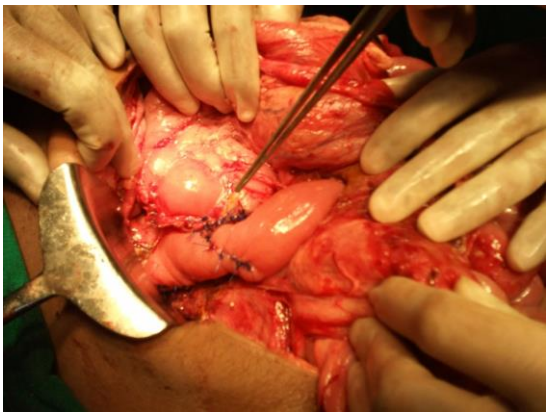

Figure 4: Roux-en-Y duodenojejunostomy anastomosis on the duodenal perforation site.

Patient was kept on total parenteral nutrition for 5 days with antibiotic cover and blood transfusion. On 5th postoperative day feeding through jejunostomy was commenced. Patient had an uneventful post operative recovery. Feeding jejunostomy tube was removed after full oral resumption of feeding.

DISCUSSION

Blunt abdominal injuries are the results of a direct blow to the epigastrium, and they account for 25% of all duodenum traumas, while the remaining 75% are due to penetrating trauma. They are usually due to motor vehicle accidents, especially in unrestrained drivers. As the duodenum is deep seated in the abdomen, duodenal injury is very often associated with injuries of major vessels, kidney and thoracic organs, so isolated duodenal trauma is rare. Diagnosis is often difficult as symptoms are generally attributed to the injury of adjacent structures. Often the leak is small and it takes hours to form a significant collection and signs of peritonitis or retroperitoneal abscess. Sometimes high grade fever, generalised abdominal pain and weight loss are the only symptoms (1-4).

Radiographic studies such as plain abdominal films are helpful but only if positive.

Important abnormal findings such as unexplained fluid collections surrounding the duodenum and retroperitoneal free air, particularly that outlining the upper pole of the right kidney, strongly suggest a duodenal injury. The upper gastrointestinal contrast study by the ingestion or administration of a water-soluble medium may confirm or exclude the presence of a leak. Ultrasound can be performed initially to rule out injuries to intra-abdominal organs and vessels but it is inadequate to detect lesions in the pancreaticoduodenal area. CT scan is very useful in diagnosing duodenal trauma, retroperitoneal fluid and air collection and extent of injury to the adjoining structures. Thus CT scan with both oral and intravenous contrast medium is of paramount importance; in fact in this way it may be possible to demonstrate the extravasation of oral or intravenous contrast medium in the presence of a laceration. However, in some cases even CT scan can be negative at admission, or subtle CT findings such as small amount of unexplained fluid, and unusual bowel morphology, can be underestimated and dismissed. Diagnostic laparoscopy does not confer any improvements over traditional methods in the investigation of the duodenum. Because of the anatomical position diagnostic laparoscopy is a poor modality in determining duodenal injury (4-9).

The first successful repair of a duodenal injury after blunt trauma was reported by Herczel in 1896. Despite the presence of suggestive CT and DPL findings, the diagnosis was delayed in 20% of the 35 patients whose records were examined in the study; this delayed diagnosis was associated with increased abdominal complications. Patients with persistent abdominal complaints and equivocal CT or DPL findings should undergo laparotomy or repeat CT scan evaluations. Exploratory laparotomy offers the chance to diagnose as well as to treat the duodenal injury if any. Second part of the duodenum must be mobilised by Kocher's manoeuvre. The right colon must be mobilised by Cattell and Braasch manoeuvre. Lesser sac may be opened through gastrocolic ligament to inspect the medial aspect of the second part of duodenum. But it should always be kept in mind that the major vessels in the area might be injured, so surgeon should be prepared for proximal and distal control of aorta and vena cava. Severe oedema, crepitation or bile staining of the periduodenal tissues implies a duodenal injury until proven otherwise. Brotman recommended instillation of methylene blue through a nasogastric tube (10,11).

Duodenal injuries have been divided into different grades, most useful being the grading by the American Association for the Surgery of Trauma (Table 1).

Table 1: Grades for duodenal trauma.

I	Haematoma Laceration	Single portion of duodenum Partial thickness only
II	Haematoma Laceration	Involving more than one portion Disruption <50 per cent circumference
III	Laceration	Disruption of 50-70 per cent circumference of D2 Disruption of 50-100 per cent circumference of D1, D3, D4
IV	Laceration	Disruption >75 per cent circumference of D2 involving ampulla or distal common bile duct
V	Laceration	Massive disruption of duodenopancreatic complex Devascularisation of duodenum

Feliciano has reported by far the largest experience of combined pancreaticoduodenal injuries and suggested that (a) simple duodenal injury with no ductal or pancreatic injury (grades I and II) should be treated with primary repair and drainage; (b) grade III duodenal and pancreatic injuries are best treated with repair or resection of both organs as indicated, pyloric exclusion, gastrojejunostomy and closure and (c) grade IV and V duodenal and pancreatic injuries are best treated by pancreaticoduodenectomy. Bozkurt suggested that the use of primary repair in grade III injury may be associated with higher duodenum-related morbidity. His recommendation was to use complex repair for grade III duodenal injuries (12, 13).

Surgical management of duodenal trauma depends upon various factors: (a) anatomical relation to the ampulla of Vater; (b) the characteristics of the injury (simple laceration *versus* destruction of the duodenal wall); (c) the involved circumference of the duodenum and associated injury to the biliary tract, pancreas, or major vascular injury.

Repair can be done in one or two layers. Longitudinal duodenotomies may be closed transversely if the length of the duodenal injury is less than 50% of the circumference of the duodenum.

Pedicle mucosal graft, using a segment of jejunum or a gastric island flap from the body of the stomach has been suggested as a method of closing large duodenal defects. Another possibility is the use

of a jejunal serosal patch to close the duodenal defect. In complete transection of the duodenum, the preferred method of repair is primary anastomosis of the two ends after appropriate debridement and mobilisation. The repair of the first, third and fourth part of the duodenum is often straightforward after mobilisation and necessary debridement. But the repair of second part of the duodenum needs a more complex approach, especially when large amount of tissue is lost. In case of transection of the first part of the duodenum, antrectomy should be performed with closure of the duodenal stump and Bilroth II gastrojejunostomy. When such injury occurs distal to the ampulla of vater, closure of the distal duodenum and Roux-en-Y duodenojejunal anastomosis is appropriate. A Roux-en Y loop sutured over the duodenal defect in end to side fashion is the procedure of choice. External drainage adjacent to the repair and preferably closed one must be provided as it aids in early detection of leak and control of duodenal fistula (10, 14-20).

Tube decompression was advocated for duodenal decompression and diversion of its contents in order to protect the repair because suture line dehiscence is common in high risk duodenal trauma. Yet favourable outcome has been observed with tube decompression in cases of delayed diagnosis. In this study "quadruple tube" decompression consisting of nasogastric tube or gastrostomy, anterograde and retrograde jejunostomy tubes for duodenal decompression and feeding and T-tube drainage for common bile duct was used to divert the high volume of gastric, pancreatic and biliary secretions traversing the duodenum. In this technique, there was lower incidence of suture line breakdown compared to other techniques. Pyloric exclusion along with gastrojejunostomy was devised to divert secretions away from duodenum. It is a technically easier, less radical and quicker operation than diverticulation of the duodenum and appears to be equally effective in the protection of a duodenal repair. But marginal ulcerations are problems in long term follow up of cases. Pyloric exclusion is not necessary for all patients with severe duodenal injuries, as previously suggested. Selected SDI (severe duodenal injury) patients can be safely managed by simple primary repair (21-25).

Pancreaticoduodenectomy is a major procedure and should be only be considered in cases of massive disruptive injuries to pancreaticoduodenal complex, extensive devascularisation of duodenum and damage of second part of the duodenum, especially of the ampulla of Vater and distal part of the common bile duct. Reconstruction should be done within 48 hours of the injury. Damage control, control of bleeding and bowel contamination and ligation of common bile duct and pancreatic duct should be the rule (26).

Use of octreotide in protection of the suture line in pancreaticojejunostomy and pancreaticoduodenectomy has been shown to be beneficial. A significant number of patients are salvaged by drainage, total parenteral nutrition and meticulous overall care (11).

The concept of staged laparotomy can be successfully applied to wounds of the pancreas and duodenum. Most duodenal injuries can be managed with debridement and primary repair. Temporary exclusion and reoperation should be employed for unstable patients (27).

Extensive local damage of intraduodenal or intrapancreatic bile duct needs a staged pancreaticoduodenectomy. Less extensive local injuries may be managed by intraluminal stenting, sphincteroplasty or reimplantation of the ampulla of Vater (28).

In conclusion; isolated duodenal trauma is a rare condition. It may be associated with retroperitoneal collection which may develop into an abscess. But its clinical features are very nonspecific and often insidious. So a high degree of clinical suspicion and relevant investigations will aid in diagnosis. As our case was diagnosed in a late stage, drainage of the abscess with duodenal diversion in the form of Roux-en Y duodenojejunostomy along with a feeding jejunostomy supported by total parenteral nutrition was the approach. The patient's recovery from symptoms and improved general condition justifies it.

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