Intramural Duodenal Hematoma : A Case Report and Review of the Literature

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Abstract

One case of intramural duodenal hematoma following blunt abdominal injury is presented. The radiographic examinations included plain abdominal films, ultrasonography, upper gastrointestinal series, computerized tomographic (CT) scan and magnetic resonance imaging (MRI). The patient was examined by gastroscopy and treated conservatively as an in-patient for 1 month. He was symptom free at the 3-month follow-up.

Key word : Intramural Duodenal Hematoma

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Intramural duodenal hematoma is an uncommon lesion usually caused by blunt abdominal injury such as handle bar injuries and child abuse[1-3]. Bleeding disorders and anticoagulation therapy are known as potential causes of spontaneous intramural duodenal hematoma[4,5]. The hematoma usually resolves in 1-3 weeks with conservative therapy, using nasogastric drainage, intravenous fluids, and careful observation. Operations are reserved for those in whom conservative therapy fails because of associated intra-abdominal injuries or complications[4].

The authors report a case of intramural duodenal hematoma from blunt abdominal injury that caused duodenal obstruction and was treated con-

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servatively. Representative cases show manifestations of this injury as presented by MRI image.

CASE REPORT

A 21-year-old man presented with severe vomiting and epigastric pain, one-hour after blunt abdominal injury from fighting. The plain abdominal film showed no abnormality. He was admitted for observation in a district hospital for 7 days. At home, he still had epigastric pain and vomiting after ingestion. He went back to the district hospital and was referred to our hospital, 14 days after the injury. He was investigated with acute abdomen series that revealed double bubble sign with markedly gastric distension and a large amount of gastric content (Fig. 1A, B). The upper gastrointestinal series showed an intramural filling defect with coiled spring appearance at the second and third portions of the duodenum leading to complete obstruction (Fig. 2). The sonogram showed a complex hypo-echogenic mass of intramural hematoma with internal septation causing a mass effect to the duodenal lumen (Fig. 3).

The gastroscopy showed inflamed and edematous gastric mucosa. The scope was unable to pass through the second part of the duodenum due to external compression. The non-contrast CT scan showed an inhomogeneous, high-attenuation mass at the second part of the duodenum associated with obstructive change of the duodenum (Fig. 4A-D). In addition, the contrast-enhanced CT scan demonstrated the ring sign characteristic feature of an intramural hematoma. The MRI showed an inhomogeneous hypersignal intensity of the hematoma on T1-weighted and hypersignal intensity on T2-weighted sequences (Fig. 5A-C), representing the subacute stage of hematoma. The hematoma had a well-defined concentric ring configuration on MR images, a finding that helped establish the diagnosis.

The patient was treated conservatively with nasogastric drainage and intravenous nutritional support. After one month, the patient felt well. The patient could eat by himself and had no epigastric pain. The patient remained asymptomatic at the 3-month follow-up.

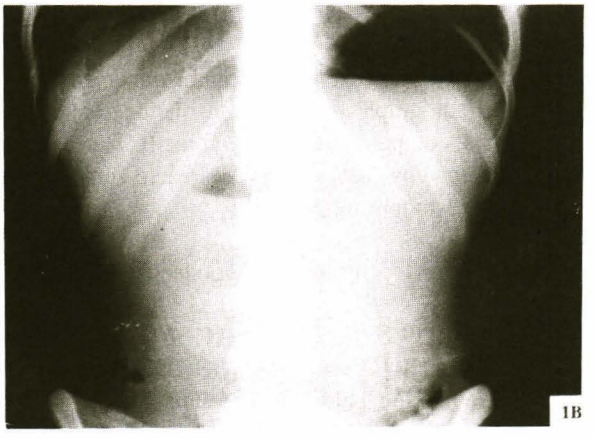

Fig. 1. (A, supine; B, upright): Plain abdomen film reveals a double bubble sign with marked gastric distension and a large amount of gastric content.

DISCUSSIONS

Intramural duodenal hematoma is one of the least common abdominal injuries. McLauchlan first described this condition in 1838[2]. These hematomas may be the result of a motor vehicle crash, an introgenic injury, play-related or sporting injuries, child abuse, or a spontaneous bleed in a patient with a coagulopathy[5]. Adults most commonly present with such hematomas after hitting the steering wheel in a motor vehicle crash[4]. The duodenum has copious blood vessels, resulting in extravasation of blood between the mucosa and serosa. The intramural hematoma arises in the subserosa, separating the serosa from the muscularis layer. The hematoma then collects additional fluid and gradually compresses the mucosa against the opposite side of the duodenum producing

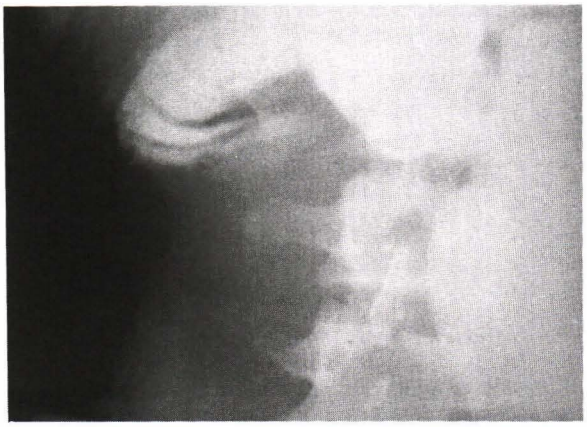

Fig. 2. **Upper gastrointestinal series: A filling defect as well as a coiled spring appearance of intralumimal duodenal hematoma causing complete obstruction of duodenum.**

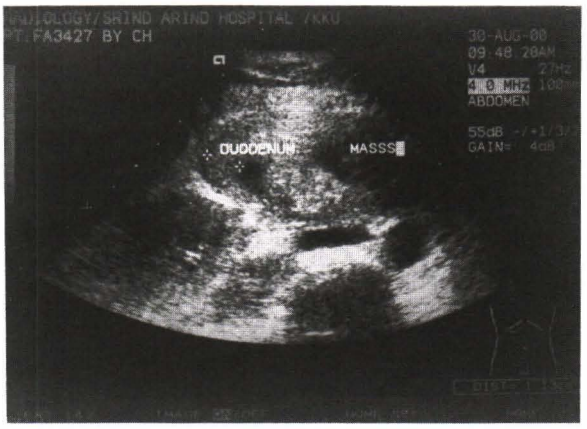

Fig. 3. **The sonogram shows a complex hypo-echogenicity of intramural duodenal hematoma with internal septation causing mass effect to the duodenal lumen adjacently.**

varying degrees of luminal obstruction(6). Usually, patients with a duodenal hematoma present with insidious onset of obstruction, at least 48 hours after injury. The symptom findings commonly include epigastric pain and vomiting. The clinical signs are non-specific. The salient features of laboratory tests are leucocytosis and hyperamylasaemia.

Plain film of the abdomen may reveal 1) gastric dilation with gaseous distention to the site of lesion; 2) external compression of the lumen; 3) a distended loop with an ill-defined mass; 4) a crescent-shaped air shadow; or 5) fluid levels in the paralyzed loop(7).

Felson first described the radiographic pictures of intramural duodenal hematoma demonstrated by upper gastrointestinal series, including a coil spring mucosal appearance, intramural mass and duodenal obstruction(8). The "coiled spring" sign represents an intramural extramucosal mass with crowding of the valvulae conniventes. Endoscopy can provide information about the location of the intramural hematoma, in correlation to the gastrointestinal lumen and the site of the bleeding(1). Upper gastrointestinal series is not routinely performed for diagnosis except if duodenal perforation is suspected.

Ultrasonography is now the method of choice for diagnosis and follow-up because it is a rapid, non-invasive, and non-radiative procedure. The sonographic picture is variable and depends on the age of the hematoma, from fresh blood to one with partial or complete lysis. A bowel related lesion is a well-known sonographic picture and consists of an asymmetrically located core representing a compressed mucosa and a sonolucent halo representing a thickened bowel wall infiltrated by edema or hemorrhage(9). In an intramural hematoma, the halo is composed of hematoma and there will be some septation in the halo before complete lysis occurs. The echogenic core can be small or large, and depends on whether the mucosa is collapsed or swollen.

CT is useful and superior in delineating the retroperitoneal extension of the hematoma and the association of the biliary obstruction and pancreatitis (8). The CT appearance depends on the age of the hematoma and the density of the surrounding structure. Fresh intramural hematoma appears hyperdense and compresses the duodenal lumen. Attenuation of the hematoma gradually diminishes and at times the diagnosis can be confusing.

The MRI offers several advantages over CT in terms of multiplanar anatomic display and superior soft tissue contrast and, often allows more specific tissue characteristic diagnosis to be made. MRI does not only better depict the extent of the retroperitoneal lesion, but also to identify acute and subacute blood products, thereby affecting both diagnosis and management. MRI is sensitive to blood products in different stages of evolution because of the paramagnetic signal

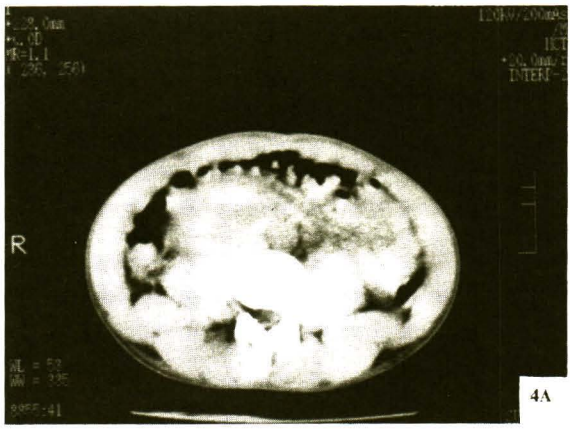

Fig. 4A. Non-enhanced CT scan demonstrates an inhomogeneous, high-attenuation mass associated with obstructive changes.

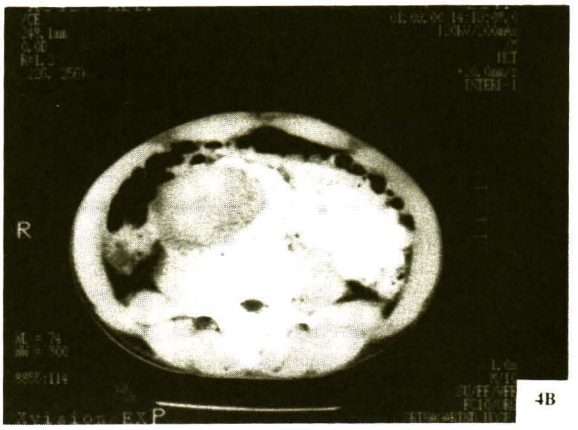

Fig. 4B. Enhanced CT scans demonstrates non-enhanced hematoma on arterial phase.

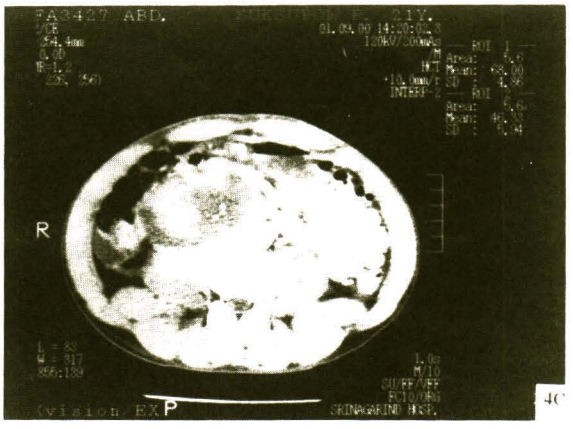

Fig. 4C. Enhanced CT scan demonstrates minimal enhanced rim on portovenous phase. The duodenal hematoma displaced duodenal lumen and inferior vena cava.

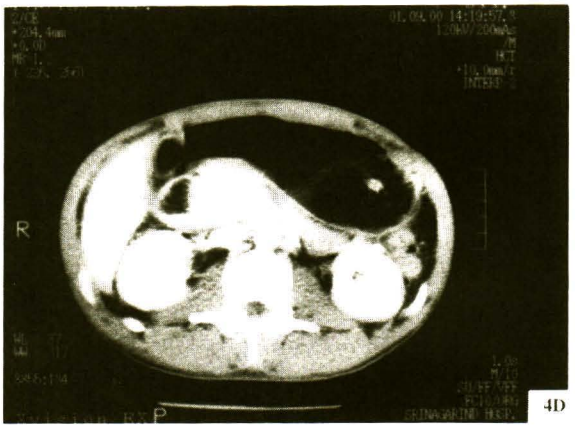

Fig. 4D. Enhanced CT scan on portovenous phase: This image shows an intramural hematoma causing dilatation of the duodenum evidenced by retained fluid filled in the lumen, marked by eccentric focus of fluid and compressed anteriorly by an intramural hematoma.

properties of the blood products[10], which change over time depending on their dominant component; acute, deoxyhemoglobin; subacute, intra- or extracellular methemoglobin; chronic, hemichromes. The evolution of the MRI appearance of non-CNS hematomas is less well characterized and more variable than those of the brain and spine, because the CNS possesses a blood-brain barrier, has a high oxygen concentration, and lacks rapid response from macrophage[11]. In the presented case, the MR images of intramural duodenal hematoma are hyperintense signal intensity on T1-weighted and T2-weighted, representing the subacute stage of hematoma that is the compatible duration of examination from the time of injury. MRI is, however, less available and requires more patient cooperation, and is therefore difficult to

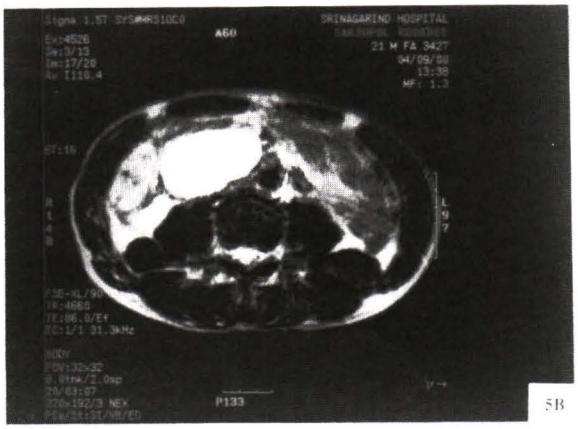

Fig. 5A, B. **Axial T1-wieghted A) spin-echo (720/40, TR/TE) and T2-weighted B) fast spin-echo (4660/86) images show a hyperintense signal intensity intramural duodenal hematoma on the subacute stage of a hematoma.**

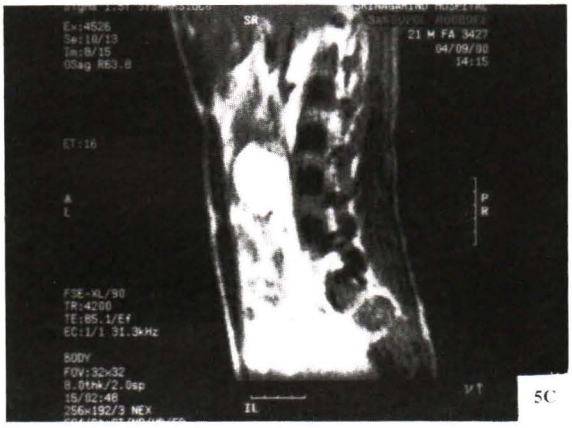

Fig. 5C. **Sagittal T2-weighted fast spin-echo (4200/85.1) shows the hyperintense signal intensity of a duodenal hematoma.**

perform in an acutely ill patient who may not have a stable airway.

Recently it has become apparent that surgery was unnecessary in most patients with a duodenal hematoma without perforation. The association of duodenal hematoma with perforation was comparatively rare. The authors reviewed recent reports, of the 34 patients reported by Jewett et al[5], Wooley et al[6], Touloukian[12], and found that 4 patients underwent surgery because of perforation. The incidence perforation associated with duodenal hematoma was only 12 per cent. Usually, the hematoma resolved in 1-3 weeks. Thus, conservative treatment with nasogastric drainage, intravenous fluids, and careful observation was suggested. Aizawa et al reported a patient with a duodenal hematoma treated with ultrasonically guided drainage and balloon dilation[13]. They also recommended planned conservative management. Surgical treatment was recommended only when complications occurred, such as bile or pancreatic duct compression, without resolution within 7-10 days, fistula formation, perforation or a severely damaged bowel[2,5].

In summary, the authors present the case of a young adult who had a blunt abdominal injury, developing to an intramural duodenal hematoma. Plain abdominal films, ultrasonography, upper gastrointestinal series, CT scan, MRI and gastroscopy were performed. CT scan and MRI showed specific diagnostic findings of intramural duodenal hematoma. The patient was successfully treated conservatively.

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ลิ่มเลือดคั่งในชั้นกล้ามเนื้อของลำไส้เล็กส่วนต้น : รายงานผู้ป่วย 1 รายและทบทวนรายงานในอดีต

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ผู้ป่วย 1 รายเกิดมีลิ่มเลือดคั่งในชั้นกล้ามเนื้อ ของลำไส้เล็กส่วนต้น หลังจากได้รับบาดเจ็บบริเวณช่องท้อง การตรวจทางรังสีวิทยาประกอบด้วย เอกซเรย์ช่องท้อง อัลตราซาวด์ เอกซเรย์ลำไส้ส่วนบนร่วมกับสารทึบรังสี เอกซเรย์คอมพิวเตอร์ และการตรวจด้วยคลื่นสะท้อนสนามแม่เหล็ก นอกจากนี้ยังมีการตรวจทางกล้องส่องภายในกระเพาะอาหารด้วย ผู้ป่วยได้รับการรักษาแบบประคับประคองในโรงพยาบาลเป็นเวลา 1 เดือน เมื่อจำหน่ายผู้ป่วยกลับบ้านแล้ว ได้นัดผู้ป่วยมาติดตามผลการรักษาในเดือนที่สาม พบว่าผู้ป่วยมีอาการเป็นปกติดี

คำสำคัญ : ลิ่มเลือดคั่ง, ลำไส้เล็ก

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