

Post-Traumatic Intramural Duodenal Hematoma in Children

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Key words: pediatric trauma, duodenal hematoma, duodenal trauma, handlebar injury, traumatic pancreatitis

Abstract

Background: Intramural duodenal hematoma generates partial or complete obstruction that develops slowly and progressively with a consequent delay in diagnosis. Many diagnostic and therapeutic measures remain debatable and justify a review of current management policy.

Objectives: To highlight the diagnostic and therapeutic steps in pediatric IDH.

Methods: The records of 12 children with post-traumatic IDH who were treated in the Hillel Yaffe Medical Center between 1986 and 2000 were retrospectively reviewed. Three of them had clotting disorders and were excluded. The interval between their admission and diagnosis as well as the therapeutic decisions were evaluated and analyzed.

Results: Nine children were treated for IDH. The interval between admission and diagnosis ranged from 24 hours to 6 days. Five children had associated traumatic pancreatitis. Initially, all the children were conservatively treated. In seven the hematoma resolved after 9–20 days. Two children were operated upon because the obstruction failed to resolve. All nine children recovered without permanent complications.

Conclusions: Intramural duodenal hematoma has many clinical and therapeutic puzzling aspects. Bicycle handlebar, road accidents and sports trauma are the main etiologic factors in children, but child abuse should be kept in mind. Associated traumatic pancreatitis is common. Gastroduodenal endoscopy may be useful to clarify doubtful cases. Pediatric surgeons should increase awareness regarding IDH in order to reduce delay in diagnosis and the need for surgical decompression.

IMAJ 2006;8:95–97

Intramural duodenal hematoma is an uncommon cause of high intestinal obstruction. More than 70% of intramural duodenal hematomas in children are trauma related. The responsible blunt abdominal trauma is at times so trivial that in many occasions the child cannot remember it. Intramural duodenal hematoma has been described at all ages and in both sexes, but the pediatric male is most affected. Presently, conservative measures are the first management choice in the great majority of cases. Different opinions still exist regarding diagnostic procedures and timing of surgery, if necessary.

Patients and Methods

Between January 1986 and January 2000 eight boys and four girls with obstructing post-traumatic duodenal hematoma were

treated at the Hillel Yaffe Medical Center. Their medical files were retrospectively reviewed. Three of them had clotting disorders and were excluded from this report. Their clinical course as well as the therapeutic decisions were evaluated and analyzed.

Results

The age range of the seven boys and two girls was 2–14 years. The etiologic factors were handlebar injuries in four, sports related in two, vehicle accidents in two, and child abuse in one. Six children were admitted within 24 hours. The other three were hospitalized 4–10 days after the traumatic episode. Abdominal pain and biliary vomiting were present in all cases at some stage. In children who presented late, the main complaints were recurrent abdominal pain, and vomiting associated with feeding difficulty. Abdominal examination was unremarkable apart from upper abdominal tenderness and an upper abdominal mass in one late-presenting case. In four children, the initial diagnosis was traumatic pancreatitis, based on clinical findings and hyperamylasemia. In one case, the association of fever, hyperamylasemia and a palpable abdominal mass led to an initial diagnosis of traumatic pseudocyst. The correct diagnosis was made only 2–6 days later. In two children, an initial plain abdominal X-ray showing gastroduodenal dilatation with scanty distal gas, as well as absence of the right psoas shadow, was suggestive of duodenal obstruction. The correct diagnosis was usually established through computed tomography [Figure 1]. Ultrasound and barium meal were helpful in three cases [Figures 2 and 3]. A gastroduodenal endoscopy was done in one late-presenting case, where CT, barium meal and ultrasound were not conclusive. The diagnosis of IDH was reached within 72 hours in four children and up to 6 days in the other five. Intramural duodenal hematoma was an isolated injury in four children. In the other five it was associated with pancreatitis. Two children had associated head trauma.

All nine children were initially treated conservatively. In seven of them the hematoma resolved within 9–20 days. Some clinical improvement was already noticed after 3–5 days. In two children, surgical drainage was performed since no improvement was noticed after 14–16 days. IDH evacuation was the only procedure performed. Children with isolated IDH had a mean hospital stay of 8 days. The two patients who underwent surgery remained hospitalized for 16 and 22 days respectively. Both had associated traumatic pancreatitis.

All nine children recovered without permanent complications.

IDH = intramural duodenal hematoma



Figure 1. Enhanced CT reveals intramural duodenal hematoma almost completely obstructing the lumen.



Figure 2. Transverse ultrasound scan shows the IDH as a hypoechoic mass.

Two children were rehospitalized 6 and 14 days after discharge. One child had a recurrent bout of pancreatitis, and the other had small bowel obstruction. Both recovered after conservative treatment. At 1–3 years follow-up all nine children were asymptomatic.

Discussion

Traumatic intramural duodenal hematoma in children occurs in 2 to 3% of blunt abdominal trauma [1,2]. Anatomic factors such as duodenal retroperitoneal fixation, position in front of the vertebral column, the rich submucosal and subserosal vascular plexus, and a weak muscular abdominal wall, are all contributory to the development of IDH. The close duodenopancreatic relationship explains why traumatic pancreatitis is the most commonly associated intraabdominal injury in IDH. Jewett et al. [1], in a revision of 182 cases of IDH in children, found that 21% had associated pancreatitis. Since the trauma is sometimes trivial, some children do not remember it [3]. Handlebar trauma, road traffic injury and sports trauma are the main etiologic

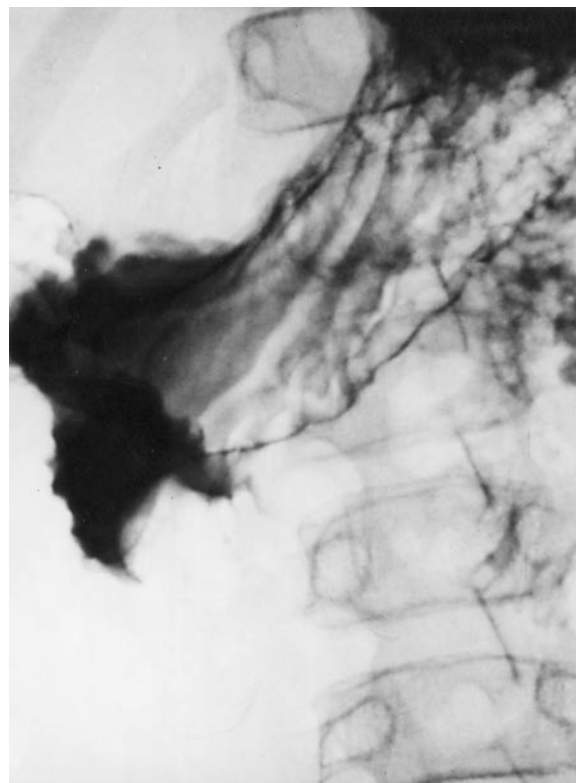


Figure 3. Barium meal demonstrates the obstructed duodenal lumen.

factors [4,5]. In addition, child abuse should always be kept in mind, mainly in children under the age of 5 [6,7], as in one of our cases. In a special subgroup, clotting disorders represent an additional factor that can be a cause for the development of IDH even with minimal or endoscopic trauma [8]. It has been suggested that endoscopic procedures should be performed only in children with more than 50,000/mm³ platelets and normal prothrombin time/partial thromboplastin time [9].

The first reported case of IDH in 1938 was believed to be a pseudoaneurysm between the mucosa and muscular layers [10]. Since then data have accumulated from isolated cases or small series [11]. It soon became apparent that when the duodenum is pressed against the lumbar spine by a traumatic agent, the resulting contusion and bleeding can generate hematoma. This hematoma can increase and gradually obstruct the lumen. IDH has been diagnosed at all ages and in both sexes but the pediatric male is the most affected [12]. The diagnosis of IDH is based on signs and symptoms of high intestinal obstruction following trauma, supported by radiologic evidence of duodenal obstruction [13]. The best imaging tool is an enhanced CT, although ultrasound and barium meal are also useful. Endoscopic studies and magnetic resonance imaging are performed in isolated cases when clinical data and conventional techniques are inconclusive [14–16]. MRI typically shows a three-layered ring sign [17].

The principles of conservative management are based on nasogastric decompression and total parenteral nutrition. Clotting disorders should be excluded or treated. If pancreatitis is



Figure 4. Operative view of the incised serosa at the duodenojejunal junction and clot evacuation.

present it should be addressed properly. Somatostatin should be used in cases of severe duodenopancreatic damage. The hematoma absorption should be followed up with ultrasound imaging. After a few days, usually a week, the nasogastric tube can be periodically closed to test and stimulate duodenal transit. Clear fluids are then introduced and the diet is gradually advanced. In most cases, hematoma resolution is completed after 2 weeks of treatment. Surgical exploration is considered if there is no clinical improvement and the hematoma does not regress within 2 weeks [14]. During surgery, the duodenopancreatic region must be carefully examined. Manipulation should be very gentle to avoid additional trauma to the explored organs. Pancreatic damage and the degree and extent of duodenal injury are evaluated [18]. In most cases, a radial incision to evacuate the hematoma is all that is needed. Mucosal injury should be avoided to reduce the hazard of leakage. Experience has proven that clot drainage is easily achieved by an incision at the duodenojejunal junction, and not at a previously traumatized duodenal wall [Figure 4]. The serosal incision is left open to heal spontaneously. There is no need to look for the bleeding vessels since they are usually thrombosed.

When severe duodenopancreatic damage is present, simple hematoma drainage is not enough. In these rare cases, duodenal repair with or without proximal decompression is an option [19]. In a recent report, an adult with IDH was successfully treated by a CT-guided percutaneous procedure, following conservative treatment failure [20].

Conservative treatment of IDH is highly successful, mainly in early diagnosed cases. When surgery become imperative, clot drainage is simple to achieve and will suffice to relieve obstruction in the vast majority of patients.

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Every time I see an adult on a bicycle, I no longer despair for the future of the human race

H.G. Wells (1866-1946), British writer