

## CLINICAL VIGNETTE

# Intraduodenal Hematoma after Therapeutic Upper Endoscopy Causing Acute Pancreatitis

Michael C. Jean, MD and Sittiporn Bencharit, MD

### Case

A 65-year-old female presented to the emergency department (ED) for right-sided conjunctival hemorrhage, weakness and fatigue. She had a history of large, infiltrating ductal carcinoma of the breast diagnosed in 2011, when she underwent a right mastectomy with 6 of 9 positive lymph nodes. A right-sided tissue expander was placed, but reconstructive surgery was never performed. No chemotherapy was performed, as the patient sought out an alternative medicine doctor, who treated her with intravenous zinc and other unconventional therapies. Years later, she was diagnosed with metastasis to the liver, bone, spine, and lungs. Other pertinent past medical history included chronic renal insufficiency.

The patient had an allergy to penicillin. She denied any current medications except for the occasional over-the-counter ibuprofen or naproxen, which she took for varied aches and pains. She denied a history of smoking or alcohol intake.

Initial laboratory values performed in the ED found the patient to be anemic with a hemoglobin (Hgb) of 6.6 g/dL. Additional laboratory values include a white blood count (WBC) of 4.9 K/uL, mean corpuscular volume (MCV) 103.7, platelet count (Plt) 51 K/uL, AST 41 U/L, alkaline phosphatase 159 U/L (nml 35-105), INR 1.1, PTT 46 seconds (nml 25-35) and a reticulocyte count of 4.5% (nml 0.5 to 1.5). History was negative for melena or bright red blood per rectum. Fecal occult blood was positive in the ED. The patient's hemoglobin responded appropriately to 9.7 g/dL, after transfusion of two units of packed red blood cells (PRBC).

Gastroenterology was consulted, and an esophagogastroduodenoscopy (EGD) and colonoscopy were performed on hospital day #2. EGD showed mild gastritis and was otherwise normal. Cold biopsies were taken of the antrum, duodenal bulb, and the second and third portions of the duodenum. Colonoscopy was negative for bleeding, polyps, diverticula, or any mucosal abnormalities. No biopsies were taken during the colonoscopy. The gastric biopsies later returned negative for *Helicobacter pylori*. The duodenal biopsies were negative for blunting of villi and for intraepithelial inflammatory cell infiltrates. On hospital day #3, that patient was discharged home in stable condition.

One day after discharge, the patient returned to the ED with nausea, vomiting, and epigastric abdominal pain. She denied

any overt bleeding such as melena or bright red blood per rectum. She did report several episodes of coffee ground emesis. Lab values were as follows: Hgb of 6.6 g/dL, WBC 6.6 K/uL, Plt 51 K/uL, creatinine (Cr) 1.3 mg/dL, lipase 64 U/L, bilirubin 0.7 mg/dL.

A second EGD was performed on hospital day #2. Oozing of blood was noted coming from the previous cold biopsy sites at the fundus, body, and duodenum (Figure 1). Nearly a liter of dark, yellow fluid was suctioned from the stomach. Per the endoscopy report, duodenal edema with possible duodenal obstruction was noted. Within the duodenum, several large clots were removed with the endoscope. Active oozing was seen along a biopsy site. The biopsy site was 1 to 2 cm downstream to the papilla, along the inferior, posterior border of the 2<sup>nd</sup> portion of the duodenum. Four mL of 1:10,000 epinephrine was injected at the bleeding biopsy sites, followed by bipolar electrocautery. Given the amount of blood loss during the endoscopy, 2 units of PRBC and 2 units of platelet were transfused.

On hospital day #3, the patient continued to have epigastric pain, nausea and vomiting. A lipase level that morning was greater than 600 U/L. Aggressive fluid resuscitation with lactated ringers at 200 mL/hour was initiated. Computed tomography scan (CT) of the abdomen and pelvis was performed on an urgent basis. No intravenous contrast was given, as the patient's glomerular filtration rate was 47 (Normal >59). The CT scan (Figure 2) showed an 8cm hemorrhage, within wall of the second and third portion of the duodenum. No free intraperitoneal air was seen, yet there was concern of a small perforation given a small amount of extraluminal hemorrhage visualized on the scan. Numerous hepatic metastases and extensive metastatic osseous disease were noted. Incidental cholelithiasis was noted as well. Given the CT scan findings, the patient was made NPO, and intravenous levofloxacin and metronidazole were initiated.

A hematology consult contributed the anemia to the intraduodenal hematoma, malignant bone marrow infiltration, and increased consumption of red blood cells (RBC). It was thought the thrombocytopenia and increased RBC consumption were from low-grade disseminated intravascular coagulopathy (DIC). Three doses of desmopressin were given as well as blood product support to keep the platelets above 100K/uL, and to

keep the hemoglobin above 8 g/dL. Over the next 8 hospital days, an additional 4 units of platelets, and 3 units of PRBCs were given to meet these parameters.

The patient became progressively more jaundiced, and the bilirubin continued to rise by approximately 1-2 mg/dL a day. On hospital day #6, labs were as follows: Total bilirubin 9.4, direct bilirubin 7.3, AST 106, ALT 47, alkaline phosphatase 232, lipase 117, Hgb 6.6. Magnetic resonance cholangiopancreatography could not be performed secondary to the metal in the previously placed breast tissue expander. Endoscopic ultrasound was not available at our institution. Transabdominal ultrasound of the right upper quadrant showed multiple masses in the liver consistent with metastatic disease. No biliary ductal dilation was noted. There were small gallstones and sludge noted in the gall bladder, but no evidence of cholecystitis.

On hospital day #11, the patient developed numbness along the left side of her face, as well as a left-sided facial droop. A non-contrast CT scan of the head showed no evidence of acute hemorrhage or focal mass. A heterogeneous lytic appearance of the skull, consistent with metastasis, was demonstrated. Labs were as follows: Bilirubin 19.8, AST 187, ALT 54, alkaline phosphatase 513.

Treatment options were discussed in detail with the patient and her family. Given her advanced cancer and poor prognosis, the patient decided not to proceed with any further intervention or treatment. The patient was discharged on home hospice.

### **Discussion**

Intraduodenal Hematoma (IDH) were first described in the medical literature in 1838.<sup>1</sup> IDH are most common in the pediatric population, and are most commonly secondary to blunt abdominal trauma.<sup>2</sup> The 2<sup>nd</sup> and 3<sup>rd</sup> portion of the duodenum has a relatively fixed retroperitoneal position, and is adjacent to the vertebral spine. This makes the 2<sup>nd</sup> and 3<sup>rd</sup> portion of the duodenum more prone to shear injury, and to the development of hematomas after abdominal trauma.<sup>3,4</sup> A rich submucosal vascular plexus, and the lack of a well-developed serosal layer in the retroperitoneum, likely increase the risk of hematomas as well.<sup>2,4</sup> Of note, spontaneous, non-traumatic IDH's have been reported in patients with coagulopathies and in patients on anticoagulation.<sup>5</sup>

IDH following various endoscopic procedures have also been described. Cold biopsies of the duodenum taken during upper endoscopy have been reported as a cause of IDH in several reports.<sup>6,7</sup> IDH after endoscopic retrograde cholangiopancreatography (ERCP) has been reported.<sup>8</sup> This therapeutic ERCP included a sphincterotomy, balloon dilation and extrac-

tion of gallstones. Also, IDH has been reported after submucosal injection of epinephrine into the base of a duodenal ulcer.<sup>9-12</sup> Risk factors for IDH after endoscopic procedures include underlying coagulopathies, recent use of anticoagulants, thrombocytopenia, and liver cirrhosis.<sup>13</sup>

IDH should be suspected in the differential diagnosis of upper abdominal pain, nausea, and vomiting occurring after endoscopy. Occasionally, a drop in hemoglobin is noted post procedure. CT scan is usually the best method of diagnosis, and it also can be used to rule out the dreaded complication of intestinal perforation.

Complications of IDH can lead to perforation, intraluminal bleeding, as well as pancreatitis.<sup>14-16</sup> Pancreatitis is thought to occur from ampullary obstruction and compression from the hematoma.<sup>10</sup> Mass effect from the hematoma can lead to gastric outlet obstruction and proximal duodenal obstruction.

Treatment is typically conservative with nasogastric tube placement and bowel rest. The hematoma typically resolves within a period of weeks. Total parenteral nutrition has also been recommended when patients are NPO over prolonged periods of time. Surgical drainage has been described in more urgent cases of ongoing bleeding and instability.<sup>17</sup> Drainage under ultrasound or CT guidance are also potential options. There is one case reporting successful intraluminal endoscopic drainage of the hematoma.<sup>18</sup>

The true incidence IDH after endoscopic procedures is unknown, given it is a rare complication. In a pediatric population at a single institution, approximately 2500 upper endoscopies with duodenal biopsies were performed over a 5-year time period. Two cases of IDH were documented in their population. The authors thus estimated the incidence of IDH as possibly as high as 1 in 1250.<sup>6</sup>

Zinelis et al<sup>19</sup> suggested that extending the forceps greater than 3cm beyond the tip of the endoscope to grasp mucosa could cause tenting of the mucosa, possibly tearing submucosal vessels. As a way to decrease the chance of causing IDH, these authors suggested not extending the biopsy forceps >2-3 cm past the tip during biopsies. Authors have also recommended taking cold biopsies well away from the major ampulla, in order to decrease the risk of pancreatitis after IDH.

### **Conclusion**

Intraduodenal hematomas secondary to endoscopic procedures are a known, yet rare, complication following endoscopy. Physicians need to be cognizant of this rare, yet potentially fatal complication.



Figure 1. (Left picture shows oozing/bleeding in the 2<sup>nd</sup> portion of the duodenum. Middle picture shows previous biopsy site after blood clots removed. Right picture shows biopsy site after injection and cautery)



Figure 2. Intraduodenal hematoma noted in the 2<sup>nd</sup> and 3<sup>rd</sup> portions of the duodenum. Hounsfield unit measured 75, which is consistent with blood.

## REFERENCES

1. **McLauchlan J.** Fatal false aneurysmal tumour occupying nearly the whole of the duodenum. *Lancet.* 1838; 2:203-5.
2. **Jones WR, Hardin WJ, Davis JT, Hardy JD.** Intramural hematoma of the duodenum: a review of the literature and case report. *Ann Surg.* 1971 Apr;173(4):534-44. PubMed PMID: 5573645; PubMed Central PMCID: PMC1397412.
3. **Kunin JR, Korobkin M, Ellis JH, Francis IR, Kane NM, Siegel SE.** Duodenal injuries caused by blunt abdominal trauma: value of CT in differentiating perforation from hematoma. *AJR Am J Roentgenol.* 1993 Jun; 160(6):1221-3. PubMed PMID: 8498221.
4. **Konstantinidis A, Plurad D, Barmparas G, Inaba K, Lam L, Bukur M, Branco BC, Demetriades D.** The presence of nonthoracic distracting injuries does not affect the initial clinical examination of the cervical spine in evaluable blunt trauma patients: a prospective observational study. *J Trauma.* 2011 Sep;71(3):528-32. doi: 10.1097/TA.0b013e3181f8a8e0. PubMed PMID: 21248650.
5. **Polat C, Dervisoglu A, Guven H, Kaya E, Malazgirt Z, Danaci M, Ozkan K.** Anticoagulant-induced intramural intestinal hematoma. *Am J Emerg Med.* 2003 May;21(3): 208-11. PubMed PMID: 12811714.
6. **Guzman C, Bousvaros A, Buonomo C, Nurko S.** Intraduodenal hematoma complicating intestinal biopsy: case reports and review of the literature. *Am J Gastroenterol.* 1998 Dec;93(12):2547-50. Review. PubMed PMID: 9860424.
7. **Grasshof C, Wolf A, Neuwirth F, Posovszky C.** Intramural duodenal haematoma after endoscopic biopsy: case report and review of the literature. *Case Rep Gastroenterol.* 2012 Jan;6(1):5-14. doi: 10.1159/000336022. Epub 2012 Jan 5. PubMed PMID: 22379465; PubMed Central PMCID: PMC3290028.
8. **Weiss E, Tadley M, Leung PS, Kaplan M.** Ruptured Dissecting Intramural Duodenal Hematoma Following Endoscopic Retrograde Cholangiopancreatography. *ACG Case Rep J.* 2017 May 24;4:e70. doi: 10.14309/crj.2017.70. eCollection 2017. PubMed PMID:28584843; PubMed Central PMCID: PMC5449572.
9. **Dibra A, Kelliçi S, Çeliku E, Draçini X, Maturo A, Çeliku E.** Intramural duodenal hematoma after

submucosal injection of epinephrine for a bleeding ulcer: case report and review. *G Chir*. 2015 Jan-Feb;36(1):29-31. Review. PubMed PMID: 25827667; PubMed Central PMCID: PMC4396664.

upper gastrointestinal endoscopic biopsy. *Dig Dis Sci*. 1989 Feb;34(2):289-91. PubMed PMID: 2644113.

Submitted June 29, 2018

10. **Ofori E, Sunkara T, Then E, John F, Gaduputi V.** Acute duodenal intramural hematoma complicated by acute pancreatitis-a rare complication of endoscopic epinephrine injection therapy. *Oxf Med Case Reports*. 2018 Jan 23; 2018(1):omx090. doi: 10.1093/omcr/omx090. eCollection 2018 Jan. PubMed PMID: 29383264; PubMed Central PMCID: PMC5778456.
11. **Silva JD, Veloso N, Godinho R, Gonçalves L, Medeiros I, Viveiros C.** Fatal acute pancreatitis following sclerosis of a bleeding duodenal ulcer complicated by an intramural duodenal hematoma. *Rev Esp Enferm Dig*. 2012 Dec;104(11):603-4. PubMed PMID: 23368652.
12. **Calhan T, Sahin A, Kahraman R, Soydaş B, Tosun A, Cebeci E.** A Lethal Complication of Endoscopic Therapy: Duodenal Intramural Hematoma. *Case Rep Gastrointest Med*. 2015;2015:201675. doi: 10.1155/2015/201675. Epub 2015 Nov 30. PubMed PMID: 26697240; PubMed Central PMCID: PMC4677192.
13. **Sugai K, Kajiwara E, Mochizuki Y, Noma E, Nakashima J, Uchimura K, Sadoshima S.** Intramural duodenal hematoma after endoscopic therapy for a bleeding duodenal ulcer in a patient with liver cirrhosis. *Intern Med*. 2005 Sep;44(9):954-7. PubMed PMID: 16258210.
14. **Chang CM, Huang HH, How CK.** Acute pancreatitis with an intramural duodenal hematoma. *Intern Med*. 2015; 54(7):755-7. doi: 10.2169/internalmedicine.54.3147. Epub 2015 Apr 1. PubMed PMID: 25832937.
15. **Goyal H, Singla U, Agrawal RR.** A rare cause of acute pancreatitis: intramural duodenal hematoma. *Case Rep Gastrointest Med*. 2012;2012:275604. doi: 10.1155/2012/275604. Epub 2012 Oct 4. PubMed PMID: 23091743; PubMed Central PMCID: PMC3471415.
16. **Shiozawa K, Watanabe M, Igarashi Y, Matsukiyo Y, Matsui T, Sumino Y.** Acute pancreatitis secondary to intramural duodenal hematoma: Case report and literature review. *World J Radiol*. 2010 Jul 28;2(7):283-8. doi:10.4329/wjr.v2.i7.283. PubMed PMID: 21160669; PubMed Central PMCID: PMC2998857.
17. **Elmoghazy W, Noaman I, Mahfouz AE, Elaffandi A, Khalaf H.** Surgical management of complicated intramural duodenal hematoma: A case-report and review of literature. *Int J Surg Case Rep*. 2015;17:103-5. doi: 10.1016/j.ijscr.2015.10.028. Epub 2015 Oct 30. PubMed PMID: 26595897; PubMed Central PMCID: PMC4701797.
18. **Lee JY, Chung JS, Kim TH.** Successful endoscopic decompression for intramural duodenal hematoma with gastric outlet obstruction complicating acute pancreatitis. *Clin Endosc*. 2012 Sep;45(3):202-4. doi: 10.5946/ce.2012.45.3.202. Epub 2012 Aug 22. PubMed PMID: 22977802; PubMed Central PMCID: PMC3429736.
19. **Zinelis SA, Hershenson LM, Ennis MF, Boller M, Ismail-Beigi F.** Intramural duodenal hematoma following