



Needle-knife incision and drainage of duodenal intramural hematoma relieving duodenal and biliary obstruction

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INTRODUCTION

Duodenal intramural hematomas have been reported after endoscopic interventions,¹ after pediatric blunt trauma,² in anticoagulation therapy,³ in patients with leukemia,⁴ after bone marrow transplantation,⁵ and after pancreatitis.⁶ Intramural duodenal hematomas usually occur in the second and third segments of the duodenum because of their retroperitoneal fixation and a rich submucosal and subserosal vascular supply.^{7,8}

Management of these hematomas is usually conservative unless other adverse events arise that may warrant surgical interventions.^{1,9} Large duodenal intramural hematomas can cause intraluminal obstruction in the form of double obstruction (duodenal and biliary) as well as triple obstruction (duodenal, biliary, and pancreatic).¹⁰ Endoscopic incision with drainage of an obstructive intramural duodenal hematoma has been reported as a novel technique if conservative measures fail.¹¹

In this case, we illustrate endoscopic needle-knife incision and drainage of duodenal intramural hematoma relieving duodenal and biliary obstruction. The hematoma caused compression of the major papilla, distorting anatomy and causing a functional biliary obstruction not allowing ERCP to be performed. Hence, hematoma drainage was performed with a needle-knife, allowing subsequent interventions (EUS and ERCP) to be performed in this patient (Video 1, available online at www.videogie.org).

CASE PRESENTATION

A 44-year-old man was hospitalized with abdominal pain and postprandial vomiting. He had cirrhosis because of

Abbreviations: CBD, common bile duct; LAMS, lumen-apposing metal stent.

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alcohol-use disorder and chronic hepatitis C, cholelithiasis, and chronic pancreatitis complicated by pancreatic pseudocysts and multiple acute pancreatitis episodes.

Investigations showed elevated liver biochemistries (Tables 1 and 2). An MRCP showed an obstructing intramural duodenal hematoma (Fig. 1), a 7.5-cm pancreatic cyst, and a common bile duct (CBD) stricture. A CT scan ruled out active bleeding (Figs. 2 and 3). The CT axial view showed the large submucosal duodenal hematoma measuring approximately 5 × 14 cm (alkaline phosphatase, transverse dimensions) with surrounding edema extending into the peripancreatic and retroperitoneal spaces. In addition, a cyst was seen in the body and tail of the pancreas (Figs. 2-4). The CT coronal view showed the duodenal submucosal hematoma and the pancreatic cyst (Fig. 5).

Endoscopically, a large obstructing duodenal hematoma was observed (Fig. 6). Endosonographically, the hematoma had hypoechoic and hyperechoic features with no Doppler flow (Fig. 7). The hematoma was enclosed within layer 4 (muscularis propria) of the duodenum, ensuring there was no perforation or communication. To relieve the obstruction, the hematoma was incised with a needle-knife (Fig. 8) entering the cavity. The incision was dilated, and the hematoma cavity bluntly dissected with rat-toothed forceps, similar to blunt dissection in surgeries (Fig. 9), allowing drainage and evacuation of contents. An EUS showed CBD

TABLE 1. Elevated liver chemistries

Total bilirubin	8.5 mg/dL
Direct bilirubin	6.6 mg/dL
Alkaline phosphatase	2710 IU/L
Aspartate aminotransferase	168 IU/L
Alanine aminotransferase	174 IU/L

TABLE 2. Hematology

White blood cell count	10.14 × 1000/mm ³
Differential	Neutrophil: 83.5%, Lymphocyte: 11.3%, Monocyte: 4.3%, Eosinophil: 0%, Basophil: 0.2%
Hemoglobin	11.7 g/dL
Hematocrit	35.5%
Platelets	239 × 1000/mm ³

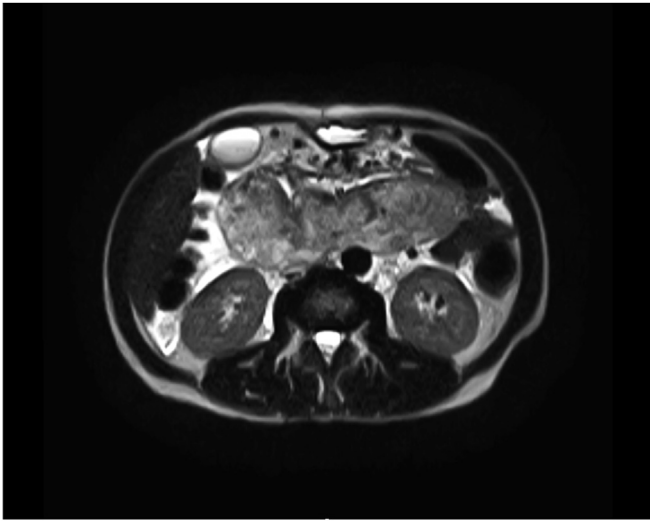


Figure 1. MRI without contrast showing an obstructing intramural duodenal hematoma.

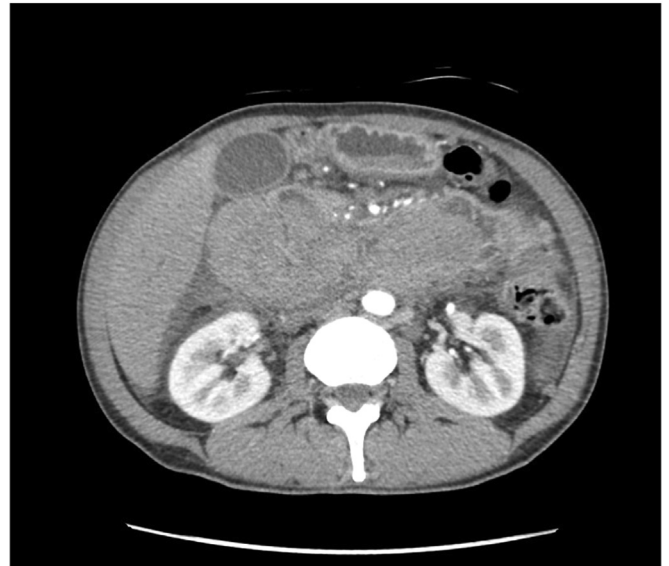


Figure 3. CT scan with arterial contrast does not show any contrast extravasation ruling out active bleeding.

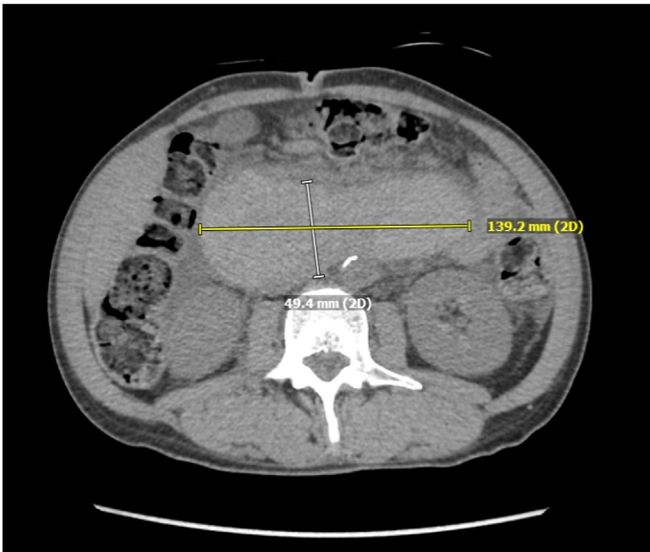


Figure 2. CT scan without contrast showing the size of the duodenal hematoma: 139.2 × 49.4 mm.

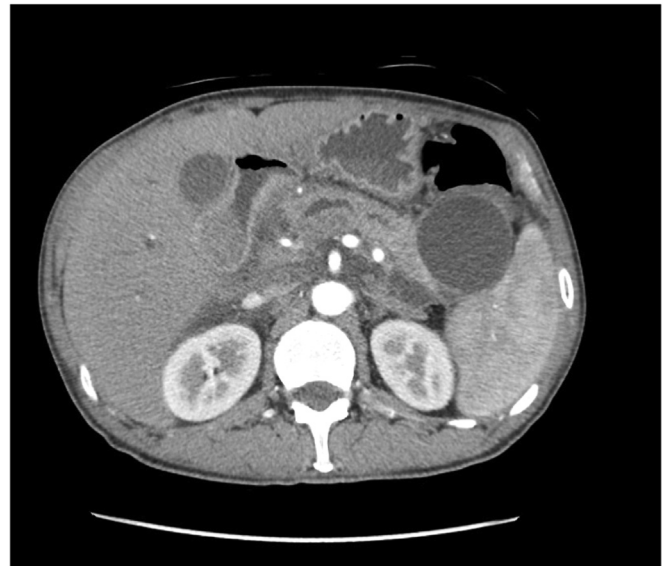


Figure 4. CT scan showing a pancreatic body and tail cyst.

dilation of 10 mm, a moderate amount of biliary sludge without calculi (Fig. 10), and a pancreatic body and tail anechoic unilocular cyst (74 × 45 mm) (Fig. 11). ERCP was attempted, but the large hematoma prevented access to the papilla. The hematoma caused compression of the major papilla, distorting the anatomy and causing a functional biliary obstruction. Hence, additional hematoma drainage was performed (Fig. 12), permitting biliary cannulation, which showed a distal CBD stricture and upstream CBD dilation without calculi (Fig. 13). After a sphincterotomy, a 7F × 7-cm plastic biliary stent was placed. Follow-up on day 4 showed biochemical improvement (Table 3). At a separate

session on day 4, EUS-guided pancreatic cystogastrostomy with a 15- × 10-mm lumen-apposing metal stent (LAMS) was performed. Clear fluid drained from the cavity was suggestive of a pseudocyst (Fig. 14).

After improvement in symptoms and liver biochemistries in 2 months (Table 4), a repeat endoscopy was performed, which showed complete resolution of the hematoma (Fig. 15). Hence, the biliary stent and the LAMS were removed with rat-toothed forceps in the same session. No adverse events were observed, and no antibiotics were used with any of these procedures. A repeat CT scan after 3 months at an outside facility showed sequelae of chronic



Figure 5. CT coronal view showing the duodenal hematoma and the pancreatic cyst.

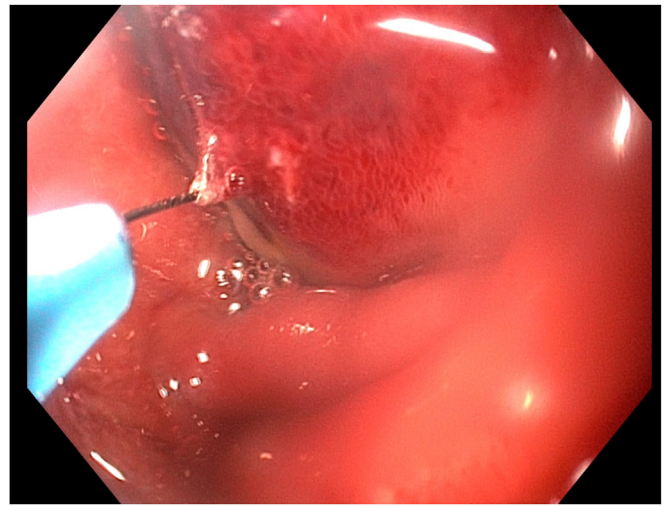


Figure 8. Needle-knife incision and drainage of the hematoma.

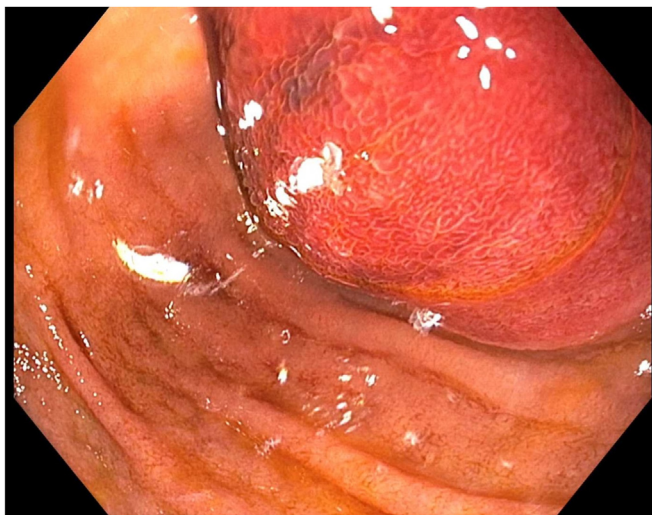


Figure 6. Endoscopic view from the duodenal bulb showing the obstructing duodenal hematoma.

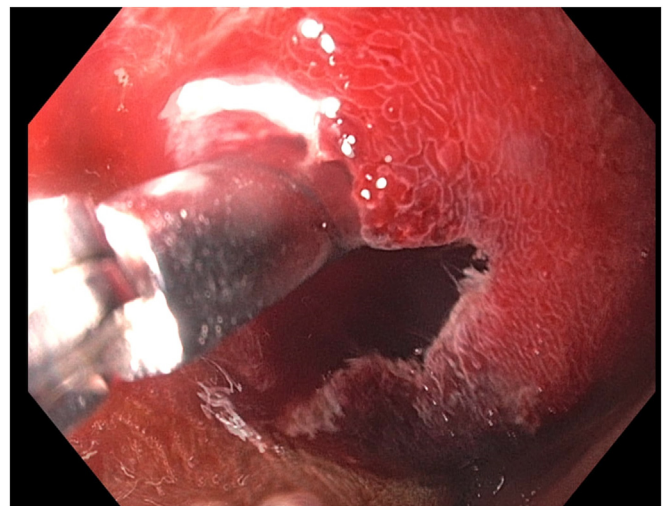


Figure 9. Blunt dissection and dilation of the incision site with rat-toothed forceps.



Figure 7. EUS of the hematoma showing irregular hypoechoic and hyperechoic features without Doppler flow. The hematoma was enclosed within layer 4 (muscularis propria) of the duodenum.



Figure 10. EUS showing common bile duct dilation of 10 mm with moderate amount of sludge but no stones.

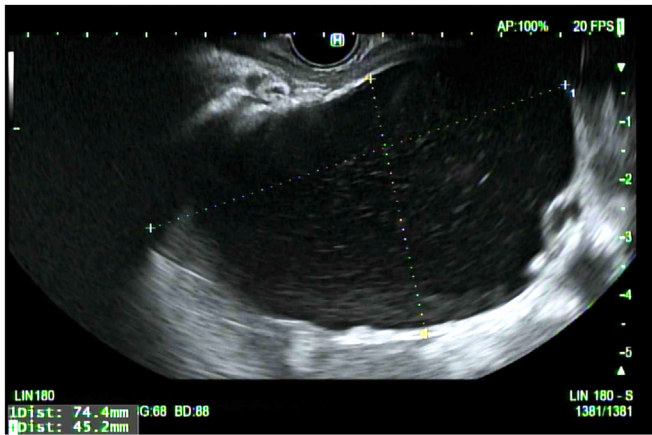


Figure 11. EUS showing an anechoic unilocular pancreatic body and tail cyst of 74.4 × 45.2 mm.

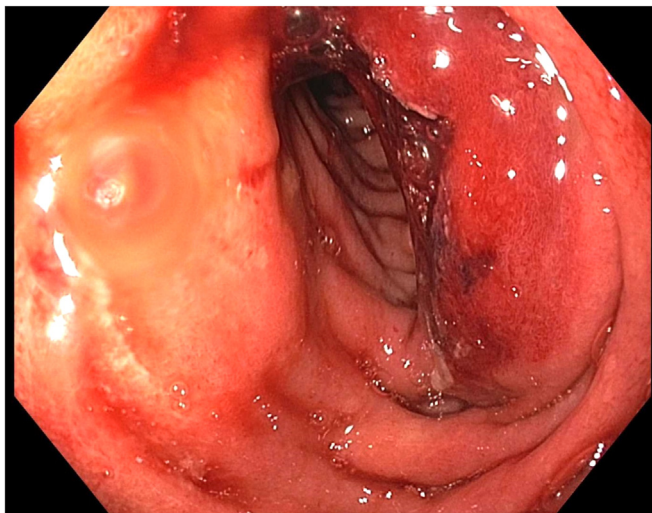


Figure 12. Hematoma after incision and drainage with relief of obstruction.

pancreatitis with pancreatic calcifications, CBD of 8 mm, and no evidence of duodenal hematoma or perforation.

CASE SUMMARY

This patient had an episode of acute-on-chronic pancreatitis complicated with a pseudocyst and spontaneous duodenal intramural hemorrhage causing luminal and functional biliary obstruction by compressing the major papilla. The distal CBD stricture seen on MRCP and ERCP was likely caused by the compression effect of the inflamed pancreas and chronic pancreatitis. However, the duodenal hematoma caused compression of the major papilla, distorting anatomy and causing a functional biliary obstruction not allowing ERCP to be performed. After confirmation with EUS,

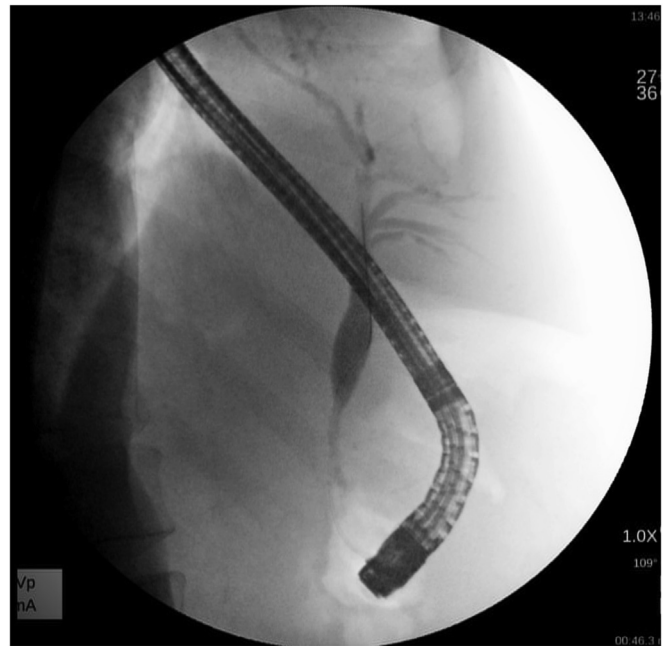


Figure 13. ERCP showing a distal common bile duct stricture and upstream common bile duct dilation.

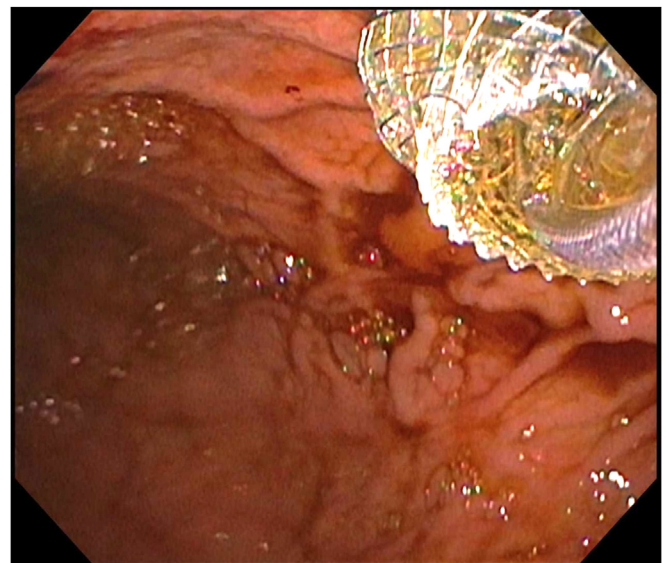


Figure 14. Cystogastrostomy with a 15- × 10-mm lumen-apposing metal stent.

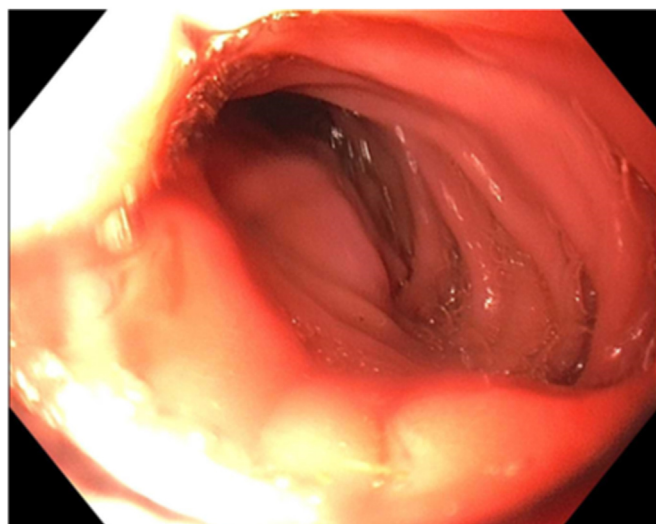
the patient underwent needle-knife-guided hematoma evacuation followed by ERCP with biliary stenting and LAMS placement at a separate session to treat the jaundice and pseudocyst, respectively. On follow-up, the patient had durable relief from the endoscopic intervention, manifested as improvement in symptoms, normalization of liver chemistries, and endoscopic and imaging resolution of the collection.

TABLE 3. Biochemical improvement by day 4

Before and after biliary and hematoma drainage	Day 1	Day 4
Total bilirubin	8.5 mg/dL	2.7 mg/dL
Direct bilirubin	6.6 mg/dL	1.6 mg/dL
Alkaline phosphatase	2710 IU/L	835 IU/L
Aspartate aminotransferase	168 IU/L	21 IU/L
Alanine aminotransferase	174 IU/L	31 IU/L

TABLE 4. Biochemical course by day 60 at the time of removal of biliary stent and lumen-apposing metal stent

Before and after biliary and hematoma drainage	Day 1	Day 4	Day 60
Total bilirubin	8.5 mg/dL	2.7 mg/dL	0.5 mg/dL
Direct bilirubin	6.6 mg/dL	1.6 mg/dL	0.2 mg/dL
Alkaline phosphatase	2710 IU/L	835 IU/L	235 IU/L
Aspartate aminotransferase	168 IU/L	38 IU/L	25 IU/L
Alanine aminotransferase	174 IU/L	31 IU/L	21 IU/L

**Figure 15.** Follow-up endoscopy after 2 months showing resolution of the hematoma.

CONCLUSION

Large duodenal intramural hematomas can cause obstruction of the duodenal lumen and/or pancreatobiliary system. Management of these hematomas is usually conservative unless other adverse events arise. This case illustrates endoscopic needle-knife incision and drainage of a duodenal intramural hematoma and performance of subsequent interventions. With careful patient selection, this technique can be used to relieve obstruction of the duodenal lumen and biliary system.

DISCLOSURE

The authors did not disclose any financial relationships.

REFERENCES

- Guzman C, Bousvaros A, Buonomo C, Nurko S. Intraduodenal hematoma complicating intestinal biopsy: case reports and review of the literature. *Am J Gastroenterol* 1998;93:2547-50.
- Winthrop AL, Wesson DE, Filler RM. Traumatic duodenal hematoma in the pediatric patient. *J Pediatr Surg* 1986;21:757-60.
- Veldt BJ, Haringsma J, Florijn KW, Kuipers EJ. Coumarin-induced intramural hematoma of the duodenum: case report and review of the literature. *Scand J Gastroenterol* 2011;46:376-9.
- Lipson SA, Perr HA, Koerper MA, Ostroff JW, Snyder JD, Goldstein RB. Intramural duodenal hematoma after endoscopic biopsy in leukemic patients. *Gastrointest Endosc* 1996;44:620-3.
- Ramakrishna J, Treem WR. Duodenal hematoma as a complication of endoscopic biopsy in pediatric bone marrow transplant recipients. *J Pediatr Gastroenterol Nutr* 1997;25:426-9.
- Oliveira JHB, Esper RS, Ocariz RC, et al. Intramural duodenal hematoma secondary to pancreatitis: case report and review of the literature. *Sao Paulo Med J* 2018;136:597-601.
- Jones WR, Hardin WJ, Davis JT, Hardy JD. Intramural hematoma of the duodenum: a review of the literature and case report. *Ann Surg* 1971;173:534-44.
- Zinelis SA, Hershenson LM, Ennis MF, Boller M, Ismail-Beigi F. Intramural duodenal hematoma following upper gastrointestinal endoscopic biopsy. *Dig Dis Sci* 1989;34:289-91.
- Touloukian R. Protocol for the nonoperative treatment of obstructing intramural duodenal hematoma during childhood. *Am J Surg* 1983; 145:330-4.
- Samanta J, Dhar J, Muktesh G. Para-duodenal pancreatitis with triple obstruction: Divergent path for a management enigma. *Dig Endosc* 2021;33:205.
- Kwon C-I, Ko KH, Kim HY, et al. Bowel obstruction caused by an intramural duodenal hematoma: a case report of endoscopic incision and drainage. *J Korean Med Sci* 2009;24:179-83.