

Contents lists available at [ScienceDirect](#)

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

A belly of blood: A case report describing surgical intervention in a gastric intramural haematoma precipitated by therapeutic endoscopy in an anticoagulated patient



Sabrina Ngaserin Hui Na Ng (MRCSed MBBS)*, Hiang Jin Tan (MRCSed MD),
Christopher Hang Liang Keh (FRCS MD)

Department of General Surgery, Ng Teng Fong General Hospital, Singapore

ARTICLE INFO

Article history:

Received 11 April 2016

Received in revised form 28 May 2016

Accepted 3 June 2016

Available online 18 July 2016

Key words:

Gastric haematoma

Endoscopy

Anticoagulation

Case report

ABSTRACT

Gastric intramural hematoma, “intramural dissection” or “false aneurysm”, is a rare and dangerous condition which may be more broadly classified as a spectrum of acute gastric mucosal injury. It is postulated that disruption of the mucosa and blood vessels within the submucosal layer results in dissection of the muscularis propria from the mucosa, with eventual clot formation. While a majority of cases resolve with conservative management, we describe a successfully managed case requiring surgical intervention. Progression of the haematoma was documented both endoscopically and surgically in an elderly anticoagulated patient who suffered a complication of therapeutic endoscopic intervention. A review of the literature is presented.

© 2016 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Gastric intramural hematoma is an uncommon condition in current medical practice. Also termed intramural dissection, this dangerous condition may be more broadly classified as a spectrum of “acute gastric mucosal injury”, where disruption of the mucosa and blood vessels within the submucosal layer results in dissection of the muscularis propria from the submucosa, with eventual clot formation.

The condition has been reported throughout the gastrointestinal tract and can be broadly attributed to spontaneous, medical, traumatic or iatrogenic causes. While most cases resolve with conservative management, surgery was mandatory in a few described cases of gastric intramural haematoma due to concomitant perforation or gastric outlet obstruction. To the best of our knowledge, this is the second case documenting both endoscopy and surgery for uncontrolled haemorrhage.

2. Case report

An 81 year old Chinese female was admitted for a fall and managed by the orthopaedics unit at our institution for T12 and L2 compression fractures and a left clavicle fracture. Her prior medical conditions include hypertension, hyperlipidaemia, and osteoporosis. She was provided with analgesia including a course of NSAIDs. During this admission, she also developed a left segmental pulmonary embolus, in the absence of deep vein thrombosis, possibly related to immobility. After thorough investigations to rule out secondary causes, she was started on subcutaneous low-molecular-weight heparin (enoxaparin) at the dose of 1 mg/kg twice daily by her haematologist. Upon initiating treatment, she was found to have progressive iron deficiency anaemia hence an upper gastrointestinal (GI) endoscopy and CT colonography was arranged by her managing gastroenterologist. Enoxaparin was withheld for 12 h prior to the procedure.

Her upper GI endoscopy revealed pangastric erosions and a 4 mm ulcer with visible vessel in the gastric antrum. The Forrest 2a ulcer was treated with adrenaline injection and heater probe. Small biopsies were taken from fundus for urease testing and histology. Haemostasis appeared to be secure at the end of the procedure. An hour later, the patient developed tachycardia, haematemesis, and significant haemoglobin drop of 2 g/dL. An endoscopy was repeated immediately. This revealed large amount of blood clots in the gastric antrum which could not be completely removed by suctioning.

* Corresponding author at: MOH Holdings Pte Ltd, 1 Maritime Square, #11-25 HarbourFront Centre, Singapore.

E-mail addresses: sabrina@ngaserin.com (S.N.H.N. Ng), hiang_jin07@hotmail.com (H.J. Tan), chrishl.keh@juronghealth.com.sg (C.H.L. Keh).

<http://dx.doi.org/10.1016/j.ijscr.2016.06.014>

2210-2612/© 2016 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

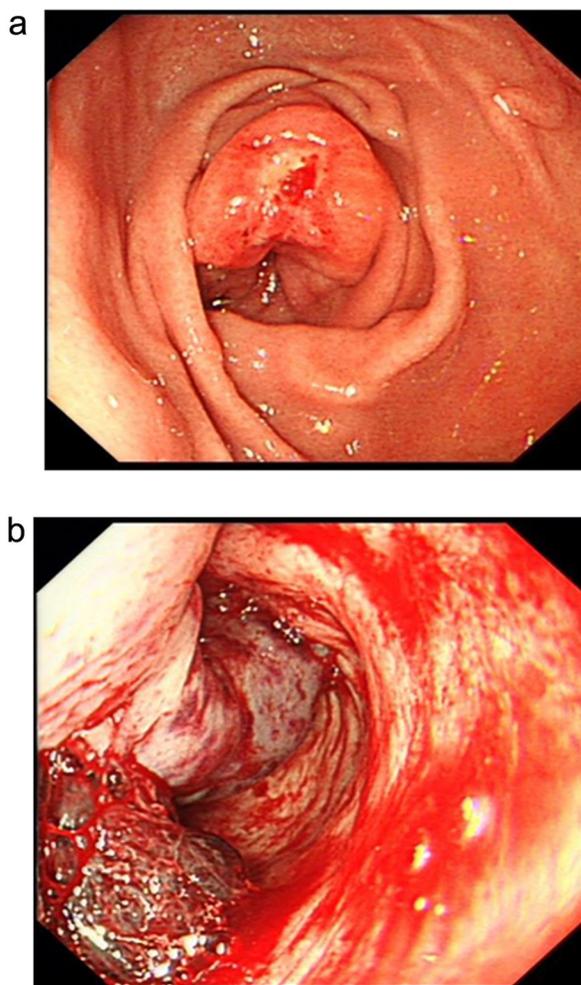


Fig. 1. (a) Initial upper GI endoscopy – Forrest 2a antral ulcer on a background of non-erosive gastritis. (b) Second upper GI endoscopy – Evolving antral haematoma and fresh bleeding.

Hence the source of bleeding could not clearly identified (Fig. 1a). She was actively resuscitated with fluids and transferred to the intensive care unit.

Angioembolisation was not entertained as a second line modality due to high risk of post-procedure ulcer perforation related to ischaemia. As there was no significant haemodynamic compromise after initial resuscitation with fluids, a second attempt at therapeutic intervention with upper GI endoscopy was performed under general anaesthesia in the operating room. This second upper GI endoscopy in the operating room again revealed a large amount of blood clots as well as on-going oozing of fresh blood. The endoscopist attempted to remove the clots with a snare to better localise the course of bleeding but was unsuccessful. A significant antral submucosal hematoma had begun developing along the anterior wall of the antrum (Fig. 1b). We were unable to localise the source of continuous fresh bleeding and decision was made for immediate exploratory laparotomy.

At laparotomy, it was apparent that a large haematoma had occupied the anterior aspect of the stomach causing extensive serosal stretch from fundus to pylorus (Fig. 2a). The lesser sac was entered and a gastrostomy was performed at the relatively normal posterior wall of the stomach. The tense intramural gastric haematoma was revealed within the stomach lumen. In addition, the mucosa of the anterior wall of the stomach was lacerated at

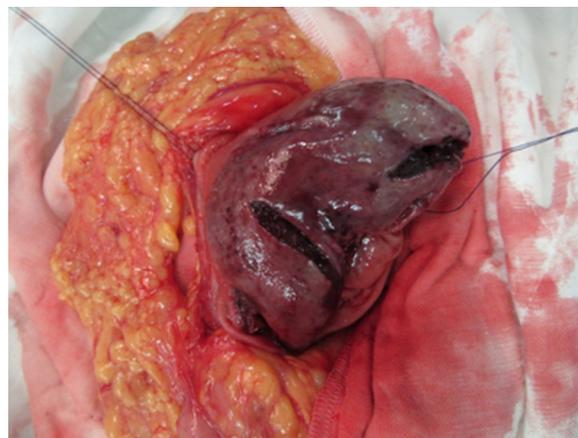


Fig. 2. (a) After opening lesser sac and creating posterior wall gastrostomy – Anterior gastric wall intramural submucosal haematoma with mucosal lacerations.

three parts, demonstrating the tense blood clot spilling into stomach lumen. Small areas of active bleeding were controlled with direct pressure. Haemostasis was quickly achieved. A nasojejunal tube was inserted under direct visualization before closure of the gastrostomy.

The patient recovered well post operatively. She was recommenced on prophylactic dose enoxaprin 48 h after surgery. Proton pump inhibitors were prescribed for the management of her antral ulcer on the background of gastritis. There was no evidence of *Helicobacter pylori* colonisation. Nasojejunal feeding was continued for one week before diet was gradually escalated back to normal. She was discharged well 14 days later.

3. Discussion

First described by MacLauchlan in the Lancet in 1838 as a false aneurysmal tumour in the duodenum [1], a century later the condition is better understood. However, it remains difficult to obtain an accurate estimate of the incidence of intramural gastrointestinal haematomas as it persists to be a rare clinical and surgical entity. Postulated pathophysiology includes disruption of blood vessel within the submucosal layer which uncommonly results in dissection of the muscularis propria from the submucosa, resulting in a “false aneurysm”.

Intramural gastrointestinal haematomas have been described in the oesophagus, stomach, small bowel and colon. The most common site reported is the duodenum, with over 130 cases in the literature [2]. In these patients, blunt abdominal trauma was the most common causative association, and gastric outlet obstruction, intestinal obstruction and intussusception are known complications [2]. The second most common site is the oesophagus with over 79 cases [3], followed by isolated reports of 47 cases involving the stomach (Table 1).

In gastric intramural haematomas, a review of the literature suggests that the most common aetiology is coagulopathy, with or without contribution by peptic ulcer disease. This is most commonly related to use of anticoagulation [4–15], less commonly in patients with haemophilia [16–19], and one case described a patient with thrombocytopenia from myelofibrosis [20]. Other causes include peptic ulcer disease [21–23], vascular aneurysms [24–27], fish bone ingestion [28,29], as a complication of endoscopy [30–36], spontaneous and idiopathic cases [37–41], and other isolated cases related to amyloidosis [42–44], pancreatitis [45], Ehlers-Danlos syndrome [46], splenic rupture [47], and one case describing haematoma after splenectomy for idiopathic

Table 1
Aetiology and management of gastric intramural haematoma.

Aetiology	References	Cases, n (%)	Management			
			Conservative	Embolization	Percutaneous drainage	Surgery
Spontaneous (idiopathic)		6 (13%)	3 (43%)			4 (57%)
Coagulopathy			13 (70.6%)	2 (11.8%)	0 (0%)	3 (17.6%)
a. Anticoagulation (with or without pepticulcer)		12 (26%)				
b. Haemophilia		4 (8.5%)				
c. Myelofibrosis		1 (2%)				
Gastric pathology			7 (87.5%)	0 (0%)	0 (0%)	1 (12.5%)
a. Peptic ulcer only		3 (6%)				
b. Aneurysm		5 (11%)				
Fish bone ingestion		2 (4%)	2 (100%)	0 (0%)	0 (0%)	0 (0%)
Endoscopy		7 (15%)	5 (71%)	0 (0%)	0 (0%)	2 (29%)
Others						
a. Pancreatitis		1 (2%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)
b. Amyloidosis		3 (6%)	1 (33.3%)	0 (0%)	0 (0%)	2 (66.7%)
c. Ehlers-Danlos Syndrome		1 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)
d. Splenic rupture		1 (2%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)
e. After splenectomy for idiopathic thrombocytopenic purpura		1 (2%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)
Total		47	31/48 (64.5%)	3/48 (6.5%)	1/48 (2%)	13/48 (27%)

thrombocytopenic purpura [48]. Ours is the first case reporting haematoma in a patient anticoagulated with enoxaparin, with contribution from peptic ulcer disease. We are also reminded that care should be taken during endoscopy in such patients to prevent potentially life-threatening complications. The condition should be clearly recognised to aid choice of management.

There is no agreed standard of care for this rare condition, however the majority of (64.5%) documented cases resolve spontaneously. Based on first principles, the managing clinician should first aim to resuscitate the patient and secure haemostasis. Meanwhile, medical management involves correcting any underlying coagulopathy. In the event of failure of conservative treatment, described therapeutic modalities to achieve haemostasis include endoscopy, arterial embolization, percutaneous drainage and surgery. From our analysis, most cases as a result of coagulopathy and fish bone ingestion were treated successfully with medical and supportive measures. Two cases out of 17 cases caused by coagulopathy were resolved by transarterial catheter embolization after bleeding was isolated to the left gastric arteries [8,12]. One case caused by focal pancreatitis benefited from percutaneous aspiration of the established haematoma [45]. Only one out of 7 cases caused by peptic ulcer disease and gastric aneurysms and one complication of endoscopy required laparotomy for perforation [22,34]. Most cases of amyloidosis resulted in gastrectomy for intractable recurrent bleeding and outcomes in these patients were poor, including death due to multiorgan failure [42,43]. The patient with Ehlers-Danlos syndrome required surgery mainly because of gastric outlet obstruction from the haematoma, which also resulted in transient ischaemia of the duodenum due to increased intraluminal pressure that resolved upon clot evacuation [46].

Of particular interest to us are the idiopathic cases for which majority of patients were misdiagnosed to have gastric tumours. Because of diagnostic dilemmas, these patients likely received unnecessary gastrectomies due to lack of recognition of the condition and diagnoses were only revealed post-operatively [37–39].

In all cases, the decision to operate emergently was largely driven by the clinical picture and specific indications, such as gastric perforation, gastric outlet obstruction, and less commonly for unresolved bleeding. Our patient is such a rare case who benefited from surgical haemostasis. Following arrest of bleeding, one then selects an appropriate route of alternative alimentation while the patient undergoes bowel rest while awaiting resolution of the haematoma. This may comprise of either nasojejunal tube feeding or feeding jejunostomy.

4. Conclusion

Gastric submucosal haematoma is a rare disorder that should be recognised to avoid unnecessary surgical intervention and misadventure, as most cases may be managed conservatively.

Conflict of interest

Nothing to declare.

Funding

Nothing to declare.

Ethical approval

Nothing to declare.

Consent

Consent has been obtained.

Author contribution

First author – writing main bulk of the paper.
Second author – study concept and design, writing the paper.
Corresponding author – editing and making necessary changes to the paper.

Guarantor

Dr Christopher Hang Liang Keh.

References

- [1] J. McLauchlan, False aneurysmal tumour occupying nearly the whole of the duodenum, *Lancet* 2 (1838) 203–205.
- [2] W.R. Jones, Intramural hematoma of the duodenum: a review of the literature and case report, *Ann. Surg.* 173 (April (4)) (1971) 534–544.
- [3] J. Koike, M. Matsushima, H. Teraoka, A case of submucosal hematoma of the esophagus and stomach, possibly caused by fish bone ingestion, *Tokai J. Exp. Clin. Med.* 35 (2010) 46–56.
- [4] C.E. Hughes III, J. Conn Jr., J.O. Sherman, Intramural hematoma of the gastrointestinal tract, *Am. J. Surg.* 133 (1977) 276–279.
- [5] M.D. Crema, L. Monnier-Cholley, E. Maury, J.M. Tubiana, L. Arrive, What is your diagnosis? Extra-pleural hematoma, *J. Radiol.* 85 (4 Pt. 1) (2004) 419–421.
- [6] B. Felson, Intramural gastric lesion with sudden abdominal pain, *JAMA* 230 (1974) 603–604.

- [7] Q.J. Durward, M.M. Cohen, S.C. Naiman, Intramural hematoma of the gastric cardia, *Am. J. Gastroenterol.* 71 (1979) 301–305.
- [8] H. Imaizumi, T. Mitsuhashi, M. Hirata, T. Aizaki, H. Nishimaki, K. Soma, T. Ohwada, K. Saigenji, A giant intramural gastric hematoma successfully treated by transcatheter arterial embolization, *Intern. Med.* 39 (2000) 231–234.
- [9] L. Leborgne, A. Mathiron, G. Jarry, Spontaneous intramural gastric haematoma as a complication of oral anticoagulant therapy mimicking acute myocardial infarction, *Eur. Heart J.* 28 (2007) 1804.
- [10] R.H. Félix, Warfarin-induced gastric intramural hematoma, *Rev. Assoc. Med. Bras.* 60 (January–February (1)) (2014), 16–7.
- [11] V. Dhawan, A. Mohammed, R.N. Fedorak, Gastric intramural hematoma: a case report and literature review, *Can. J. Gastroenterol.* 23 (2009) 19–22.
- [12] F.J. González Rodríguez, E. Domínguez Comesaña, J.L. Portela Serra, M. Piñon Cimadevila Á, Giant oesophagogastric haematoma, *Cir. Esp.* 91 (May (5)) (2013) e25, <http://dx.doi.org/10.1016/j.ciresp.2012.05.012> (Epub 2012 Oct 26).
- [13] A.I. Hurtado-Doce, M.A. Solla-Buceta, R.M. Galeiras-Vázquez, Spontaneous intramural gastric haematoma in an anticoagulated patient, *Rev. Esp. Enferm. Dig.* 103 (September (9)) (2011) 496.
- [14] M. Dibuz, T. Szabó, E. Monoki, L. Nagymélykúti, M. Illyés, E. Varga, L. Csipő, Gastric and duodenal intramural hematoma: report of two cases, *Orv. Hetil.* 139 (December (49)) (1998) 2963.
- [15] N. Maimon, T. Penner, W. Demajo, Warfarin-induced gastric bleeding and intestinal obstruction, *Eur. J. Intern. Med.* 17 (May (3)) (2006) 211–212.
- [16] P.H. Griffin, F.W. Schnure, S. Chopra, D.C. Brooks, J.I. Gilliam, Intramural gastrointestinal hemorrhage, *J. Clin. Gastroenterol.* 8 (3 Pt. 2) (1986) 389–394.
- [17] K. Morimoto, T. Hashimoto, S. Choi, et al., Ultrasonographic evaluation of intramural gastric and duodenal hematoma in hemophiliacs, *J. Clin. Ultrasound* 16 (1988) 108–113.
- [18] B. Felson, Intramural gastric lesion with sudden abdominal pain, *JAMA* 230 (1974) 603–604.
- [19] F.W. Wright, J.M. Matthews, Hemophilic pseudotumor of the stomach, *Radiology* 98 (1971) 547–549.
- [20] M. Melato, G. Falconieri, R. Manconi, S. Bucconi, Intramural gastric hematoma and hemoperitoneum occurring in a patient affected by idiopathic myelofibrosis, *Hum. Pathol.* 11 (1980) 301–302.
- [21] S.E. Sheward, M. Davis, E.G. Amparo, H.K. Gogel, Intramural hemorrhage simulating gastric neoplasm, *Gastrointest. Radiol.* 13 (1988) 102–104.
- [22] S.C. Ng, M. Shariff, D. Datta, G. Hanna, G. Holdstock, Gastrointestinal: gastric wall hematoma, *J. Gastroenterol. Hepatol.* 2 (2006) 915.
- [23] G. Horvát, K. Szele, L. Panka, G. Szepesi, A. Kovács, I. Kissik, Rare complication of duodenal ulcer: intramural hematoma in the gastric antrum, *Orv. Hetil.* 139 (July (30)) (1998) 1799–1802 (Hungarian).
- [24] N.E. Langlois, I.D. Miller, Intramural gastric hematoma originating from an atherosclerotic aneurysm of a gastric artery, *Am. J. Gastroenterol.* 88 (1993) 613–614.
- [25] S. Matsuo, S. Yamaguchi, S. Miyamoto, et al., Ruptured aneurysm of the visceral artery: report of two cases, *Surg. Today* 31 (2001) 660–664.
- [26] P. Molnar, T. Miko, Multiple arterial caliber persistence resulting in hematomas and fatal rupture of the gastric wall, *Am. J. Surg. Pathol.* 6 (1982) 83–86.
- [27] S. Nishiyama, B.L. Zhu, L. Quan, K. Tsuda, Y. Kamikodai, H. Maeda, Unexpected sudden death due to a spontaneous rupture of a gastric dissecting aneurysm: an autopsy case suggesting the importance of the double-rupture phenomenon, *J. Clin. Forensic Med.* 11 (2004) 268–270.
- [28] J. Koike, M. Matsushima, H. Teraoka, A case of submucosal hematoma of the esophagus and stomach, possibly caused by fish bone ingestion, *Tokai J. Exp. Clin. Med.* 35 (2010) 46–56.
- [29] S. Elliott, J. Bruce, Submucosal gastric haematoma: a case report and review of the literature, *Br. J. Radiol.* 60 (1987) 1132–1135.
- [30] C.W. Yang, H.H. Yen, Large gastric intramural hematoma: unusual complication of endoscopic submucosal dissection, *Endoscopy* 43 (Suppl. 2) (2011) E240.
- [31] M. Sollfrank, W. Koch, H. Waldner, K. Rudisser, Intramural duodenal hematoma after endoscopic biopsy, *Rofo* 173 (2001) 157–159.
- [32] K. Sugai, E. Kajiwara, Y. Mochizuki, et al., Intramural duodenal hematoma after endoscopic therapy for a bleeding duodenal ulcer in a patient with liver cirrhosis, *Intern. Med.* 44 (2005) 954–957.
- [33] P. Sun, S.Y. Tan, G.H. Liao, Gastric intramural hematoma accompanied by severe epigastric pain and hematemesis after endoscopic mucosal resection, *World J. Gastroenterol.* 18 (2012) 7127–7130.
- [34] A. Sadio, et al., Intramural hematoma: a rare complication of endoscopic injection therapy for bleeding peptic ulcers, *Endoscopy* 43 (2011) E141–E142.
- [35] S. Itaba, T. Kaku, Y. Minoda, H. Murao, K. Nakamura, Gastric intramural hematoma caused by endoscopic ultrasound-guided fine-needle biopsy, *Endoscopy* 46 (Suppl. 1) (2014) UCTN:E666, <http://dx.doi.org/10.1055/s-0034-1390867> (Eub 2014 Dec 19).
- [36] B. Keum, H.J. Chun, Y.S. Seo, Y.S. Kim, Y.T. Jeon, H.S. Lee, S.H. Um, C.D. Kim, H.S. Ryu, Gastric intramural hematoma caused by argon plasma coagulation: treated with endoscopic incision and drainage (with videos), *Gastrointest. Endosc.* 75 (April (4)) (2012) 918–919, <http://dx.doi.org/10.1016/j.gie.2011.04.041> (Epub 2011 Aug 6).
- [37] J. Hui, A.K. AhChong, K.L. Mak, K.M. Chiu, A.W. Yip, Spontaneous intramural hematoma of stomach, *Dig. Surg.* 17 (2000) 524–527.
- [38] J.D. Rothstein, W.R. Sandusky, T.E. Keats, Hematoma as a cause of radiographic deformity of stomach, *Radiology* 90 (1968) 116–117.
- [39] B.P. Costa, C. Manso, C. Baldaia, F.C. Alves, F.C. Sousa, Gastric pseudotumor, *Hepatogastroenterology* 47 (2000) 151–154.
- [40] K.V. Rajagopal, J.F. Alvares, Spontaneous giant intramural hematoma of esophagus and stomach, *Indian J. Gastroenterol.* 24 (2005) 88.
- [41] S. Oe, T. Watanabe, K. Kume, M. Shibata, M. Hiura, I. Yoshikawa, M. Harada, A case of idiopathic gastroesophageal submucosal hematoma and its disappearance observed by endoscopy, *J. UOEH* 36 (June (2)) (2014) 123–128.
- [42] N. Iijima-Dohi, A. Shinji, T. Shimizu, S.Z. Ishikawa, K. Mukawa, T. Nakamura, K. Maruyama, Y. Hoshii, S. Ikeda, Recurrent gastric hemorrhaging with large submucosal hematomas in a patient with primary AL systemic amyloidosis: endoscopic and histopathological findings, *Intern. Med.* 43 (2004) 468–472.
- [43] M. Muraki, Y. Kanno, K. Higuchi, K. Shirotori, T. Oguchi, K. Hora, K. Kiyosawa, Laceration of gastric mucosa associated with dialysis-related amyloidosis, *Clin. Nephrol.* 64 (2005) 448–451.
- [44] Y.C. Yeh, C.H. Lin, S.C. Huang, Y.K. Tsou, Education and imaging. Gastrointestinal: gastric hematoma with bleeding in a patient with primary amyloidosis, *J. Gastroenterol. Hepatol.* 29 (March (3)) (2014) 419.
- [45] C.T. Chou, R.C. Chen, A.D. Yang, Gastric subserosal hematoma developing from focal pancreatitis: a case report, *Kaohsiung J. Med. Sci.* 25 (January (1)) (2009) 45–48, [http://dx.doi.org/10.1016/s1607-551x\(09\)70040-3](http://dx.doi.org/10.1016/s1607-551x(09)70040-3).
- [46] Y. Kobayashi, A. Kuwabara, H. Okamoto, K. Sugimura, K. Hatakeyama, Gastric submucosal hematoma and mucosal rupture with Ehlers-Danlos syndrome: a case report, *Acta Med. Biol.* 54 (2006) 59–62.
- [47] T.V. Lloyd, J.C. Johnson, Intramural gastric hematoma secondary to splenic rupture, *South. Med. J.* 73 (1980) 1675–1676.
- [48] M. Kami, A. Matsukura, Y. Kanda, S. Ogawa, M. Makuuchi, H. Hirai, Intramural hematoma of stomach after splenectomy for idiopathic thrombocytopenic purpura, *Haematologica* 84 (1999) 669–671.

Open Access

This article is published Open Access at sciedirect.com. It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.