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Case report

A case report of endovascular management of delayed upper gastrointestinal bleeding after open esophagectomy for a benign esophageal stricture

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ABSTRACT

Introduction: Delayed upper gastrointestinal (GI) bleeding is a rare complication of esophagectomy and can be difficult to manage.
Presentation: A 76-year-old female represented 17 days post open esophagectomy with an unstable upper GI bleed. When control could not be achieved endoscopically, she was transferred to the Radiology Department where a triphasic CT angiogram confirmed active contrast extravasation into the gastric tube. She proceeded to the Interventional Radiology suite where a thoracic angiogram revealed an active arterial bleed from a branch of the thyrocervical trunk. The bleeding vessel was successfully embolised with coils and haemostasis was achieved.
Discussion: Management options for upper GI bleeding post esophagectomy include medical, endoscopic and endovascular approaches.
Conclusion: Our case represents a rare example of delayed bleeding into a gastric conduit post open esophagectomy for a benign stricture. The case reinforces:

a) The management options available for controlling an acute upper GI bleed.
b) The value of a CT angiogram in identifying the site of bleeding and mapping the relevant vascular anatomy prior to embolization.
c) How endovascular embolization is a minimally invasive and potentially life-saving intervention for bleeds that cannot be controlled endoscopically.

1. Introduction

Upper gastrointestinal (GI) bleeding is a recognised complication of esophagectomy and affects 0.3% of patients [1]. Delayed bleeding into the gastric conduit has been rarely reported in the literature [2–4]. Bleeding after an open esophagectomy with no preoperative chemotherapy or radiotherapy is even more uncommon.

In line with SCARE [5] and PROCESS [6] guidelines, we present the case of a 76-year-old female who experienced an unstable upper GI bleed on day 17 post open esophagectomy for a benign stricture. After unsuccessful endoscopic treatment, the patient was transferred to the Interventional Radiology (IR) suite where she underwent successful coil embolization of a bleeding branch of the thyrocervical trunk.

The patient was diagnosed and managed in our institution; a tertiary referral university teaching hospital.

2. Presentation of case

A 76-year-old female was admitted electively to our institution under the care of the Upper GI Surgery team. She underwent an open transhiatal esophagectomy with neck anastomosis. She had experienced progressive dysphagia for five years due to a benign esophageal stricture for which she had undergone oesophago-gastro-duodenoscopy (OGD) and dilations previously.

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She had a past medical history of ischaemic heart disease, hypothyroidism, macular degeneration and glaucoma. Her past surgical history consisted of coronary artery bypass grafts, cholecystectomy, appendicectomy, small bowel resection, hysterectomy, tonsillectomy and breast lumpectomy. She was living alone and independent in her activities of daily living at baseline.

Her early post-operative course was uneventful and she was discharged to convalescence. On post-operative day 17, however, she represented with an unstable upper GI bleed. An emergent OGD revealed a large volume of clot filling the gastric tube. Clot dislodgement revealed an active arterial bleed at the level of the neck anastomosis. This could not be controlled either by 14 ml of 1:10,000 adrenalin injection or two sessions of luminal tamponade with a through-the-scope (TTS) balloon to 18 mm diameter for 10 min.

The patient was transferred to the Radiology Department where a triphasic CT angiogram confirmed active contrast extravasation into the gastric tube. She proceeded directly to the IR suite for endovascular management.

The access site in the right groin was cleaned and draped with the patient in a supine position. The right common femoral artery was accessed using a micropuncture set consisting of a 21-gauge needle, a 0.018 wire and a 5 French dilator/sheath. A guidewire and catheter were advanced through the abdominal and descending thoracic aorta to the aortic arch. A thoracic angiogram revealed an active arterial bleed from the left inferior thyroid artery, a branch arising from the thyrocervical trunk. Coil embolization was performed using a combination of a single fibered microcoil and a single non-fibered microcoil. Haemostasis was achieved.

The patient was transferred to the Intensive Care Unit (ICU) for airway protection and ventilation, intravenous proton pump inhibitor and antibiotic cover. She was successfully extubated after three days and transferred to the surgical ward. A repeat OGD found her conduit to be healthy and she was recommenced on diet. She was medically fit for discharge and awaiting transfer back to convalescence at the time of writing.

3. Discussion

Esophagectomy is a major operation with considerable perioperative morbidity and mortality. The most common complications are cardiac, respiratory and gastric tube ischaemia or anastomotic leak [7]. However, delayed upper GI bleeding has only rarely been reported [2–4]. Our patient's case of delayed bleeding after an open esophagectomy for a benign stricture is likely to be even more uncommon.

Acute upper GI hemorrhage is a common surgical emergency. Despite recent advances in its management, the mortality remains about 10% [8]. Bleeding after esophagectomy may result from either small vessel incorporation in the anastomosis or from stress-induced ulceration.

Management options include medical, endoscopic and endovascular approaches. It has been suggested that bleeding within the first 48 h after surgery in a patient with a stable haematocrit usually resolves with conservative management [9].

Endoscopic approaches include clips, adrenalin injections and balloon tamponade. Clips are often deployed in the management of non-surgical patients [10]. There is some reluctance to use clips in the early post-operative period due to the risk of disrupting the anastomosis. However, there is at least one report of successful endoscopic management of a post-esophagectomy upper GI bleed with clips which avoided the need for a second surgery [2].

When a bleed cannot be managed endoscopically, endovascular management is the next intervention of choice. Endovascular angiography is both a diagnostic and a therapeutic tool. Transcatheter arterial embolization is effective at treating acute GI bleeding [11]. Some studies have shown embolization to be safer than surgery in high risk patients [12,13]. Haemostasis is achieved by decreasing blood flow and perfusion pressure and promoting clot formation in the bleeding vessel [14,15].

Fig. 1. Axial non-contrast CT at the level of the gastric conduit.

Fig. 2. Axial arterial phase CT showing contrast extravasation (red arrow) into the gastric conduit from the level of the anastomosis. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Complications of endovascular embolization include gut ischaemia [16] and non-target embolization [11]. Of particular importance in our case, when embolizing through the thyrocervical trunk, is a thorough knowledge of normal vascular anatomy, anatomic variants and potential anastomoses with the anterior spinal artery [17]. Other potential complications include vascular injuries such as vasospasm, dissection, perforation and pseudoaneurysm, contrast reactions and contrast-induced nephropathy.

Our case also illustrates the significant value of a triphasic CT angiogram in identifying the site of bleeding and mapping the relevant vascular anatomy prior to embolization. CT angiogram detects a flow rate as small as 0.3 ml/min. It is 50–86% sensitive and 92–95% specific for identifying the source of acute GI bleeding [18–20]. In our institution, the standard protocol for acute GI bleeds involves a non-contrast, arterial phase and three-minute delayed phase CT. The hallmark of active bleeding on CT is a contrast blush followed by a changing appearance, or 'pooling', of extravasated contrast over time between the arterial and delayed phases [21]. Identification of the bleeding site with triphasic CT prior to endovascular intervention saves a considerable amount of time in achieving rapid stabilisation of the patient by allowing therapeutic intervention to be immediately directed to the affected site. It can also greatly reduce the total contrast load required in

Fig. 3. Axial delayed phase CT showing progressive pooling of contrast (red arrow) in the gastric conduit confirming the presence of active hemorrhage. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

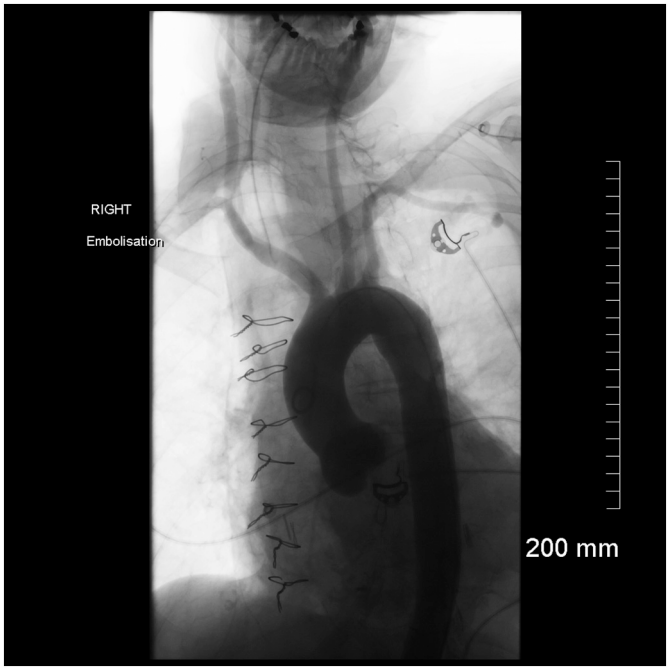

Fig. 4. An aortic archogram showing conventional aortic arch anatomy.

these patients who may be susceptible to acute kidney injury.

4. Conclusion

Our case represents an uncommon example of delayed bleeding into a gastric conduit post open esophagectomy for a benign stricture. The case illustrates the management options available for controlling an acute upper GI bleed. It reinforces the value of a triphasic CT angiogram in identifying the site of bleeding and mapping the relevant vascular anatomy prior to embolization. Finally, it demonstrates how endovascular embolization is a minimally invasive and potentially life-saving intervention for bleeds that cannot be controlled endoscopically (Figs. 1–7).

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Not applicable.

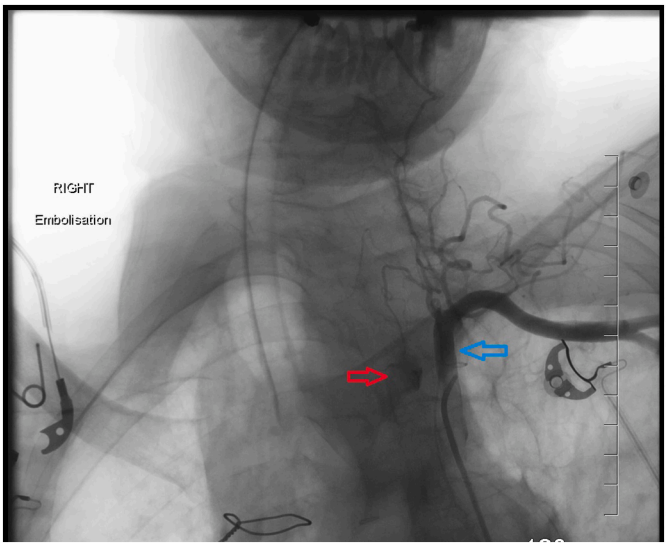

Fig. 5. Selective injection of the left subclavian artery (blue arrow) reveals contrast extravasation (red arrow) from the left inferior thyroid artery, a branch of the thyrocervical trunk. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

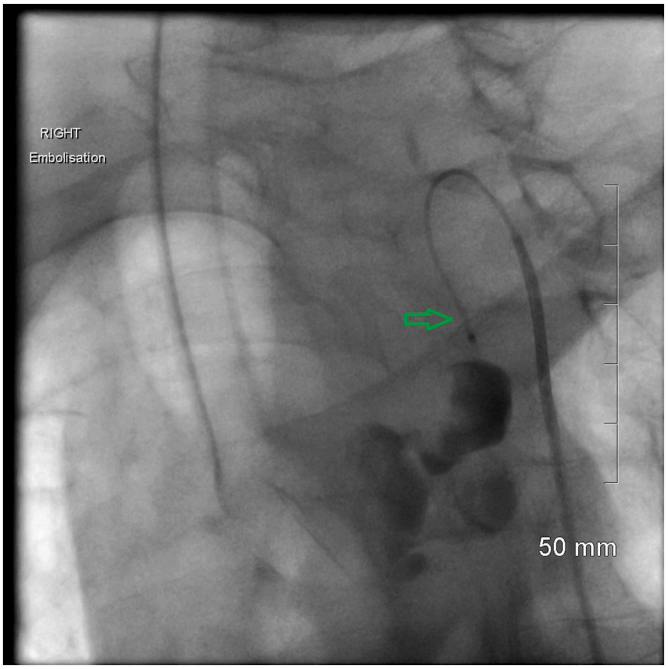

Fig. 6. A microcatheter (green arrow) is advanced into the bleeding vessel. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Ethical approval

Not applicable.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

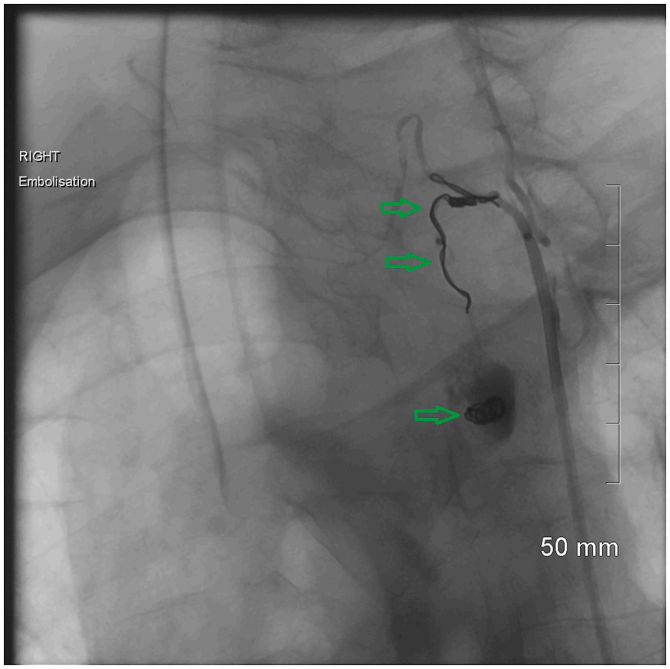

Fig. 7. Coils (green arrows) are deployed into the bleeding vessel and haemostasis is achieved. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Author contributions

Gerard Lambe conceived the idea for the case and drafted the manuscript.

Michael Courtney and Ciaran Judge assisted with preparation and proofreading of the figures and the final manuscript.

Noel E Donlon and Narayanasamy Ravi provided clinical input from the Department of Upper GI Surgery.

Mark Ryan performed the endovascular embolization and provided specialist interventional radiology input and comments.

Guarantor

Gerard Lambe.

Research registration

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Provenance and peer review

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Declaration of competing interest

The authors declare no conflicts of interest.

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References

[1] L. Kun, W. Yun-Jie, C. Qing-Shu, W. Dao-Xi, Z. Zhen-Yuan, Emergency re-operation for postoperative hemorrhage following partial esophagectomy for carcinoma of the esophagus and cardia of the stomach, Dis. Esophagus 14 (2001) 251–253, https://doi.org/10.1046/j.1442-2050.2001.00196.x.

[2] R.-Q. Zhang, N.-N. Kang, Y. Che, W.-L. Xia, Z.-C. Yu, H.-G. Pan, W. Ge, A.-G. Chen, J. Wan, Endoscopic management of early upper gastrointestinal bleeding after minimally invasive Ivor-Lewis esophagectomy, Ann. Thorac. Surg. 101 (2016) 1581–1584, https://doi.org/10.1016/j.athoracsur.2015.03.124.

[3] D. Di Mauro, L. Sarli, L. Roncoroni, An exceptional postoperative gastric tube bleeding after esophageal resection for cancer, Dis. Esophagus 22 (2009) E11–E13, https://doi.org/10.1111/j.1442-2050.2008.00892.x.

[4] S. Liddle, A. Mirakhur, E. Debru, Challenging delayed bleeding after an Ivor Lewis oesophagectomy, J. Surg. Case Rep. (2020), rjaa471, https://doi.org/10.1093/jscr/rjaa471.

[5] SCARE Group, R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230, https://doi.org/10.1016/j.ijsu.2020.10.034.

[6] PROCESS Group, R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A.J. Fowler, D. P. Orgill, The PROCESS 2018 statement: updating consensus preferred Reporting Of CasE Series in Surgery (PROCESS) guidelines, Int. J. Surg. 60 (2018) 279–282, https://doi.org/10.1016/j.ijsu.2018.10.031.

[7] J.D. Luketich, A. Pennathur, O. Awais, R.M. Levy, S. Keeley, M. Shende, N. A. Christie, B. Weksler, R.J. Landreneau, G. Abbas, M.J. Schuchert, K.S. Nason, Outcomes after minimally invasive esophagectomy, Ann. Surg. 256 (2012) 95–103, https://doi.org/10.1097/SLA.0b013e3182590603.

[8] A.S. Gado, B.A. Ebeid, A.M. Abdelmohsen, A.T. Axon, Clinical outcome of acute upper gastrointestinal hemorrhage among patients admitted to a government hospital in Egypt, Saudi J. Gastroenterol. 18 (2012) 34–39, https://doi.org/10.4103/1319-3767.91737.

[9] N.T. Nguyen, M. Longoria, S. Chalifoux, S.E. Wilson, Gastrointestinal hemorrhage after laparoscopic gastric bypass, Obes. Surg. 14 (2004) 1308–1312.

[10] M. Kato, Y. Jung, M.A. Gromski, R. Chuttani, K. Matthes, Prospective, randomized comparison of 3 different hemoclips for the treatment of acute upper GI hemorrhage in an established experimental setting, Gastrointest. Endosc. 75 (2012) 3–10, https://doi.org/10.1016/j.gie.2011.11.003.

[11] F.Y. Yap, B.O. Omene, M.N. Patel, T. Yohannan, J. Minocha, M.G. Knuttinen, C. A. Owens, J.T. Bui, R.C. Gaba, Transcatheter embolotherapy for gastrointestinal bleeding: a single center review of safety, efficacy, and clinical outcomes, Dig. Dis. Sci. 58 (2013) 1976–1984, https://doi.org/10.1007/s10620-012-2547-z.

[12] L.-G. Eriksson, M. Ljungdahl, M. Sundbom, R. Nyman, Transcatheter arterial embolization versus surgery in the treatment of upper gastrointestinal bleeding after therapeutic endoscopy failure, J. Vasc. Interv. Radiol. 19 (2008) 1413–1418, https://doi.org/10.1016/j.jvir.2008.06.019.

[13] S. Mirsadraee, P. Tirukonda, A. Nicholson, S.M. Everett, S.J. McPherson, Embolization for non-variceal upper gastrointestinal tract haemorrhage: a systematic review, Clin. Radiol. 66 (2011) 500–509, https://doi.org/10.1016/j.crad.2010.11.016.

[14] B. Funaki, On-call treatment of acute gastrointestinal hemorrhage, Semin Intervent Radiol. 23 (2006) 215–222, https://doi.org/10.1055/s-2006-948758.

[15] R.S. Ramaswamy, H.W. Choi, H.C. Mouser, K.H. Narsinh, K.C. McCammack, T. Treesit, T.B. Kinney, Role of interventional radiology in the management of acute gastrointestinal bleeding, World J. Radiol. 6 (2014) 82–92, https://doi.org/10.4329/wjr.v6.i4.82.

[16] A. Barkun, M. Bardou, J.K. Marshall, Nonvariceal upper GI bleeding consensus conference group, consensus recommendations for managing patients with nonvariceal upper gastrointestinal bleeding, Ann. Intern. Med. 139 (2003) 843–857, https://doi.org/10.7326/0003-4819-139-10-200311180-00012.

[17] M. del V. Diéguez, C. Pérez-García, C. Malfaz, F.F. Gil, J.S. Lorente, M.E. Boyra, M. G. Leyte, A. Pérez-Higueras, E. Castro-Reyes, Embolization through the thyrocervical trunk: vascular anatomy, variants, and a case series, J. NeuroInterv. Surg. 10 (2018) 1012–1018, https://doi.org/10.1136/neurintsurg-2018-013808.

[18] A.E. Chua, L.J. Ridley, Diagnostic accuracy of CT angiography in acute gastrointestinal bleeding, J. Med. Imaging Radiat. Oncol. 52 (2008) 333–338, https://doi.org/10.1111/j.1440-1673.2008.01964.x.

[19] V. García-Blázquez, A. Vicente-Bártulos, A. Olavarria-Delgado, M.N. Plana, D. van der Winden, J. Zamora, EBM-connect collaboration, accuracy of CT angiography in the diagnosis of acute gastrointestinal bleeding: systematic review and meta-analysis, Eur. Radiol. 23 (2013) 1181–1190, https://doi.org/10.1007/s00330-012-2721-x.

[20] E. Rondonotti, R. Marmo, M. Petracchini, R. de Franchis, M. Pennazio, The American Society for Gastrointestinal Endoscopy (ASGE) diagnostic algorithm for obscure gastrointestinal bleeding: eight burning questions from everyday clinical practice, Dig. Liver Dis. 45 (2013) 179–185, https://doi.org/10.1016/j.dld.2012.07.012.

[21] J.M. Artigas, M. Martí, J.A. Soto, H. Esteban, I. Pinilla, E. Guillén, Multidetector CT angiography for acute gastrointestinal bleeding: technique and findings, Radiographics. 33 (2013) 1453–1470, https://doi.org/10.1148/rg.335125072.