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Managing the Unmanageable: A Two- Staged Palliative Resection to Control Life- Threatening Duodenal Bleeding Due to Recurrent Paraganglioma

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
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Conflict of interest: None declared

Patient: Male, 40
Final Diagnosis: Paraganglioma
Symptoms: GI bleeding • syncope
Medication: —
Clinical Procedure: Palliative multivisceral staged resection
Specialty: Surgery

Objective: Unusual clinical course
Background: This report presents therapeutic decision-making and management of refractory, life-threatening duodenal bleeding in a young man with recurrent metastatic retroperitoneal paraganglioma.
Case Report: The patient had been symptom free for 8 years after radioactive MIBG (metaiodobenzylguanidine) therapy. Failure of endoscopic or angiographic bleeding control led to urgent need to evaluate possible endocrine functional status, tumor curability, safety of incomplete resection, intra- and postoperative support needs, and anticipated recovery potential and postoperative function. Aside from these considerations, impact of tumor biology, alternative therapeutic options, current management guidelines, and ethical challenges of resource utilization for such complex palliative operative intervention were reviewed.
Conclusions: Based on the observed outcomes after an urgent presentation of an unusual tumor-related complication, palliation-intent therapy was justifiable even if significant treatment-related risks were expected and complex resources were required.

MeSH Keywords: Emergency Treatment • Endocrine Surgical Procedures • Gastrointestinal Hemorrhage • Palliative Care • Paraganglioma, Extra-Adrenal

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Background

Life-threatening duodenal bleeding that remains refractory to endoscopic or interventional radiologic management has become a relatively uncommon clinical scenario that provides significant therapeutic challenges. While primary gastrointestinal (GI) or vascular conditions represent the most common underlying mechanisms for such problem, duodenal hemorrhage as a result of primary, recurrent, or metastatic paraganglioma is exquisitely rare [1]. We encountered a paraganglioma-related duodenal bleed that required urgent and complex therapeutic decisions.

Case Report

A 40-year-old male presented with a massive upper GI bleed. Cross-sectional imaging and esophagogastroduodenoscopy (EGD) revealed a large mass eroding into the duodenum, refractory to endoscopic hemostasis. Two attempts at interventional radiologic hemostasis (arterial embolization and endovascular

coiling) were undertaken and failed. Ten years prior to presentation the patient had been diagnosed with succinate dehydrogenase-B (SDHB) mutant metastatic paraganglioma. He subsequently had been treated twice with radioactive ¹³¹Iodine-metaiodobenzylguanidine (MIBG) therapy, with an initial complete response. He subsequently remained asymptomatic and was thus lost to follow-up for 8 years. After failed non-operative management and after 2 independent surgical consultations that deemed this tumor process to be technically unresectable, the patient was transferred to our hospital. He had received 12 units PRBC transfusions in the prior 4 days. Upon admission, he was in no current distress and hemodynamically stable. Computed tomography imaging revealed a large retroperitoneal primary tumor and several small bony metastases. The 18×16×13 cm mass that extended between liver hilum and aortoiliac bifurcation, exhibited central necrosis, high vascularity, and duodenal involvement, and was accompanied by 5 small peritoneal nodules (Figure 1). Vascular structures in the hepatoduodenal ligament were displaced but not encased, and the infrahepatic inferior vena cava (IVC) was not visualized. Laboratory values included a hemoglobin concentration of 9.4 g/dL, international

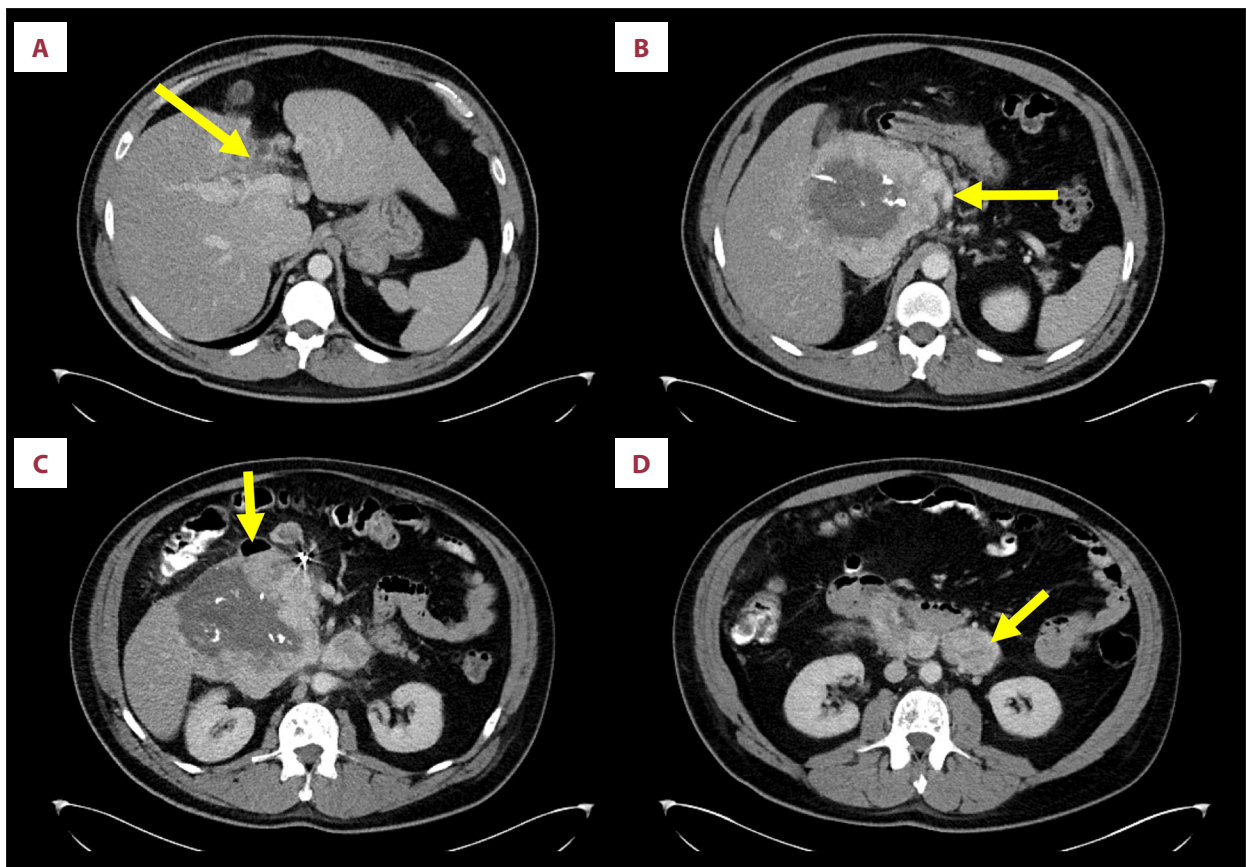


Figure 1. Computed tomography images. (A) Highest extent of the tumor (arrow). (B) Superior mesenteric artery origin (arrow). Tumor mass with 3 endovascular coiling artifacts. Note the absence of a continuous contrast column within the area of the inferior vena cava. (C) Tumor involvement of the duodenum (arrow); the mesenteric root to the right is not directly involved. (D) Lowest extent of the main tumor, with additional adjacent tumor nodule (arrow).

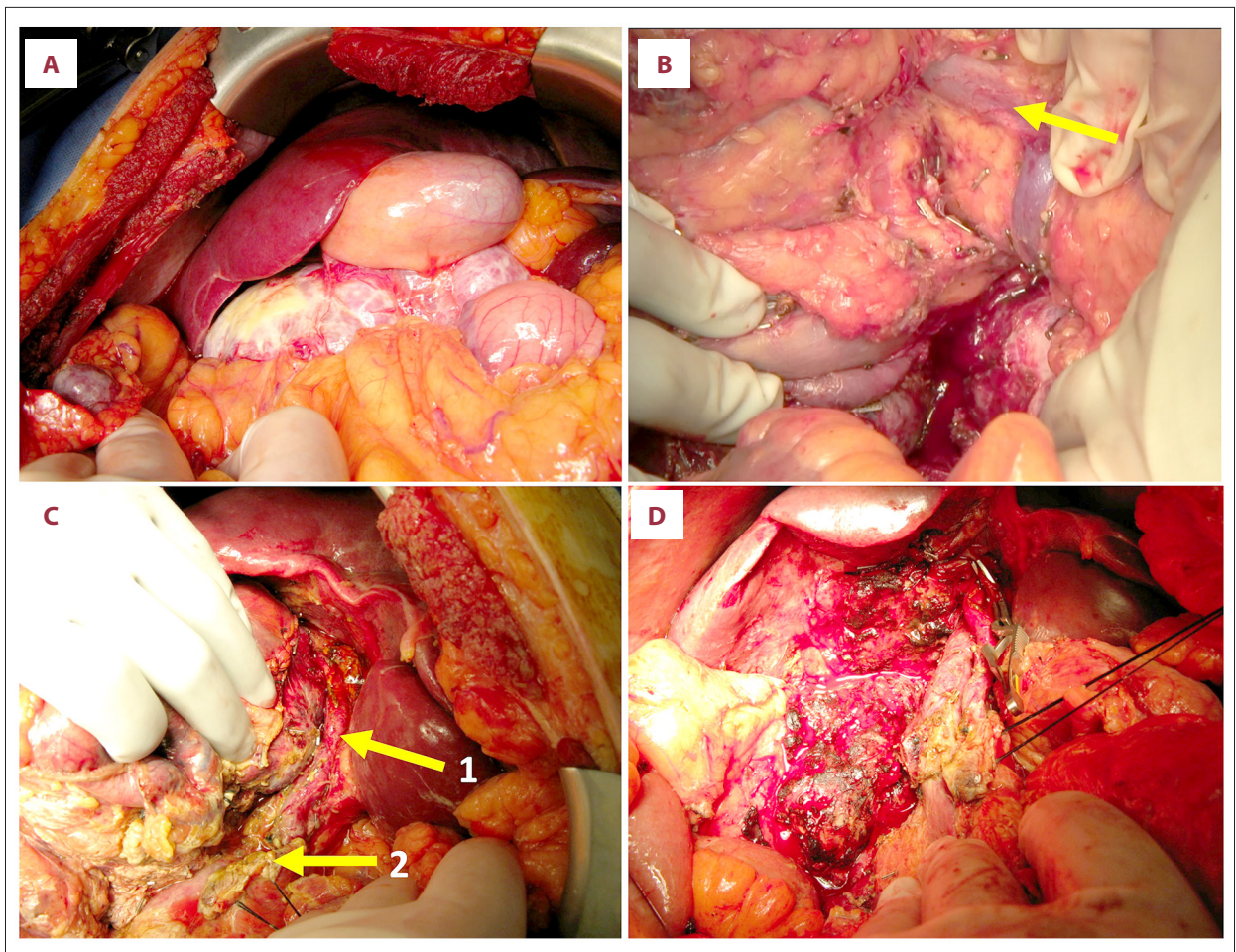


Figure 2. Intraoperative images. (A) First operation: initial appearance of the infrahepatic mass. (B) First operation: relationship between peritumoral tissues and superior mesenteric vein (SMV, arrow). (C) Second operation: dissection plane between tumor and hepatic artery (1), and at pancreatic neck (2). (D) Second operation: appearance after completed R2 resection.

normalized ratio (INR) of 1.3, and mildly elevated plasma norepinephrine (641 pg/mL) and normetanephrine (1.21 nmol/L) levels. Plasma epinephrine and dopamine levels, and the vanillyl mandelic acid (VMA)/creatinine ratio were within normal limits.

Operative therapy

With the goal to palliate this life-threatening bleed, operative preparations were made. The team was prepared to resect and reconstruct portions of duodenum, IVC, liver, or pancreas as necessary. Intraoperatively, a large, firm, and fixed mass was encountered, which involved the second and third portions of the duodenum but appeared to be displacing common hepatic artery (CHA), superior mesenteric vein (SMV), portal vein (PV), and superior mesenteric artery (SMA) (Figure 2). Figure 3 provides schematic outlines of the intraoperative images in Figure 2. After lengthy and challenging development of peripancreatic, infrahepatic, and posterior tumor planes, safe resection required committing to pancreatoduodenectomy. Thus,

the gastroduodenal artery (GDA) was divided, and bile duct, gastric antrum, and pancreatic neck were transected, allowing for further mobilization. The most difficult plane remained posterior to the tumor and at the inferolateral liver edge, where significant radiation fibrosis and challenging bleeding were encountered. After 12 hours of operating time, the patient became coagulopathic and acidotic, and the decision was made for temporary packing and resuscitation prior to a possible second attempt at resection. At this time point, the patient had been transfused with 10 units of PRBCs for an estimated blood loss of 8.2 L. After overnight stabilization and correction of the acidotic state, the patient underwent successful completion of mass resection, albeit in form of R2 resection, with *en bloc* pancreatoduodenectomy, followed by anastomotic reconstruction.

Hospital course

The patient had an uneventful postoperative course until postoperative day 11 when a GDA stump bleed was encountered

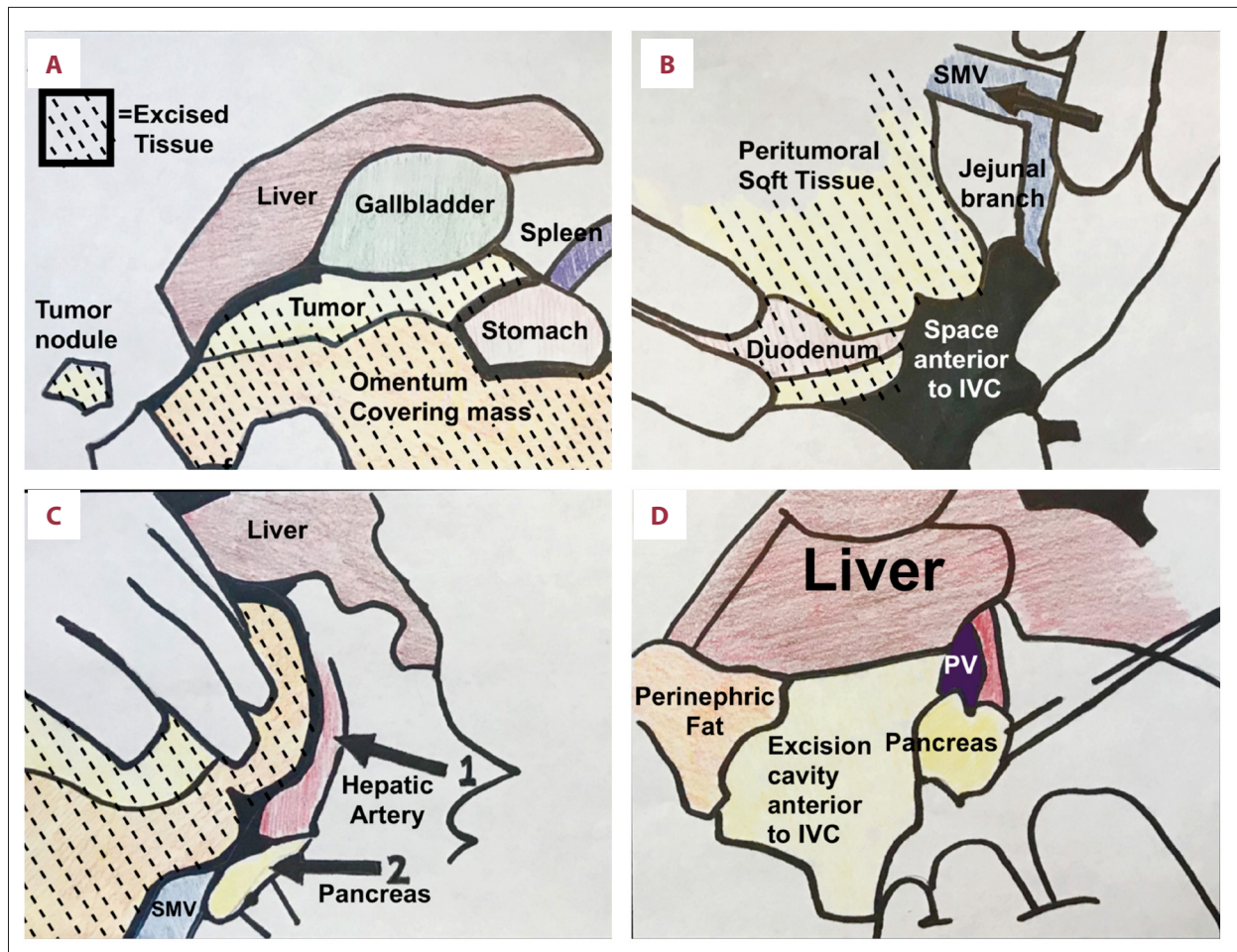


Figure 3. (A–D) Schema for intraoperative findings as displayed in Figure 2.

and successfully controlled by angiographic stenting. He was discharged on postoperative day 27, tolerating a regular diet. Currently he is symptom-free, with very good performance status, at 8 months after the resection. He has started oral cytotoxic therapy with the intent to provide some control benefit of his residual tumor.

Discussion

An unusual combination of a rare disease mechanism, acute and threatening presentation, complex operative therapy requirements, and system challenges all were felt to be of great impact in this case, and deserve to be highlighted and discussed in more detail.

The rate of metastatic disease in paragangliomas, often referred to as extra-adrenal pheochromocytomas, has been reported to be around 10% [1]. Lifelong follow-up is recommended especially for young patients, for those with germline mutations (such as SDHB), for extra-adrenal tumors, and for large

tumor size [2]. Malignant paragangliomas are more common in carriers of the SDHB mutation [3]. Prognosis is worse in the metastatic setting, with an overall 5-year survival of less than 50% [4]. The mainstay of treatment at this stage is systemic therapy, including the aforementioned ¹³¹I MIBG therapy, or the more recently validated peptide receptor radionuclide therapy that has been associated with some overall survival benefit [5]. Symptoms due to localized disease may benefit from specific local therapy options including resection.

Given such a relatively rare disease entity, which aspects were supportive of an operative intervention in this particular case? This resection, with a truly “palliative” intent for symptom control, actually saved a patient from ongoing hemorrhage and resulting death. Interventional radiologic procedures had failed, leaving laparotomy and resection as the only sensible remaining option. It was clear that the operation would not be curative, but that the somewhat favorable biology of this tumor would possibly support some significant quality life after successful recovery. Indeed, in some select circumstances of slow-growing malignant tumors, even palliative R2 resections can

confer some survival advantage, through controlling symptoms and thus facilitating additional treatment options [6]. For most paragangliomas, as in this case, the relative oncologic hazard appears to be lesser, and the size or functional status of the tumor have not been shown to affect survival [4].

How safe was this resection? Paragangliomas can exhibit endocrine function approximately 50% of the time [4]. However, this tumor was deemed non-functional since the patient had no related hemodynamic abnormality, and since there was no meaningful serum elevation of any vasoactive compound. Consequently, there was no intraoperative need for specific pharmacologic control of vasoactive hormone effects. The tumor was highly vascular, but the CHA, PV, SMA and SMV were not encased while the IVC was expected to be possibly involved. While involvement of a large vascular structure is not an absolute contraindication to resection, the resulting reconstruction challenges, greater morbidity risks and thus reduced palliation benefit would require a very cautious selection of such a step. In addition, the availability of transfusion products and the proper hemodynamic support must be stressed as essential intraoperative components for successful management.

Which operative steps defined key challenges in this case? In the first operation, the team had to commit to a pancreaticoduodenectomy before complete tumor mobilization because further dissection progress did not appear possible without transection of the visceral structures involved. This operative decision and implicit commitment to *en bloc* resection necessitates anastomotic reconstruction for any meaningful recovery. Another difficult step was deciding to abort the first operation. While this staged approach is more commonly utilized in trauma settings, the patient acuity for surgical oncology procedures rarely leads to the need to “stabilize in the interim”. It proved necessary, and against initial expectations, was successful in this case. Finally, deciding when to proceed with the second operative step and whether to consider an immediate reconstruction after mass removal was based on the patient’s recovery in terms of hemodynamics and acidosis overnight, and the relative stability encountered during the second-stage completion of resection. A possible third-step procedure for reconstruction was not expected to be superior to an immediate reconstruction decision.

References:

1. van Hulsteijn LT, Niemeijer ND, Dekkers OM, Corssmit EP: (131)I-MIBG therapy for malignant paraganglioma and pheochromocytoma: Systematic review and meta-analysis. *Clin Endocrinol*, 2014; 80(4): 487–501
2. Lenders JWM, Eisenhofer G: Update on modern management of pheochromocytoma and paraganglioma. *Endocrinol Metabol (Seoul)*, 2017; 32(2): 152–61
3. van Hulsteijn LT, Dekkers OM, Hes FJ et al: Risk of malignant paraganglioma in SDHB-mutation and SDHD-mutation carriers: A systematic review and meta-analysis. *J Med Genet*, 2012; 49(12): 768–76
4. Cunningham SC, Suh HS, Winter JM et al: Retroperitoneal paraganglioma: single-institution experience and review of the literature. *J Gastrointest Surg*, 2006; 10(8): 1156–63

Surgical palliation is still a challenging concept, even within surgical oncology, and there is a lack of consensus if palliation is defined by intent, postoperative factors, or prognosis [7]. Symptom resolution, patient age, and gained quality-of-life years are all validated reasons that can support this operation [8]. Our patient was young, his bleeding resolved as a result of the procedure, and he gained quality time with a current excellent postoperative performance status. A central problem was of course the difficulty in predicting any meaningful longer-term success that could be achieved with such radical and complex therapy. A similar palliation decision had to be made at the time of postoperative GDA bleeding, with uncertain efficacy and outcomes of an interventional radiographic procedure. If physicians are involved in any comparable clinical scenario, the balance between difficult life-preserving efforts, the desire for compassionate individual patient support, and facing the uncertainty of an incurable malignancy is expected to always be challenging. In addition, the ethical dilemma around the appropriateness of utilizing resources in such a situation, both institutional (blood bank support, blood transfusion products) and societal (spending of health care resources, post-hospital support), needs to be carefully contemplated and weighed against anticipatable intervention benefits. The presented case of our patient’s outcomes appear to represent a more successful and hopefully instructive example for such balanced decision-making.

Conclusions

Retroperitoneal paragangliomas are rare, slow-growing tumors with potential for metastasis and endocrine function. A slow course of disease progression can lead to significant symptoms that are caused by local tumor invasion. As the presented case highlighted, palliative resection is indicated in the younger, more functional patient with significant tumor-related symptoms and lack of less invasive options, even in the setting of metastatic disease. Complex multivisceral resection as described requires proper expertise and resources to conduct safe (possibly staged) operations, complex anesthesia, vascular control and appropriate perioperative patient management. Aside from the primary intent of life-preserving therapy, it is also anticipated that successful palliation can enable the patient to undergo additional tumor-directed therapy, with a potential for further progression-free survival benefits.

5. Nastos K, Cheung VTF, Toumpanakis C et al: Peptide receptor radionuclide treatment and (131)I-MIBG in the management of patients with metastatic/progressive phaeochromocytomas and paragangliomas. *J Surg Oncol*, 2017; 115(4): 425–34
6. Jeong SJ, Yoon YS, Lee JB et al: Palliative surgery for colorectal cancer with peritoneal metastasis: A propensity-score matching analysis. *Surg Today*, 2017; 47(2): 159–65
7. McCahill LE, Krouse RS, Chu DZ et al: Decision making in palliative surgery. *J Am Coll Surg*, 2002; 195(3): 411–22; discussion 422–23
8. Sallnow L, Feuer D: The role of surgery in the palliation of malignancy. *Clin Oncol*, 2010; 22(9): 713–18