A COMMON CLINICAL PRESENTATION AND AN UNCOMMON DIAGNOSIS OF GANGLIOCYTIC PARAGANGLIOMA: A CASE REPORT

**ABSTRACT**: Duodenal gangliocytic paraganglioma is an uncommon tumour with a common clinical presentation. The characteristic feature of the tumour is the presence of epitheloid, spindle and ganglion cells on routine staining. It is mostly benign, though it has tendency for malignant transformation. Presenting to you a case 39yr/Male, with complaints of malena, headache, dizziness, fatigue. This case was a diagnostic dilemma. A battery of tests performed to ascertain the diagnosis. A definitive diagnosis was not available. After multidisciplinary team approach, it was unanimously decided to subject the patient to surgery. The histopathological examination showed spindle cells, epitheloid cells and ganglion cells, thereby clinching the diagnosis of ‘Duodenal Gangliocytic Paraganglioma’. The first case was reported in 1957, however only a few hundred cases are available in the literature mostly in the form of case reports. Existing case series contain only single digit cases. Because of the rarity of the case, it is important to report thereby adding to the existing literature.

**KEYWORDS:** Duodenum, Gangliocytic Paraganglioma, Excision, histopathological examination

**INTRODUCTION**

Gangliocytic Paraganglioma (GP) was first described in 1957 as duodenal ganglioneuroma by Dahl et al.1 In 1971, Kepes and Zacharias first described these tumors as GP because of the presence of both ganglion cells and epithelioid cells.2 The characteristic feature of the tumour is the presence of epitheloid, spindle and ganglion cells on routine staining. It is mostly benign, though it has tendency for malignant transformation. The most common site for metastasis is regional lymph nodes. Gangliocytic [paraganglioma](https://www.sciencedirect.com/topics/medicine-and-dentistry/paraganglioma%22%20%5Co%20%22Learn%20more%20about%20paraganglioma%20from%20ScienceDirect%27s%20AI-generated%20Topic%20Pages) mainly arises from the second part of the [duodenum](https://www.sciencedirect.com/topics/medicine-and-dentistry/duodenum) in close proximity to the [ampulla of Vater](https://www.sciencedirect.com/topics/medicine-and-dentistry/ampulla-of-vater) and periampullary region, although the tumor can be seen throughout the [gastrointestinal tract](https://www.sciencedirect.com/topics/medicine-and-dentistry/gastrointestinal-tract).6 GPs are exceedingly rare tumors, with approximately 280 cases identified in a MEDLINE search through November 2022.3,4,5  Hence it is important to report this case. Thereby adding to the existing literature.

This case report has been reported in line with the SCARE Criteria 2023.7

**CASE REPORT**

**Patient Information**

A 39yr/Male presented to a peripheral hospital with complains of headache, weakness, giddiness, fatigue, malena for a period of 1 week. There was no history of similar complaints in the past. All vitals were stable at presentation. No pallor, icterus, clubbing, cyanosis, edema or lymphadenopathy. On subsequent evaluation, Hb- 12.6gm/dl, Stool- occult blood positive. Upper GI endoscopy showed hiatal hernia, antral gastritis and duodenal ulcer. He was given symptomatic treatment in the form of injectable proton pump inhibitors (PPI), intravenous fluids. He was given PPIs and discharged home in 2 days.

Clinical Findings

He was apparently alright post discharge, however after 2 weeks he presented to our hospital with complains of headache, giddiness and malena. He was again subjected to a battery of investigations, the reports were as follows: Hb- 9.4gm/dl, Platelets- 2,87,000.

**Diagnostic Assessment**

Upper GI scopy showed bleeding from ampulla, with a bulky ampulla (Fig 1). Side viewing duodenoscopy was done which showed periampullary neoplasm with ulcerations. Biopsy was taken from it. Lower GI Endoscopy was within normal limits. Histopathology report: benign ampullary mucosa, lamina propria shows mild inflammatory infiltrate of lymphocytes and plasma cells. No evidence of granulomas, dysplasia or malignancy. CEA: <0.5ng/ml. CA 19-9: 16.77 U/ml. Liver function test was within normal limit.

Computed Tomography (CT) Scan of abdomen and pelvis with oral+ IV contrast: polypoidal, heterogeneously enhancing lesion of size 2.4\*1.5\*1.5 cm seen in second part of the duodenum along medial wall just below periampullary region (Fig 2). No dilation of pancreatic duct or common bile duct. Periduodenal fat planes appear normal. Possibility of gastrointestinal stromal tumour (GIST) likely. No significant abdominal lymphadenopathy.

During this admission his Hb dropped to 8gm/dl. He was transfused with 2 pints of packed cell volume (PCV). Whole body PET CT showed small, intraluminal, polypoidal lesion in 2nd part of duodenum, closely abutting ampulla. (SUVmax: 3.6, size: 14\*15mm) (Fig 2)

 Fig 1. Showing upper GI endoscopy appearance

  Fig 2. Showing CT Scan and PET CT Appearance

**Therapeutic Intervention**

Now this patient presented a diagnostic dilemma. With no definite diagnosis to the exact nature of the periampullary lesion, further management was contemplated. Being in close proximity to the ampulla and owing to ambiguity about the nature of the lesion and its size, gastroenterology opinion did not favour endoscopic management. Hence, we decided to go ahead with surgery.

An upper midline vertical incision was taken. 2nd part of duodenum was opened in right lateral part vertically. Lesion was seen in very close proximity to ampulla. Wide excision of the lesion was done. Grossly, margin of excision was negative. Duodenal incision was closed primarily in two layers. Drain kept. Patient did well postoperatively. He was discharged on post-op day 5, tolerating full diet. Histopathology report showed gross size of 1.5\*1.2\*0.8cm. Submucosal tumor with relatively circumscribed borders composed of spindle cells, small clusters of epitheloid cells and ganglion cells. These features are suggestive of duodenal gangliocytic paraganglioma. Resection margins are free.

**Follow up and Outcome**

On routine subsequent follow up of 20 months, patient is doing well. There is no evidence of local or systemic recurrence of the disease.

**DISCUSSION**

Presenting to you a case of malena, headache, dizziness, fatigue. This case was a diagnostic dilemma. A battery of tests performed to ascertain the diagnosis. A definitive diagnosis was not available. After multidisciplinary team approach, it was unanimously decided to subject the patient to surgery. The histopathological examination showed spindle cells, epitheloid cells and ganglion cells, thereby clinching the diagnosis of ‘Duodenal Gangliocytic Paraganglioma’ (GP).

GP is a rare diagnosis, usually not even considered in the differentials in the early diagnostic stages. GP shows slight male predominance (1.5:1) and a mean tumor size of approximately 2.57 cm.3 Our case report has a male patient with symptoms suggestive of anaemia and upper GI bleeding. Initially, on endoscopy he was diagnosed as antral gastritis and duodenal ulcer and was discharged with symptomatic treatment.

GP is difficult to diagnose. Radiologically, GP usually presents a diagnostic dilemma.8 Due to the submucosal location of this tumor, preoperative pathologic diagnosis is difficult based on endoscopic biopsy alone with a diagnostic rate of only 11.4%.9 As in this case preoperative biopsy was inconclusive showing mild inflammatory infiltrate. Ct scan report suggested it to be tumor of 2.4cm, with possibility of it being GIST. Due to diagnostic uncertainty, a PET Scan was performed. Whole body PET CT showed small, intraluminal, polypoidal lesion in 2nd part of duodenum, closely abutting ampulla (SUVmax: 3.6, size: 14\*15mm).

A multidisciplinary team decided that surgical resection should be undertaken. Hence open D2 duodenotomy with wide excision of the lesion was done. Postoperative HPE report diagnosed it as GP. Immunohistochemical study is very important in the diagnosis, for epithelial cells and ganglion-like cells CD56 and Syn show highest positive rates, while spindle shaped cells express high levels of S-100 protein. It is reported that epitheloid and ganglion cells stain positive to the neuroendocrine peptides like somatostatin, pancreatic polypeptide and serotonin.6,13 Resection of the tumour is the only definitive treatment.10

 Patients with local disease and no malignant features or lymph node metastasis on preoperative workup can be considered for endoscopic mucosal resection.11 There are less than 30 reported cases with lymphatic metastasis and few cases with distant organ metastasis, 2 cases with liver metastasis and 1 with bone metastasis have been reported.12 Depending on the size and location of the tumour and the expertise available, laparoscopic or robotic or open approach can be undertaken. Complete resection of the tumor with free margins constitutes adequate treatment. Radical surgery (like whipples), though rarely needed, is indicated by the presence of aggressive behaviour indicators: infiltrative margins, high mitotic activity and nuclear polymorphism.14 Late recurrence through lymph node metastasis has been described, especially for tumours extended beyond the submucosal threshold.9,15 It can occasionally have lymph node (11.4%) or liver (1.1%) metastasis at the time of presentation.3

Recurrence of GP is rare; however, surveillance with annual contrast-enhanced CT of the abdomen is recommended, especially for patients with lymph node metastasis who do not receive adjuvant treatment.16

**CONCLUSION**

Duodenal gangliocytic paraganglioma is a rare lesion commonly arising in the 2nd part of duodenum. It is usually benign. Preoperative radiology, gastrodudenoscopy and histopathology are the investigations to aid in diagnosis. Diagnosis is very difficult and requires a high degree of suspicion. Resection constitutes definitive treatment for Gangliocytic Paraganglioma.

Consent: A written informed consent was taken from the patient for reporting the case and the accompanying images.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

**REFERENCES**

1. Dahl EV, Waugh JM, Dahlin DC. Gastrointestinal ganglioneuromas; brief review with report of a duodenal ganglioneuroma. Am J Pathol. 1957;33(5):953-965. [PubMed](https://www.ochsnerjournal.org/lookup/external-ref?access_num=13458330&link_type=MED&atom=%2Fochjnl%2Fearly%2F2023%2F07%2F10%2Ftoj.23.0010.atom) [Google Scholar](https://www.ochsnerjournal.org/lookup/google-scholar?link_type=googlescholar&gs_type=article&author%5b0%5d=EV+Dahl&author%5b1%5d=JM+Waugh&author%5b2%5d=DC+Dahlin&title=Gastrointestinal+ganglioneuromas;+brief+review+with+report+of+a+duodenal+ganglioneuroma&publication_year=1957&journal=Am+J+Pathol&volume=33&pages=953-965)
2. Kepes JJ, Zacharias DL. Gangliocytic paragangliomas of the duodenum. A report of two cases with light and electron microscopic examination. Cancer. 1971;27(1):61-67. doi: 10.1002/1097-0142(197101)27:1<61::aid-cncr2820270111>3.0.co;2-I [CrossRef](https://www.ochsnerjournal.org/lookup/external-ref?access_num=10.1002/1097-0142(197101)27:1%3C61::AID-CNCR2820270111%3E3.0.CO;2-I&link_type=DOI) [PubMed](https://www.ochsnerjournal.org/lookup/external-ref?access_num=4099700&link_type=MED&atom=%2Fochjnl%2Fearly%2F2023%2F07%2F10%2Ftoj.23.0010.atom) [Google Scholar](https://www.ochsnerjournal.org/lookup/google-scholar?link_type=googlescholar&gs_type=article&author%5b0%5d=JJ+Kepes&author%5b1%5d=DL+Zacharias&title=Gangliocytic+paragangliomas+of+the+duodenum.+A+report+of+two+cases+with+light+and+electron+microscopic+examination&publication_year=1971&journal=Cancer&volume=27&pages=61-67)
3. Okubo Y, Yoshioka E, Suzuki M, et al. Diagnosis, pathological findings, and clinical management of gangliocytic paraganglioma: a systematic review. Front Oncol. 2018;8:291. doi: 10.3389/fonc.2018.00291 [CrossRef](https://www.ochsnerjournal.org/lookup/external-ref?access_num=10.3389/fonc.2018.00291&link_type=DOI) [Google Scholar](https://www.ochsnerjournal.org/lookup/google-scholar?link_type=googlescholar&gs_type=article&author%5b0%5d=Y+Okubo&author%5b1%5d=E+Yoshioka&author%5b2%5d=M+Suzuki&title=Diagnosis,+pathological+findings,+and+clinical+management+of+gangliocytic+paraganglioma:+a+systematic+review&publication_year=2018&journal=Front+Oncol&volume=8)
4. Nguyen BD, Guo R. Multimodality imaging of multiple duodenal gangliocytic paragangliomas with post-surgical recurrence. Dig Liver Dis. 2021;53(1):122-124. doi: 10.1016/j.dld.2020.06.001 [CrossRef](https://www.ochsnerjournal.org/lookup/external-ref?access_num=10.1016/j.dld.2020.06.001&link_type=DOI) [Google Scholar](https://www.ochsnerjournal.org/lookup/google-scholar?link_type=googlescholar&gs_type=article&author%5b0%5d=BD+Nguyen&author%5b1%5d=R+Guo&title=Multimodality+imaging+of+multiple+duodenal+gangliocytic+paragangliomas+with+post-surgical+recurrence&publication_year=2021&journal=Dig+Liver+Dis&volume=53&pages=122-124)
5. Reis D, Damião F, Noronha Ferreira C, et al. Duodenal gangliocytic paraganglioma: a unique cause of abdominal pain. ACG Case Rep J. 2019;7(1):e00272. doi: 10.14309/crj.0000000000000272 [CrossRef](https://www.ochsnerjournal.org/lookup/external-ref?access_num=10.14309/crj.0000000000000272&link_type=DOI) [Google Scholar](https://www.ochsnerjournal.org/lookup/google-scholar?link_type=googlescholar&gs_type=article&author%5b0%5d=D+Reis&author%5b1%5d=F+Dami%C3%A3o&author%5b2%5d=C+Noronha%20Ferreira&title=Duodenal+gangliocytic+paraganglioma:+a+unique+cause+of+abdominal+pain&publication_year=2019&journal=ACG+Case+Rep+J&volume=7)
6. B. Wang, Y. Zou, H. Zhang, L. Xu, X. Jiang, K. Sun Duodenal gangliocytic paraganglioma: report of two cases and review of literature Int. J. Clin. Exp. Pathol., 8 (9) (2015), p. 9752 [Scopus](https://www.scopus.com/inward/record.url?eid=2-s2.0-85012977571&partnerID=10&rel=R3.0.0) [Google Scholar](https://scholar.google.com/scholar_lookup?title=Duodenal%20gangliocytic%20paraganglioma%3A%20report%20of%20two%20cases%20and%20review%20of%20literature&publication_year=2015&author=B.%20Wang&author=Y.%20Zou&author=H.%20Zhang&author=L.%20Xu&author=X.%20Jiang&author=K.%20Sun)
7. Sohrabi, Catrin BSc, PhD, MBBSa; Mathew, Ginimol BSc, MBBSb; Maria, Nicola MD, MRCSc; Kerwan, Ahmed MBBS, MScd; Franchi, Thomas MBChB, MSc, FHEA, MAcadMEde; Agha, Riaz A MBBS, MSc (Oxon), DPhil (Oxon), MRCS Eng, FHEA, FRSA, FRSPH, FRCS Glasg (Plast), FRCS (Ed), FRCS (Plast), FEBOPRASf; Collaborators. The SCARE 2023 guideline: updating consensus Surgical CAse REport (SCARE) guidelines. International Journal of Surgery 109(5):p 1136-1140, May 2023. | DOI: 10.1097/JS9.0000000000000373
8. Jain V, Selvakumar B, Varshney VK, Vishwajeet V, Taywade S, Agarwal L, Yadav T, Pandey R. Gangliocytic Paraganglioma of the Duodenum: A Masquerader. Ochsner J. 2023 Fall;23(3):251-256. doi: 10.31486/toj.23.0010. PMID: 37711472; PMCID: PMC10498948.
9. Okubo Y, Wakayama M, Nemoto T, Kitahara K, Nakayama H, Shibuya K, et al Literature survey on epidemiology and pathology of gangliocytic paraganglioma BMC Cancer. 2011;11:187[Cited Here](https://journals.lww.com/ijpm/fulltext/2018/61040/duodenal_gangliocytic_paraganglioma__a_rare_cause.25.aspx#O3-25-2) [Google Scholar](https://scholar.google.com/scholar_lookup?title=Literature+survey+on+epidemiology+and+pathology+of+gangliocytic+paraganglioma&publication_year=2011&author=Y+Okubo&author=M+Wakayama&author=T+Nemoto&author=K+Kitahara&author=H+Nakayama&author=K+Shibuya)
10. Okubo Y, Nemoto T, Wakayama M, et al. Gangliocytic paraganglioma: a multi-institutional retrospective study in Japan. BMC Cancer. 2015;15:269. [PubMed](http://www.ncbi.nlm.nih.gov/pubmed/25886293)  [Google Scholar](https://scholar.google.com/scholar_lookup?title=Gangliocytic+paraganglioma%3a+a+multi-institutional+retrospective+study+in+Japan.&publication_year=2015&author=Y+Okubo&author=T+Nemoto&author=M+Wakayama)
11. Loftus TJ, Kresak JL, Gonzalo DH, Sarosi GA Jr, Behrns KE. Duodenal gangliocytic paraganglioma: a case report and literature review. *Int J Surg Case Rep*. 2015;8C:5-8. doi:  10.1016/j.ijscr.2015.01.003 [PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4353939/) [PubMed](https://pubmed.ncbi.nlm.nih.gov/25600615) [CrossRef](https://doi.org/10.1016/j.ijscr.2015.01.003) [Google Scholar](https://scholar.google.com/scholar_lookup?journal=Int+J+Surg+Case+Rep&title=Duodenal+gangliocytic+paraganglioma:+a+case+report+and+literature+review&author=TJ+Loftus&author=JL+Kresak&author=DH+Gonzalo&author=GA+Sarosi&author=KE+Behrns&volume=8C&publication_year=2015&pages=5-8&pmid=25600615&doi=10.1016/j.ijscr.2015.01.003&)
12. H.K. Park, H.S. Han Duodenal gangliocytic paraganglioma with lymph node metastasis Arch. Pathol. Lab. Med., 140 (1) (2016), pp. 94-98 Google Scholar Scopus
13. J. Kwon, S. E. Lee, M. J. Kang, J. Y. Jang, S. W. Kim., A case of gangliocytic paraganglioma in the ampulla of Vater. World J. Surg. Oncol., 8 (1) (2010), p. 42. Scopus Google Scholar
14. Hoffmann K. M., Furukawa M., Jensen R. T. Duodenal neuroendocrine tumors: Classification, functional syndromes, diagnosis and medical treatment. Best Pract. Res. Clin. Gastroenterol. 2005;19:675-697. Doi:10.1016/j.bpg.2005.05.009. PubMed Google Scholar
15. Dookhan D. B., Meittinen M., Finkel G. Recurrent duodenal gangliocytic paraganglioma with lymph node metastasis. Histopathology. 1993;22:399-401. doi: 10.1111/j.1365-2559.1993.tb00145.x. PubMed Google Scholar
16. Choi H, Choi JW, Ryu DH, et al. Ampullary gangliocytic paraganglioma with lymph node metastasis: a case report with literature review. Medicine (Baltimore). 2022;101(15):e29138. Doi: 10. 1097/MD.0000000000029138 CrossRef Google Scholar