CASE REPORT

A large mesenteric paraganglioma with lymphovascular invasion

Mohd Afiq Mohd Slim, Susan Yoong, William Wallace, Keith Gardiner

Department of General Surgery, Belfast City Hospital, Belfast, UK

Correspondence to
Mohd Afiq Mohd Slim,
chain1993@yahoo.com

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SUMMARY

Mesenteric paraganglioma is a rare tumour with only 17 known published case reports so far. This is the second case that demonstrates lymphovascular invasion of the tumour and the third that exhibits its malignant potential. We present a case of a 69-year-old woman with a large palpable abdominal mass that was thought to arise from the ovary following a staging CT scan. Intraoperatively, a large ovoid mass measuring 18 cm×15 cm×11.5 cm was found on the small bowel mesentery. Histological examination revealed the characteristic Zellballen pattern with lymphovascular involvement. Mesenteric paraganglioma is rare and remains a diagnostic dilemma. Although the majority of paragangliomas are non-functional and do not show any malignant potential, individual case-based management is needed in view of their unpredictable nature. A multidisciplinary approach with genetic counselling and long-term follow-up are usually necessary to monitor for future disease recurrence.

BACKGROUND

Chromaffin cell derivative tumours are very rare with a prevalence rate of 0.2–0.6% in patients with hypertension.¹ These tumours can be further subdivided into two distinct groups: pheochromocytomas, which arise from adrenomedullary chromaffin cells, and those that arise from the extra-adrenal chromaffin cells known as paragangliomas. Of these, paragangliomas only account for 15–20% of chromaffin cell derivative tumours.²

Paragangliomas can be further subclassified into two groups depending on their distribution and origin. The first group arises from chromaffin cells of parasympathetic ganglia, which originate around the glossopharyngeal and vagus nerve distribution at the base of the skull and neck.³ The second group arises from paravertebral sympathetic ganglia of the thorax, abdomen and pelvis (TAP).³ Of these, paragangliomas that arise from the abdominal mesentery are much less common. To the best of our knowledge, this is the 18th mesenteric paraganglioma case that has been reported and the second case that demonstrates lymphovascular invasion of the lesion, which was first described by Chetrit and colleagues in 2012. We present a case of this unusual tumour found unexpectedly intraoperatively at our unit.

CASE PRESENTATION

A 69-year-old woman presented to her general practitioner with epigastric pain. A large, firm, non-tender fixed palpable mass was noted in her lower

abdomen. The patient had a history of gastro-oesophageal reflux disease, hypertension and anxiety. She had no family history of ovarian malignancy, was not taking hormonal replacement therapy and had two previous normal vaginal deliveries.

She was later admitted under the oncogynaecologists for elective laparotomy, total abdominal hysterectomy, bilateral salpingo-oophorectomy and omentectomy for a large palpable pelvic mass with a presumptive diagnosis of ovarian cancer.

INVESTIGATIONS

Observations and blood investigations including tumour markers (CEA, Ca19–9 and Ca125) were all within normal limits. Initial abdominal radiograph showed increased opacity in the lower abdomen (figure 1).

Preoperative staging CT of the TAP (figures 2–4) revealed a large, well-defined, midline mass measuring 18.5 cm×13.3 cm×18.2 cm with mixed attenuation arising from the pelvis. The mass was situated anteriorly, separate from the uterus and above the bladder, and was thought to arise from the ovary. Within the mass, multiple areas of hyperattenuation were seen, suggesting necrosis. No peritoneal disease, lymphadenopathy or other focus suggesting metastasis was found. Following this, decision for surgical intervention was made.

Figure 1 Abdominal radiograph on admission; green circle highlights the opacified area.

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Figure 2 Coronal view.

TREATMENT

Intraoperatively, the ovaries and the uterus were normal, but a large encapsulated mass was noted on the anterior surface of the small bowel mesentery (figures 5 and 6). The lesion was located 340 cm distally from the duodenojejunal flexure and 30 cm proximal to the terminal ileum. En bloc resection of the mass, small bowel mesentery and small bowel was performed with primary anastomosis.

OUTCOME AND FOLLOW-UP

Histopathological examination revealed 41 cm of normal small bowel with an 18 cm×15 cm×11.5 cm ovoid mass with intact and partially peritonealised capsule. An extra-adrenal paraganglioma with a fibrotic capsule, and variable solid to lobulated and nested pattern of uniform cells was observed (characteristic Zellballen appearance figure 7). Immunohistochemical screening on this tumour was positive for chromogranin A, synaptophysin, CD56, S100 and Ki67 at 5% with one microscopic lymphovascular invasion on one block resection (figure 8).

The patient had an uncomplicated postsurgical phase with normal blood pressure. The case was subsequently discussed at the local regional neuroendocrine multidisciplinary meeting where repeat imaging and annual follow-up was recommended to monitor for disease progression.

At the patient's 6-week postoperative follow-up appointment, no complications or variation in blood pressure was noted. Histopathology and the multidisciplinary team meeting outcome were discussed. The unpredictable nature of the disease and the necessity for annual follow-up with repeat imaging using CT to detect disease recurrence was emphasised. A follow-up telephone call several months later confirmed that the patient was continuing to do well and had regained a good quality of life. She is due for her first formal follow-up this year.

Figure 3 Sagittal view.

DISCUSSION

Based on the current 18 case reports (table 1), with the assumption that it follows the normal distribution in the population, the mean age for mesenteric paraganglioma is 55.83 years old,

Figure 4 Axial view.

Figure 5 The mass on the anterior mesentery of the small bowel.

with a confidence level of 95% (46.96, 64.71 years old). From the series, the authors also noted a propensity of females over males (2:1), which has been previously stated by Fujita and colleagues.

The ability of paragangliomas to metastasise varies widely depending on their site of origin, and can be as low as 10–22%.²¹ In this case, there were no features of coagulative tumour necrosis and no high degree of mitotic activity; <1/10 high power field with the Ki67 level of 5%, which was initially encouraging. Unfortunately, one of the specimen blocks revealed a capsular microscopic lymphovascular invasion (figure 8).

Due to its ability to present with various clinical manifestations and as a silent non-functional tumour, diagnosis of a paraganglioma requires a high index of suspicion. When functional, paragangliomas have the ability to secrete either catecholamines, epinephrine, norepinephrine or dopamine.^{1 3 22} In this case, there were no issues intraoperatively regarding the patient's blood pressure control. Retrospectively, this could possibly mean that this mesenteric paraganglioma was non-functioning. Recent clinical guidelines have recommended assaying plasma free metanephrine when the patient has been supine for 30 min or a 24 h urine fractionated metanephrine with urinary creatine as the first step in establishing the diagnosis of pheochromocytoma or paraganglioma if a patient fits certain criteria (figure 9).¹ Nevertheless, clinicians need to be aware that certain medications will cause a false-positive test in the biochemical investigations.⁴ Meanwhile, silent paragangliomas or those with the *SDHx* mutation could produce a false-negative test.¹

Once there is a clear biochemical diagnosis of pheochromocytoma or paraganglioma, imaging should be performed.

Figure 7 Zellballen pattern.

Figure 8 Lymphovascular invasion.

Currently, there is no consensus on the best imaging modality, but CT is the most readily available first-line imaging modality. As shown from this case report, diagnosing paraganglioma based on CT imaging alone can be challenging without clinical suspicion as the mass can appear homogenous or heterogeneous, or solid, cystic or necrotic.²² Nevertheless, paragangliomas and pheochromocytomas will show an area of higher attenuation with >10 Hounsfield Units.^{1 22 23} MRI does have a role in assessing for paraganglioma of the head and neck region.¹ On MRI, malignant lesions and pheochromocytomas

Figure 6 The blood vessels supplying the mass mesentery.

Table 1 Summary of case reports for mesenteric paraganglioma

Number	Authors	Year	Sex	Age (year old)	Tumour size (cm)	Metastasis
1	Areán and Arellano ⁴	1956	Male	32	10.0	None
2	Carmichael <i>et al</i> ⁵	1970	Female	62	3.2	None
3	Tanaka <i>et al</i> ⁶	1991	Female	29	10.0×9.0×7.0	Liver
4	Ishikura <i>et al</i> ⁷	1996	Female	33	15.0×15.0×15.0	Unknown
5	Onoue <i>et al</i> ⁸	1999	Female	38	4.5×3.2×3.0	None
6	Jaffer and Harpaz ⁹	2002	Female	76	8.5×8.0×2.0	None
7	Muzaffar <i>et al</i> ¹⁰	2002	Female	76	20.0×15.0	None
8	Ponsky and Gill ¹¹	2002	Female	35	5.5	Unknown
9	Canda <i>et al</i> ¹²	2004	Male	70	18.0	None
10	Nobeyama <i>et al</i> ¹³	2004	Male	53	15.0×10.0×7.0	Unknown
11	Kudoh <i>et al</i> ¹⁴	2005	Female	72	10.0×10.0×9.0	None
12	Matsumoto <i>et al</i> ¹⁵	2006	Female	77	7.0×5.5	Unknown
13	Svajdler <i>et al</i> ¹⁶	2007	Male	65	12.0×9.0×8.0	None
14	Guo <i>et al</i> ¹⁷	2009	Female	22	11.5×6.0×11.5	None
15	Jacob <i>et al</i> ¹⁸	2012	Female	63	10.0	Unknown
16	Chetrit <i>et al</i> ¹⁹	2012	Male	55	11.5×9.5×6.5	2 Lymph node
17	Fujita <i>et al</i> ²⁰	2013	Female	78	3.0×1.5×1.5	None
18	Current	–	Female	69	18×15×11.5	1 Lymphovascular

will show high-signal intensity and marked enhancement on the T2-weighted phase.²² Functional imaging modalities, for example, I-metaiodobenzylguanidine scintigraphy or positron emission tomography with CT could have a role in detecting small lesions during the staging process or for assessing disease recurrence.

Traditionally, the ‘rule of 10’ dictates that 10% of phaeochromocytomas will be malignant, extra-adrenal, bilateral, occur in children, are inherited and will not be associated with hypertension. With the advent of advanced genetics, that statement has now come under challenge, as 8–24% of the classified ‘sporadic’ phaeochromocytomas and paragangliomas might have an underlying germline mutation or may be associated with autosomal dominant familial syndromic disease with variable penetrance.²² Recent published guidelines recommend that all newly diagnosed paraganglioma or phaeochromocytoma patients should be counselled for genetic testing, as one-third of the patients will have

disease-causing germline mutations while those with the *SDHB* mutation will have a 40% risk of developing metastatic disease.¹ Early recognition of the mutations and hereditary syndrome patterns should allow earlier disease detection and intervention.

Learning points

- ▶ Mesenteric paraganglioma is a rare tumour and diagnosing a non-functional paraganglioma remains a challenging scenario for clinicians.
- ▶ Be aware of the patients’ criteria for phaeochromocytoma or paraganglioma screening.
- ▶ Consider the role of genetic screening for future prognosis.
- ▶ Bear in mind the importance of a multidisciplinary approach and long-term follow-up following the diagnosis.

Figure 9 Recommended biochemical testing for phaeochromocytoma or paraganglioma.¹

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Contributors MAMS was involved in manuscript preparation and case series analysis. SY was involved in manuscript preparation and editing. WW was involved in manuscript editing, supervisor and was the patient's consultant. KG was the surgeon who resected the tumour, supervised and was involved in manuscript editing.

Competing interests None declared.

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REFERENCES

- Lenders JW, Duh QY, Eisenhofer G, *et al.* Pheochromocytoma and paraganglioma: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab* 2014;99:1915–42.
- Lenders JW, Eisenhofer G, Mannelli M, *et al.* Pheochromocytoma. *Lancet* 2005;366:665–75.
- DeLellis R, Lloyd R, Heitz P, *et al.* *Pathology and genetics of tumours of endocrine organs*. Lyon, France: World Health Organization, 2004.
- Areán VM, Arellano R. Intra-abdominal non-chromaffin paraganglioma. *Ann Surg* 1956;144:133–7.
- Carmichael JD, Daniel WA III, Lamon EW. Mesenteric chemodectoma. Report of a case. *Arch Surg* 1970;101:630–1.
- Tanaka S, Ooshita H, Kaji H. Extraadrenal paraganglioma of the mesentery. *Rinsyo Geka* 1991;46:503–6.
- Ishikura H, Miura K, Morita J. A case of mesenteric paraganglioma. *Syokakigeka* 1996;19:651–5.
- Onoue S, Katoh T, Chigura H, *et al.* A case of malignant paraganglioma arising in the mesentery. *J Jpn Surg Assoc* 1999;60:3297–300.
- Jaffer S, Harpaz N. Mesenteric paraganglioma: a case report and review of the literature. *Arch Pathol Lab Med* 2002;126:362–4.
- Muzaffar S, Fatima S, Siddiqui MS, *et al.* Mesenteric paraganglioma. *Can J Surg* 2002;45:459–60.
- Ponsky LE, Gill IS. Laparoscopic excision of suspected extra-adrenal pheochromocytoma located in the mesenteric root. *J Endourol* 2002;16:303–5.
- Canda AE, Sis B, Sokmen S, *et al.* An unusual mesenteric paraganglioma producing human chorionic gonadotropin. *Tumori* 2004;90:249–52.
- Nobeyama I, Sano T, Yasuda K, *et al.* Case report on paraganglioma of the mesenterium. *Nihon Shokakibyo Gakkai Zasshi* 2004;101:998–1003.
- Kudoh A, Tokuhisa Y, Morita K, *et al.* Mesenteric paraganglioma: report of a case. *Surg Today* 2005;35:594–7.
- Matsumoto K, Hirata K, Kanemitsu S, *et al.* A case of mesenteric paraganglioma. *Jpn J Gastroenterol Surg* 2006;39:84–9.
- Swajdler M, Bohus P, Zavacky P, *et al.* Paraganglioma of the mesentery: a case report. *Cesk Patol* 2007;43:153–6.
- Guo N, Liu H, Peng Z. A mesenteric paraganglioma. *J Clin Neurosci* 2009;16:1650–1.
- Jacob NC, Howard M, Kelly M, *et al.* Mesenteric paraganglioma's: an important differential diagnosis in intra-abdominal tumours. *BMJ Case Rep* [Online] 2012;2012:pii: bcr0220125726. <http://casereports.bmj.com/content/2012/bcr.02.2012.5726.long> [accessed on 17 Nov 2014].
- Chetrit M, Dube P, Royal V, *et al.* Malignant paraganglioma of the mesentery: a case report and review of literature. *World J Surg Oncol* 2012;10:46. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3334678/pdf/1477-7819-10-46.pdf> [accessed on 17 Nov 2014].
- Fujita T, Kamiya K, Takahashi Y, *et al.* Mesenteric paraganglioma: report of a case. *World J Gastrointest Surg* 2013;5:62–7.
- Plouin PF, Fitzgerald P, Rich T, *et al.* Metastatic pheochromocytoma and paraganglioma: focus on therapeutics. *Horm Metab Res* 2012;44:390–9.
- Tsirlin A, Oo Y, Sharma R, *et al.* Pheochromocytoma: a review. *Maturitas* 2014;77:229–38.
- Roderick CB. Diagnosis of silent pheochromocytoma and paraganglioma. *Expert Rev Endocrinol Metab* 2013;8:47–57.

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