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Case report

Giant retroperitoneal paraganglioma: Challenges of misdiagnosis and high surgical risks, a case report

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ABSTRACT

Introduction and importance: In surgery, misdiagnosis is not uncommon, usually a result of erroneous image interpretations and pathology diagnosis especially involving a tumor or cancer. Misdiagnosis may cause increased morbidity, mortality and surgical risks.

Case presentation: A 49-year-old man presented for the second time with a right upper abdominal mass of 7 months. Previous CT scan of abdomen and exploratory surgery made the diagnosis of liver cancer. Two other tertiary hospitals drew the similar conclusions. At a cancer hospital the needle biopsy was suspicious for gastrointestinal stromal tumor, Imatinib was recommended but not started due to high cost. During this re-admission, the diagnosis of liver cancer or GIST was challenged. A high risk surgery was done with successive removal of a giant tumor. A final diagnosis of paraganlioma was made and the patient is now tumor free for 6 years.

Clinical discussion: There are 4 lessons from this case. First, a paraganlioma may be misdiagnosed. Second, the misdiagnosis may be misled by CT scan and pathology. Third, a misdiagnosis can cause increased morbidity, mortality and surgical risks. Forth, massive intraoperative hemorrhage is a high risk of surgery.

Conclusion: Careful clinical evaluation combined with pathology diagnosis may reduce the misdiagnosis of some tumor/cancer. Surgical resection may be the only way to reach a diagnosis in patient with paraganlioma. Massive intraoperative hemorrhage is a high risk of surgery in such patients.

1. Introduction

Paragangliomas(PGLs) are neuroendocrine neoplasms, derived from paraganglia of the sympathetic and parasympathetic nervous systems, most commonly found in the head and neck, rarely in the retroperitonium. PGLs do not often exhibit typical clinical symptoms of excessive secretion of catecholamines, and lack unique radiologic features. Its diagnosis is sometimes challenging and easy to be misdiagnosed as other neoplasms, such as duodenal gastrointestinal stromal tumors(GIST), retroperitoneal sarcoma, neurofibroma, pancreatic neoplasm and lymphoma, etc. [1–4]. Fortunately, the PGLs are mostly benign, but can grow to giant tumors, causing tumor necrosis and organ compression complications, thus making the surgical treatment difficult and high risky. Within we report a case of giant retroperitoneal PGL, which failed initial resection and was misdiagnosed at different hospitals. Surprisingly, the patient survived the high risk surgery, aborted the end-of-life care and is still disease free now. This work has been reported in line with the SCARE criteria [5].

2. Case presentation

A 49 year-old male without past medical history or family history of cancer and not taking any medications presented with abdominal mass for 7 months and fever for 3 days. The asymptomatic mass was first found 7 months ago, when a hepatic cancer was diagnosed based on the large liver mass on computed tomography (CT). Exploratory open surgery (by a different surgeon) revealed a giant liver mass with abundant blood vessels. The surgery was aborted due to excessive bleeding (4000 ml) while separating the tumor. Unfortunately a surgical tissue sample was not obtained. The patient was referred to 2 other tertiary hospitals, where similar conclusion as non-operable liver cancer was made and palliative treatment with Imatinib was recommended. The patient then

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went to a cancer hospital, where a positron emission tomography scan and a needle biopsy were performed. Due to the high risk of bleeding, only a very small tissue sample was obtained with suspicion of gastrointestinal stromal tumor (GIST), determined to be non-operable, again Imatinib was recommended. The high cost of Imatinib was beyond the affordability of the patient; so the end-of life care was suggested. Remaining untreated, the patient developed abdominal pain, weight loss, anorexia and fever, thus presented to this hospital for the 2nd time. The patient denied diaphoresis, diarrhea, anxiety or intermittent hypertension. No nausea, vomiting or melena.

On admission, the physical examination revealed T37.9^{0}C, HR 122 beat/min, BP 114/68 mmHg and a huge mass palpated in the right upper quadrant. Labs studies were negative for hepatitis B and C, normal for tumor markers of AFP, CEA, CA 125 and CA 19-9 (Table 1).

Repeated CT of abdomen demonstrated a giant tumor-like lesion in the right lobe of liver, possible invasion of right kidney upper pole; there was no destruction to the hepatic portal (Fig. 1).

The clinical picture and laboratory studies were not consistent with hepatic cancer or GIST. Nevertheless, the tumor kept growing, causing compressing symptoms as unable to tolerating diet, weight loss and persistent fever without signs of infection. At this stage, the risks of surgery were extremely high, including previously failed operation, giant tumor size, possible invasive or metastatic malignancy, abundant vasculatures with likelihood of massive intraoperative hemorrhage, possible requiring inferior vena cava revascularization and possible complications associated hepatic portal damage. The prognosis was extremely poor. The patient and his family were well informed of the above. The patient fully understood that it was the late stage of an unknown disease; the death would be a quick approaching end point if no surgery was tried. The patient then strongly requested a surgery to explore and remove the tumor, regardless of the surgical risks and accepting any surgical outcome. The ethical issue associated with this case was discussed with the hospital medical education department which gave permission to surgery. Informed consent obtained from the patient and the patient was brought to operating room while having a fever of 39.4 °C. A combined thoracic-abdominal incision was made. Initially, the first hepatic portal was blocked (15 min close and 5 min open, the close was repeated once), followed by ligation of the tumor blood vessels and blockage of the inferior vena cava (about 30 min). Next the right hemihepatectomy and the giant tumor resection was performed. Two centimeters of tumor invaded inferior vena cava wall was partially resected and sutured with 5–0 prolene suture. There was massive perioperative hemorrhage of 5000 ml during the surgery and 3000 ml post operation, requiring a total 7000 ml of blood transfusion. This surgery was operated by Dr. Zhengbin Huang with assistance from other surgeons.

The patient tolerated the surgery. He became afebrile 2nd day post-operation, subsequently recovered well and was discharged home on stable condition.

The resected tumor weighed 5.7 Kg. Pathology reported to be extra-adrenal paraganglioma (Fig. 2).

Yearly follow with CT of abdomen finds no tumor recurrence for 6 year so far (Fig. 3). The patient is very much satisfied with the lifesaving surgery.

Table 1
Laboratory results.

Test	Result	Reference range	Unit
WBC	11.53	10^9	cell/L
RBC	3.58	10^{12}	cell/L
Hb	94	11.0–16.0	g/L
Plt	427	10^9	cell/L
AFP	4.27	0–7	ng/ml
CEA	<0.200	0–3.4	ng/ml
CA 125	20.83	0–34.9	U/ml
CA 199	<0.600	0–39	U/ml
ALT	150	5.0–40	U/L
AST	61	8.0–40	U/L
Total protein	60.6	60–90	g/L
T BIL	12.6	1.7–21	umol/L
GGT	139	7.0–50	U/L
AKP	153	40–150	U/L
LDH	1058	115–225	U/L
Hbs Ag	<0.01	0–0.5	ng/ml
Hbs Ab	<0.01	0–10	nIU/ml
HCV	Negative		
PT	15.8	9.0–14.0	second
APTT	33.1	23.0–45.0	second
INR	1.52	0.68–1.30	
FIB	6.98	2.0–4.0	g/L

3. Discussion

Retroperitoneal PGL is rare, often asymptomatic and can be misdiagnosed. In our case, the abdominal mass was initially misdiagnosed as hepatic cancer by CT scan of abdomen. On CT of abdomen, PGL may have clear boundary, abundant blood supply, uneven texture. But these are non-specific. It is noticeable that, in China and other Asian countries, abdominal solid tumors are usually diagnosed by CT or magnetic resonance imaging; biopsy may not be performed or required prior to surgery. Unfortunately, abdominal CT interpretations yield approximately 7.6% of diagnostic errors, either perceptual or interpretive [6,7]. An average major discrepancy rate was reported to be 2.9%, with major discrepancies being defined as a discrepancy that would potentially adversely affect patient care [8].

CT guided percutaneous biopsy of tumor is a diagnostic approach and should be obtained whenever available, paying attention to the hypertensive crisis. This patient had a needle biopsy in the cancer hospital suspecting GIST. GIST typically occur in the tubular gastrointestinal tract, most commonly in the stomach and small intestine, only a small number of extra-gastrointestinal GIST has been reported in the retroperitoneal location [9]. The lacking of obstructive symptoms or gastrointestinal bleeding in this patient does not support the GIST diagnosis clinically.

His general laboratory studies were nonspecific and the tumor markers were negative. The negative hepatitis panel, normal AFP and a giant mass without signs of metastasis argue against the diagnosis of hepatic cancer in this patient. In GIST the serum tumor markers are not expected to be positive due to the mesenchymal origin of the tumor. However, there were several reports from Japan that serum CEA and/or CA19-9 level were elevated in cases of GIST, and were normalized after resection in all cases [10,11].

Nonetheless, the nature of this tumor remained a mystery. What made the case more challenging was that the patient strongly requested an exploratory surgery as the last resort, knowing that his prognosis was extremely poor and death would approach without surgical intervention. The case clearly posed high risks of surgery in several aspects: failed prior surgery, enlarged giant tumor, massive intraoperative hemorrhage, advanced stage and near end-of-life status. This hospital medical education department (functioning as the ethics committee) was consulted, from which an agreement of exploratory surgery was made. After obtaining informed consent, the surgery proceeded, overcame the high risks, succeeded and yielded a surprisingly positive outcome.

Healthcare personnel frequently face ethically difficult situations in the course of clinical practice. In such situations, healthcare personnel can experience unease or uncertainty over what is the right thing to do. Clinical ethics support may be helpful [12].

The final diagnosis of retroperitoneal PGL in this patient overthrew the misdiagnoses of hepatic cancer and GIST. The misdiagnoses misguided the treatment plans, caused severe morbidity and led to almost irreversible outcome. This is an example that medical errors are a substantial cause of morbidity and mortality as well as medical disputes [13–15].

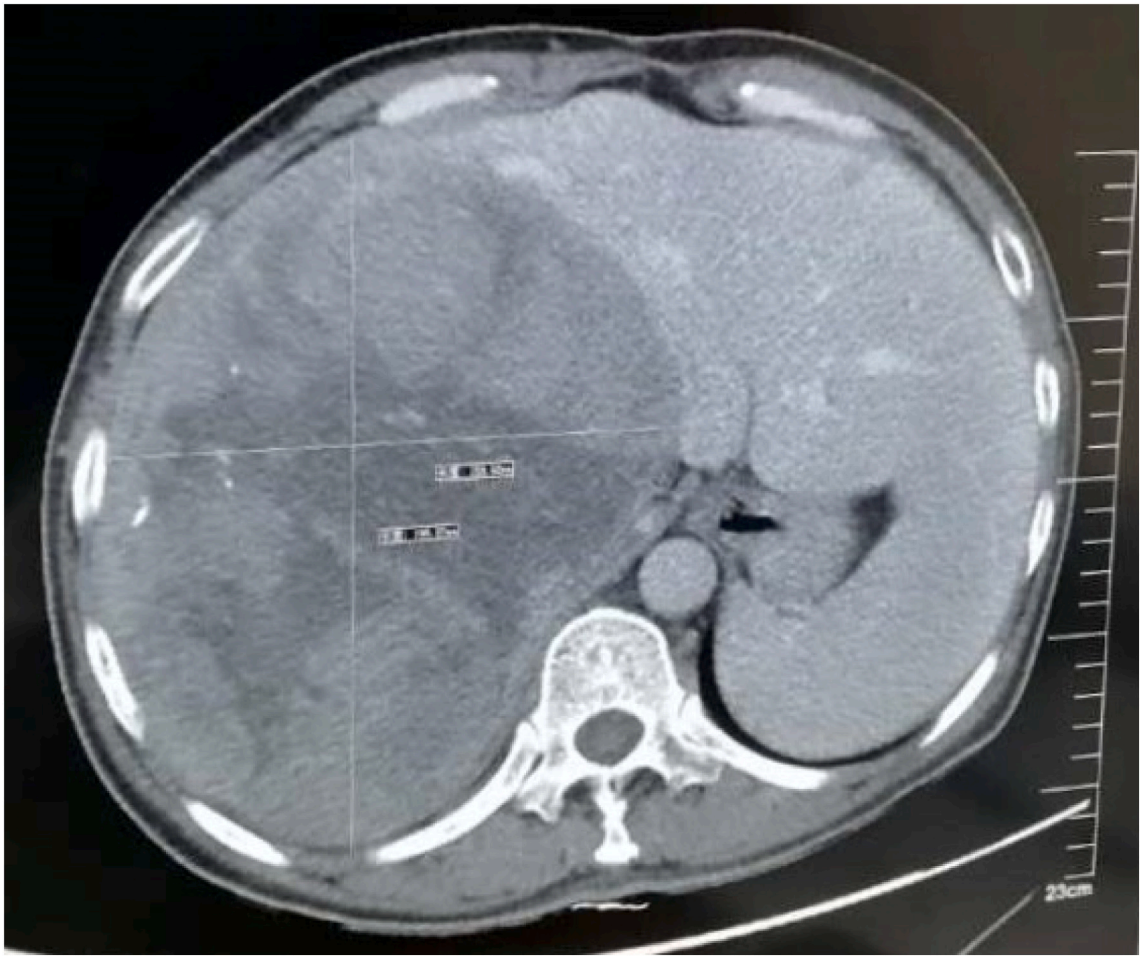

Fig. 1. CT of abdomen prior to surgery demonstrated a giant (20 × 16 cm) heterogeneous mass occupying the entire right abdomen. Extremely enlarged liver was deviated to the left abdomen.

PGLs are no longer classified as benign [16], since even without metastatic spread, multifocal or progressive disease can have significant morbidity and mortality. It is important to document the size, location and mutation status of a lesion to determine its likelihood of aggressiveness [17,18]. The choice of treatment is surgical removal of the tumor, even after recurrence.

The possibility of massive intraoperative hemorrhage from abundant tumor blood supply is the greatest challenge to the operation (as in our case), and needs to be managed properly. Extracorporeal circulation may be considered to lower the risk of massive hemorrhage which is out of capacity in our facility [19]. The prognosis of the PGL is usually well; 5-year survival is 91% in a report [20].

4. Conclusion

Careful clinical evaluation combined with pathology diagnosis can prevent or reduce misdiagnosis of abdominal solid mass, for example nonfunctional retroperitoneal PGL; whereas CT imaging of abdomen alone is not reliable. Giant retroperitoneal PGL may create a major challenge in operation for possibility of massive hemorrhage. Surgical risks stratification with preparation and preventing massive intraoperative hemorrhage is essential in such cases.

Provenance and peer review

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Ethical approval

N/a.

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.

Research registration (for case reports detailing a new surgical technique or new equipment/technology)

None.

Guarantor

Zhengbin Huang

CRediT authorship contribution statement

Zhengbin Huang: Conceptualization, Data curation, Supervision.

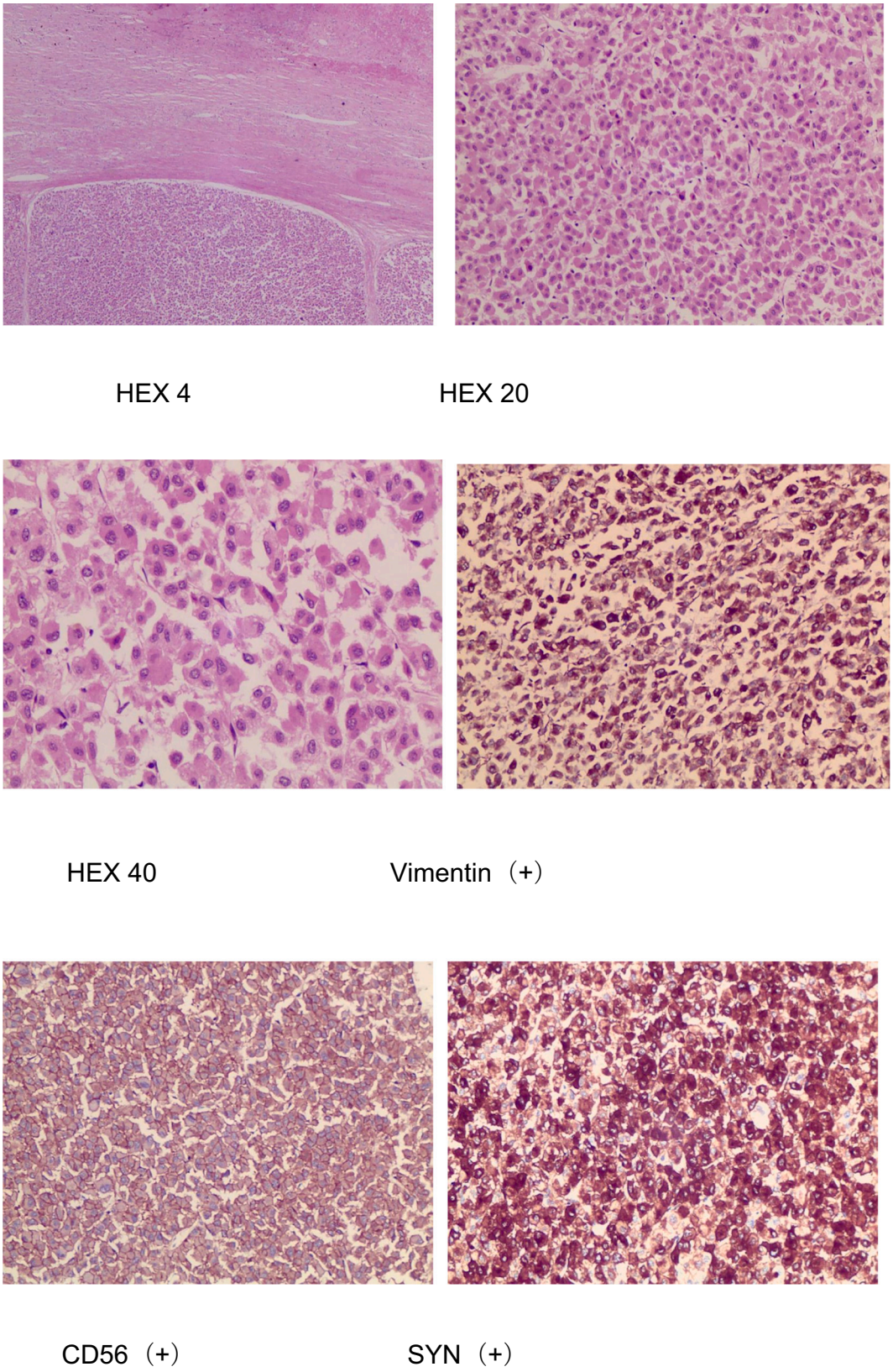

Fig. 2. Diffuse tumor tissue necrosis with abundant tumor cells in solid nest distribution. There are thin vessels around the tumor and its periphery. Tumor cells are keratotic, rich in cytoplasm, acidophilic, uniformed; the nuclei are oval shaped and eccentral, with round vacuoles and fine granular chromatins; Nucleoli are visible. Mitosis is rare. Immunohistochemical markers: PCK(−), Vimentin(+), CD56(+), CgA(−), SYN(+), Ki-67(1%). Impression: Retroperitoneal neuroendocrine tumor: extra-adrenal paraganglioma (NET-G1).

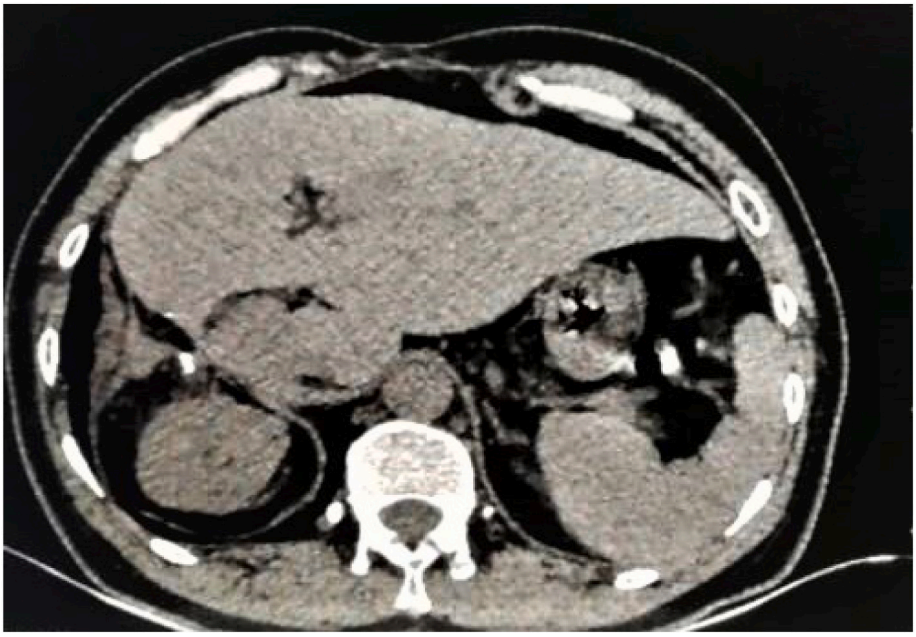

Fig. 3. CT of abdomen is tumor free at 6-year follow up.

Hanzhong Liu: Data curation and Analysis.
Wenwei Huang: Data curation and interpretation.
Hui Wang: Data curation.
Jun Liu: Data curation.
Zhengqi Wu: Writing, Reviewing and Editing.

Declaration of competing interest

None declared.

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