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## Case Report

# CT features of schwannoma in the hepatoduodenal ligament with portal vein compression: A case report <sup>☆</sup>

Peng Pu, MD<sup>a</sup>, Wei Chen, MD<sup>b,\*</sup>

<sup>a</sup> Department of Radiology, The People's Hospital of Aba Tibetan and Qiang Autonomous Prefecture, Mer kang, Sichuan Province, 624000, China

<sup>b</sup> Department of Radiology, Southwest Hospital, The Third Military Medical University, 30 Gaotanyan, Shapingba, Chongqing, 400038, China

### ARTICLE INFO

#### Article history:

Received 24 November 2022

Revised 8 December 2022

Accepted 10 December 2022

#### Keywords:

Schwannoma

Hepatoduodenal ligament

Case report

Computed tomography

### ABSTRACT

Schwannomas are a type of benign tumor that affects the nerve sheath, commonly located in the head and neck. However, Schwannomas in the hepatoduodenal ligament are extremely rare. The case was a 38-year-old female presented with a 2-month history of abdominal pain in the right upper quadrant and 2 weeks of exacerbation. Computed Tomography revealed a solid mass with target-like enhancement in the hepatoduodenal ligament. She underwent complete surgical excision, and a histopathological examination confirmed the mass as a schwannoma. This case highlights the importance of anatomical location and CT features for diagnosis of schwannoma in the hepatoduodenal ligament.

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## Introduction

Schwannomas are benign, encapsulated tumors that originate from Schwann cells in the nerve sheath. Schwannomas arise from aberrant division and proliferation of Schwann cell [1]. Tumors are most commonly found in the lower limbs, but can be found in any part of the body, abdominal schwannomas are rare [2]. Only 28 cases of hepatoduodenal ligament and porta hepatic schwannoma have been reported in the litera-

tures [3]. Preoperative radiological diagnosis of hepatoduodenal ligament schwannomas can be challenging because they are rare and can be misinterpreted as other types of tumors. Herein, we describe a case of schwannoma in the hepatoduodenal ligament with portacaval space invasion in a 36-year-old female patient who was diagnosed and treated in our department. This case is of interest because of the difficulty surrounding the preoperative diagnosis and the unique extent of tumor invasion.

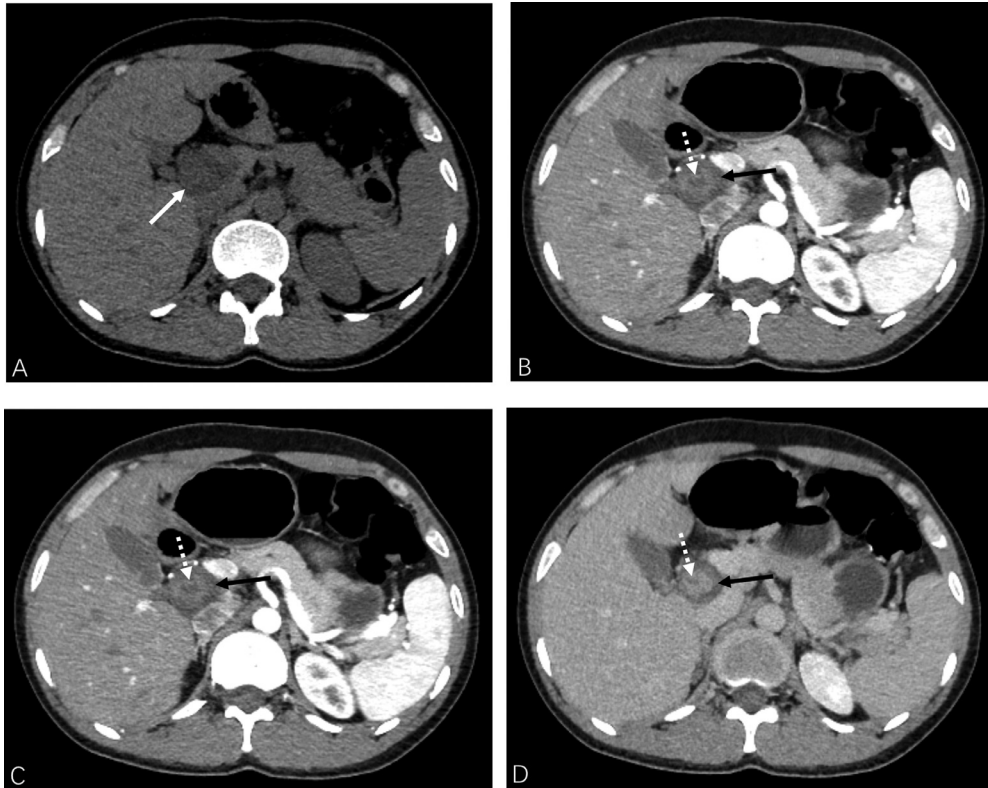
<sup>☆</sup> Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

\* Corresponding author.

E-mail address: [landcw@hotmail.com](mailto:landcw@hotmail.com) (W. Chen).

<https://doi.org/10.1016/j.radcr.2022.12.032>

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**Fig. 1** – Axial abdominal CT scans demonstrating (A) An unenhanced computed tomography (CT) scan showed a 3.2 cm × 2.8 cm well-defined hypodensity mass (white arrow) in hepatoduodenal ligament, the mass shows rim-like enhancement (dashed white arrow) on (B) arterial phase image and peripheral progressive enhancement (black arrow) on (C) portal venous phase (D) delayed phase image.

## Case report

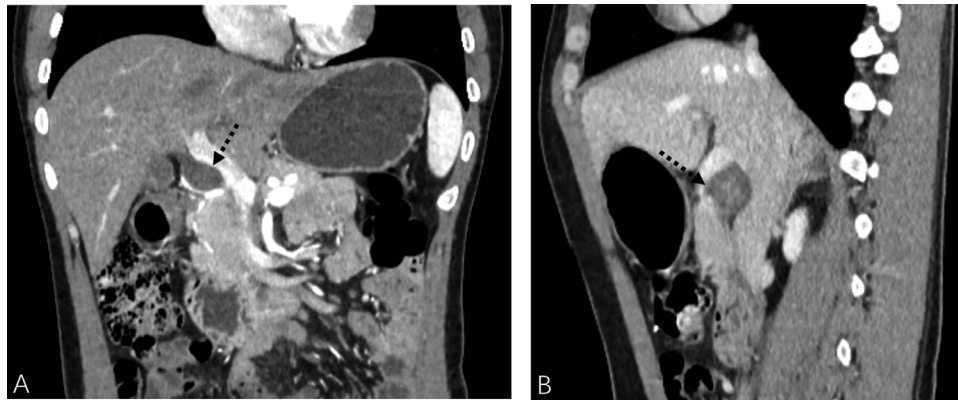
A 38-year-old female presented with a 6-month history of abdominal pain in the right upper quadrant which progressively become worse for 2 weeks. She had a medical history of cesarean section. Her family history had no significant disease. Physical examination indicated no abnormalities. The results of routine laboratory testing, such as blood checks, biochemical evaluations, and measurements of tumor marker levels, were within the reference ranges.

Plain CT and dynamic contrast-enhanced CT were performed, a low-density, round-shaped hypointense mass with well-defined margins measuring 3.3 × 2.8 × 3.2 cm in hepatoduodenal ligament on (Fig. 1A); The arterial phase showed a target ring-like enhancement (Fig. 1B). Portal vein and delayed phase still showed progressive target ring-like enhancement (Figs. 1C and D). The portal vein was displaced (Fig. 2). The lesion was clearly demarcated from the duodenum, portal vein, and inferior vena cava. The intra- and extrahepatic bile ducts were not dilated. According to the CT examinations, a hepatoduodenal ligament tumor was primarily considered. Intraoperative findings revealed that a mass surrounded by a fibrous capsule was identified in the hepatoduodenal ligament, and the mass mildly compresses portal vein. Histopathological examinations showed that the tumor was mainly composed of spindle-shaped cells. The diagnosis of schwannoma was

highly supported by immunohistochemistry stains, which revealed strong positive S-100 and negative CD 34. Finally, the lesion was diagnosed as a benign schwannoma in the hepatoduodenal ligament.

## Discussion

Schwannomas are benign nerve sheath tumors composed of neoplastic Schwann cells. Approximately 5% of benign soft tissue tumors are schwannomas, which account for more than 90% of all benign tumors [4]. They are usually diagnosed in patients aged between 20 and 50 years, regardless of gender [5], and can develop in any nerve throughout the body, Although the most common locations are the head, neck, spinal cord, and extremities, they can also occur in other areas [3]. To our knowledge, schwannomas in the hepatoduodenal ligament are extremely rare. The origin of hepatoduodenal ligament schwannomas is assumed to be sympathetic and parasympathetic nerve fibers running through the hepatic artery through the hepatoduodenal ligament [6]. It is important to emphasize that the nomenclature of hepatoduodenal ligament is inconsistent throughout the literature. A literature review using PubMed was performed to identify similar cases using search terms (“porta hepatis,” “porta hepatic,” “hilar” or “hepatoduodenal ligament”) and (“schwannoma” or “neurilemmoma”).



**Fig. 2 – On contrast-enhanced coronal and sagittal computed tomography scans, the mass has compressed and displaced the portal vein (dashed black arrow) anteriorly.**

Twenty-eight cases were identified and summarized by Hulme [3]. They are not mentioned. Nakada et al. reported 8 cases of porta hepatis [1]. Hepatic schwannomas were not included.

CT typically reveals a hepatoduodenal ligament mass in patients with schwannomas in this ligament. It has been noted that different components (such as the Antoni A and B sections) inside schwannomas exhibit different attenuations and signals on CT and MRI scans [1]. Tumor extension along the hepatoduodenal ligament, compressing IVC without obstruction, was suggestive of a slow-growing benign behavior. A wide range of clinical disorders may manifest because of the porta hepatis. Tiramani et al. [7] discuss the range of diseases that might affect the porta hepatis, dividing the causes into vascular and non-vascular causes. It is difficult to ascertain the true prevalence of these different tumors types within the porta hepatis or hepatoduodenal ligament. It is difficult to obtain a precise diagnosis prior to surgery, although CT may provide a reference for probable diagnosis. CT usually reveals a round or oval homogeneously attenuating; one of the important imaging clues for hepatoduodenal ligament schwannomas is the identification of an extrahepatic location. In our case, contact and compression with duodenal, portal veins, IVC and hepatic arteries were observed, which was found in the hepatoduodenal ligament during the operation pathological examination can provide a conclusive diagnosis of schwannoma, because these tumors frequently have spindle-shaped cells and no atypia. Well-circumscribed masses with various attenuations/intensities reflecting internal Antoni A/B components were consistent with those of schwannomas at other sites. The tumor was growing along the hepatoduodenal ligament, compressing the bile ducts and blood vessels without obstruction, which suggests that it has an extrahepatic origin and is slow-growing and benign. It has been reported that both CT and MRI show variable attenuations and internal signals based on the Antoni A and B regions within the schwannoma [1]. The case shows target-like gradually increasing enhancement that suggestive of Antoni A histology, The appears of the mass are different from other reported.

In conclusion, schwannomas in the hepatoduodenal ligament are a very rare condition with benign behavior. So far, little is known about the etiology, epidemiology, diagnosis, and treatment of this disease. In clinical work, MDT discussion is also a good choice to determine the diagnosis and treatment of patients with hepatoduodenal ligament schwannomas display good prognosis following complete surgical excision.

### Patient 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.

### REFERENCES

- [1] Nakaya M, Kurokawa R, Watadani T, Morisaka H, Higuchi M, Toda Y, et al. Schwannoma in and around the porta hepatis: radiological features in eight cases and literature review. *Abdom Radiol (NY)* 2022;47(6):1917–28.
- [2] El Sayed L, Masmajejan EH, Lavolle A, Biau D, Peyre M. Clinical results after surgical resection of benign solitary schwannomas: a review of 150 cases. *Orthop Traumatol Surg Res.* 2022;108(4):103281.
- [3] Hulme KR, Robbins E, Crawford M, Mahar A, McKenzie CA. Giant porta hepatis schwannoma: a rare cause of a cystic hepatic neoplasm. *Pathology* 2022;54(1):140–3.
- [4] Ariel IM. Tumors of the peripheral nervous system. *CA Cancer J Clin* 1983;33(5):282–99.
- [5] Caliskan S, Gumrukcu G, Kaya C. Retroperitoneal ancient schwannoma: a case report. *Rev Urol* 2015;17(3):190–3.
- [6] Yin SY, Zhai ZL, Ren KW, Yang YC, Wan DL, Liu XY, et al. Porta hepatic schwannoma: case report and a 30-year review of the literature yielding 15 cases. *World J Surg Oncol* 2016;14:103.
- [7] Tiramani SH, Shanbhogue AK, Vikram R, Prasad SR, Menias CO. Imaging of the porta hepatis: spectrum of disease. *Radiographics* 2014;34(1):73–92.