A case of primary hepatic stromal tumour misdiagnosed as a liver cyst

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Abstract
Primary hepatic stromal tumours are very rare and there are only sporadic reports in the literature. Due to the lack of specificity in their clinical manifestations and imaging features, these tumours are easily misdiagnosed. This current report presents a case of primary liver stromal tumour that was misdiagnosed as a liver cyst. The 72-year-old male patient was admitted to the hospital due to right upper abdomen fullness and discomfort for more than 2 weeks. Colour Doppler ultrasonography and enhanced computed tomography examinations revealed a cystic mass in the right lobe of the liver. The preoperative diagnosis was a liver cyst and the laparoscopic fenestration was performed. The pathological examination demonstrated that it was a primary hepatic stromal tumour. Gastroenteroscopy was performed postoperatively and no lesions were found in the gastrointestinal tract. Imatinib mesylate was given orally as the salvage therapy and a radical operation was planned at the patient’s request. This current case serves as a reminder that clinicians should consider the possibility that it could be a primary hepatic stromal tumour rather than a hepatic cyst. A multidisciplinary team is necessary for the diagnosis and treatment of patients with a primary hepatic stromal tumour.

Keywords
Primary hepatic stromal tumour, misdiagnosis, case report

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Introduction
Gastrointestinal stromal tumours are the most common mesenchymal tumours, which mainly occur in the gastrointestinal tract, being found in the stomach (60–70%), small intestine (20–25%), colon and rectum (5%) and oesophagus (<5%).¹⁻³

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Gastrointestinal stromal tumours have diverse clinical manifestations and an accurate diagnosis is mainly based on histological and immunohistochemical criteria. Among them, cluster of differentiation (CD) 117 is a specific marker in the immunohistochemical examination of gastrointestinal stromal tumours. Endoscopic ultrasound-guided tissue biopsy is also an important diagnostic method.

Primary stromal tumours that originate from the liver are extremely rare and there are only sporadic reports in the literature. The disease is easily misdiagnosed because of a lack of specificity in clinical manifestations and imaging features. This current report presents a case of primary hepatic stromal tumour that was misdiagnosed as a liver cyst. The patient underwent laparoscopic fenestration and the final pathological examination revealed a primary hepatic stromal tumour. A systematic literature review was undertaken to comprehensively identify the characteristics of primary hepatic stromal tumours.

Case report

In April 2021, a 72-year-old male patient was admitted to the Department of General Surgery of Fuyang Tumour Hospital due to right upper abdomen fullness and discomfort for more than 2 weeks. On admission, his abdomen was flat, with no intestinal pattern or peristaltic, and no varicose veins in the abdominal wall. A mass of approximately 16 × 12 cm in the right-side costal margin was palpable, with a smooth surface, and without tenderness. A colour Doppler ultrasound examination of the abdomen revealed a cystic mass of 16.4 × 12.8 cm in the right lobe of the liver, with a thin cyst wall, smooth border and uniform echo. The enhanced computed tomography (CT) examination of the abdomen showed a huge cystic low-density shadow on the right lobe of the liver, with clear margins, and the largest cross-section was about 16.7 × 12.0 cm. There was no obvious enhancement and the CT impression was that of a liver cyst (Figure 1). The patient’s routine blood analyses, liver function and liver tumour markers were all normal. The clinical diagnosis of a liver cyst was made based on the patient’s symptoms and imaging examinations. It was decided to perform laparoscopic fenestration and drainage of the liver cyst under general anaesthesia. Upon laparoscopy, a huge cyst in the right lobe of the liver was seen, with high tension, and the rest of the liver was soft with no obvious nodules. No abnormalities were found in the gallbladder, common bile duct, spleen, gastrointestinal tract and pelvic cavity. The cyst was penetrated and approximately 2000 ml of coffee-like fluid was drawn out. A laparoscopic fenestration was created, part of the cyst wall was removed for pathological examination and bleeding from the cyst edge was stopped by an ultrasonic knife and suture. After washing and checking, there was no obvious bleeding or bile leakage, so a drainage tube was placed in the cyst cavity. The patient recovered uneventfully after the surgery. Pathological examination confirmed it to be a primary hepatic stromal tumour, more specifically a rare type of extragastrointestinal stromal tumour. The immunohistochemistry results were as follows: CKp–, Vim+, desmin focal+, SMA vascular+, S-100–, CD34 vascular+, BCL-2+, STAT6 nuclear+, CD117+, DOG-1+ and Ki67+2% (Figure 2). Gastroenteroscopy was performed postoperatively and no lesions were found in the gastrointestinal tract. Imatinib mesylate was given orally at a dosage of 400 mg/day for 12 months as salvage therapy. A radical operation was planned at the patient’s request.

All procedures performed in this case were undertaken according to the Declaration of Helsinki (as revised in 2013).
Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

**Discussion**

Gastrointestinal stromal tumours are a type of tumour that originate from the mesenchymal tissue of the gastrointestinal tract. They account for 1–2% of all gastrointestinal tumours. This type of tumour originates from the interstitial cells of Cajal (ICC) in the gastrointestinal tract. Cajal cells mainly play a role in triggering gastrointestinal activity. This tumour usually occurs in the digestive tract including the stomach, small intestine, colorectal and oesophagus.

Primary hepatic stromal tumours are extremely rare and there are only sporadic cases reported in the literature. A previous study reported that ICC-like cells were observed in the portal vein of humans and animals by immunohistochemical staining, which were similar in function and structure to ICC cells. Further research confirmed that ICC-like cells exist in the human liver.
Primary hepatic stromal tumours lack typical clinical manifestations and laboratory test findings. Imaging usually show a very large tumour mass, occasionally accompanied with abdominal discomfort and gastrointestinal symptoms.\(^5\)\(^,\)\(^12\) It has also been reported that the this type of tumour was discovered when a patient sought medical advice due to rapid weight loss.\(^5\) Slightly elevated levels of alpha-fetoprotein and glycoproteins 19-9 and 125 often indicate that the disease may be malignant, but there are no tumour markers that are sensitive and specific to this disease.\(^4\) Primary hepatic stromal tumours also have no typical features on imaging and it is not easy to differentiate between primary hepatic stromal tumours and other liver diseases before surgery. The imaging findings of this type of tumour are mostly round cysts, occasionally lobulated. The cyst wall is usually thick, and necrosis and intratumoral haemorrhage may appear in the central area.

As primary hepatic stromal tumours are extremely rare, there is no consensus on how to treat them. The management is mainly based on what would be used for gastrointestinal stromal tumours. R0 resection or partial resection combined with postoperative targeted therapy could benefit patients.\(^13\) Patients with tumours that are not resectable or those that cannot tolerate surgery might require cytoreductive surgery.\(^13\) Imatinib can be used as adjuvant therapy.\(^13\) Researchers have also used radiofrequency and microwave ablation for local treatment, and the initial effects were relatively satisfactory.\(^14\)\(^,\)\(^15\)

This current report describes a case of primary hepatic stromal tumour that presented as a huge cystic lesion in the right lobe of the liver. The male patient presented with right upper abdomen fullness and discomfort. Colour Doppler ultrasonography and enhanced CT examination revealed a cystic mass in the right lobe of the liver. The preoperative diagnosis was a liver cyst and the laparoscopic fenestration was performed. However, the pathological examination demonstrated that it was a primary hepatic stromal tumour. This was an unusual case of misdiagnosis. Perhaps due to its rarity and the lack of specific clinical manifestations and imaging features, the possibility of a primary hepatic stromal tumour was not considered during the preoperative diagnosis. As a consequence, the treatment continued based on it being a hepatic cystic lesion.

A review of the published case reports of primary hepatic stromal tumours over the past 15 years was undertaken (Table 1), which included 13 males and 10 females with a median age of 59 years.\(^2\)\(^,\)\(^4\)\(^,\)\(^5\)\(^,\)\(^14\)--\(^32\) The common features were that the primary hepatic stromal tumour lacked typical clinical manifestations and patients usually presented as an accidental liver mass. The tumour size ranged from 2.4 to 23 cm with a median size of 15 cm. Among them, 65.2% (15 of 23 patients) patients had a tumour size of \(>10\) cm.\(^4\)\(^,\)\(^5\)\(^,\)\(^16\)--\(^19\),\(^21\),\(^23\),\(^24\),\(^26\),\(^28\)--\(^32\) Tumours were mostly located in one lobe of the liver, but in a minority of patients, the tumour was multilobular in the liver. Regarding their treatment, more than half of the patients underwent liver resection.\(^2\)\(^,\)\(^4\)\(^,\)\(^5\)\(^,\)\(^17\)--\(^23\),\(^25\)--\(^32\) The remaining received chemotherapy or other treatments.\(^5\)\(^,\)\(^14\)\(^,\)\(^15\),\(^24\) One patient received no treatment.\(^16\) The risk grade was high in all patients.

In conclusion, primary hepatic stromal tumours are sporadic and remain challenging in terms of accurately identifying the liver as the primary site of the tumour. The first-line treatment of primary hepatic stromal tumours is surgical resection. Additionally, imatinib can be used as
adjuvant therapy for locally advanced tumours and as the first-line treatment for unresectable tumours, recurrence and metastases. A multidisciplinary team is necessary for the diagnosis and treatment of a patient with a primary stromal tumour. The misdiagnosis in this current case serves as a reminder that clinicians should consider the possibility that it could be a primary hepatic stromal tumour rather than a hepatic cyst.

### Table 1. Case reports of primary hepatic gastrointestinal stromal tumours reported between 2003 and 2019.

| Author            | Country | Age, years | Sex | Location | Size, cm | Treatment | Cell type | Risk grade | Recurrence |
|-------------------|---------|------------|-----|----------|----------|-----------|-----------|------------|------------|
| Hu et al. 2003    | USA     | 79         | F   | R/I      | 15.0     | HR        | S         | High       | 16/Met     |
| De Chiara et al. 2006 | Italy   | 37         | M   | R/I      | 18.0     | HR        | S         | High       | 14/Met     |
| Luo et al. 2009   | China   | 17         | M   | R/I      | 5.1      | RFA       | S         | High       | 3/DFS      |
| Ochiai et al. 2009 | Japan   | 30         | M   | R + L/1  | 20       | HR        | S + E     | High       | 24/Rec + Met |
| Yamamoto et al. 2010 | Japan   | 70         | M   | L/1      | 20       | HR        | E         | High       | NA         |
| Li et al. 2012    | China   | 53         | M   | R/I      | 20.0     | Untreated | NA        | High       | NA         |
| Louis et al. 2014  | India   | 55         | F   | R + L/3  | 18.0     | HR        | S         | High       | 7/DFS      |
| Zhou et al. 2014  | China   | 56         | M   | R + L/1  | 10.0     | HR        | S         | High       | 12/DFS     |
| Bhoi et al. 2014  | India   | 41         | F   | R/2      | 15.0     | HR        | S         | High       | 5/DFS      |
| Kim et al. 2014   | South Korea | 71      | M   | L/1      | 7.0      | HR        | S         | High       | 19/DFS     |
| Mao et al. 2015   | China   | 60         | F   | R + C/1  | 19       | HR + AT   | S         | High       | 12/DFS     |
| Lin et al. 2015   | China   | 65         | M   | L/1      | 12       | Chemo     | S         | High       | 13/Met     |
| Su et al. 2015    | China   | 67         | F   | R/I      | 7.4      | HR        | NA        | High       | 14/Rec     |
| Nagai et al. 2016 | Japan   | 70         | F   | L/1      | 6.8      | HR        | S         | High       | 10/DFS     |
| Liu et al. 2016   | China   | 56         | F   | L/1      | 2.4      | MW        | S         | High       | 17/Met     |
| Wang et al. 2016  | China   | 61         | M   | C/1      | 7.3      | HR        | NA        | High       | 11/DFS     |
| Cheng et al. 2016 | China   | 63         | M   | R/I      | 13       | HR        | S         | High       | 60/DFS     |
| Losada et al. 2016 | Chile   | 61        | M   | L/1      | 15       | HR        | NA        | High       | NA         |
| Carrillo Colmenero et al. 2017 | Spain | 41        | M   | R + L/1  | 20       | HR        | S         | High       | 18/DFS     |
| Lok et al. 2017    | China   | 50         | F   | R/I      | 15       | HR        | S         | High       | 6/Met      |
| Joyon et al. 2018  | France  | 56         | M   | R/I      | 10       | TACE + HR + T + Chemo | S | High       | 12/Rec     |
| Joyon et al. 2018  | France  | 59         | F   | R + L/1  | 23       | Chemo     | S + E     | High       | 18/DFS     |
| Xu et al. 2019     | China   | 64         | F   | R/I      | 15       | HR        | S         | High       | 5/DFS      |

F, female; R, right lobe of liver; HR, hepatic resection; S, spindle; Met, metastasis; M, male; RFA, radiofrequency ablation; DFS, disease-free survival; L, left lobe of liver; E, epithelioid; Rec, recurrence; NA, not available; C, caudate lobe of liver; AT, autotransplantation; Chemo, chemotherapy; MW, microwave ablation; TACE, transcatheter arterial chemoembolization; T, transplantation.

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### Author contributions

F.L., S.H.W. and D.F.H. contributed to the study design. F.L., S.H.W., Q.Q.S., S.H.L. and D.F.H. participated in the treatment of this patient. F.L., S.H.W. and D.F.H. participated in drafting this manuscript. F.L. and D.F.H. revised the manuscript.
Declaration of conflicting interest
The authors declare that there are no conflicts of interest.

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