

The Reappraisal of Batson's Theory by Isolated Para-vertebral Metastasis of Hepatocellular Carcinoma

Po-Chin Liang, Kai-Wen Huang

The extra-hepatic metastasis of hepatocellular carcinoma (HCC) usually hints late disease stage and poor prognosis. However, we treated 5 unusual HCC patients with isolated para-vertebral metastasis by tumor excision and the surgical result is satisfactory during 3.5 years follow-up in mean. To explain why the unusual situation of isolated metastasis of HCC occurred, an alternative spreading route of cancer cells bypass pulmonary circulation and avoid pulmonary vascular filtration, the Batson's plexus, was highly suspected. We supposed that isolated para-vertebral metastases seems not to mean a late disease stage, aggressive management made longer survival possible, and it was confirmed by our clinical experience.

The Reappraisal of Batson's Theory by Isolated Para-vertebral Metastasis of Hepatocellular Carcinoma

Po-Chin Liang¹, Kai-Wen Huang^{2, 3*}

1. Department of Medical Image, National Taiwan University Hospital, National Taiwan University

2. Department of Surgery & Hepatitis Research Center, National Taiwan University Hospital, National Taiwan University

3. Graduated Institute of Clinical Medicine, National Taiwan University

Correspondence: Kai-Wen Huang, MD, MS, PhD

Department of Surgery, National Taiwan University Hospital,
No 7th, Chung-Shan S. Road, Taipei, Taiwan

Tel: 002-886-2-23123456 ext: 66144;

E-mail address: skywing@ntuh.gov.tw

Introduction:

The extra-hepatic metastasis of hepatocellular carcinoma (HCC) usually hints late disease stage and poor prognosis. Sometimes it will alter the decision making of clinicians to be over-conservative. Recently, the aggressive treatment for pulmonary metastasis of HCC was proven to prolong survival of patients with controllable primary liver lesions (Gwak GY et al., 2004). In our hospital, the same success was obtained in some HCC patients with “limited” extra-hepatic metastasis along the para-spinal area.

Case presentation

The 62-year-old male patient received extended right lobectomy under the impression of HCC in 2002 (Fig 1). Elevated alfa-fetoprotein (AFP) level (251 kU/L) was noted 6 months later after operation during the follow-up. He was admitted to our hospital again and the abdominal computed tomography (CT) (Fig 2) and angiography (Fig 3) showed a hypervascular mass within left psoas muscle, but no other metastatic lesion was noted. He received surgical excision of the tumor soon and the 4x4x3 cm, well-encapsulated, yellowish-red color mass was proven to be metastatic HCC by pathologist (Fig 4).

However, three months later, back pain developed and the serum level of AFP elevated again (907 kU/L). The spinal MRI showed right paraspinal mass (Fig 5). Tumors excision was performed again and radiotherapy with 3000 cGy over right back was completed. From then on, during the period of follow-up for 4 years, no more extra-hepatic metastatic lesion was detected.

Discussion

From 1995-2002, 5 patients of HCC presented with isolated para-vertebral metastasis was noted in NTUH. The only extra-hepatic metastatic sites of these patients were all adjacent to the spine (Fig 6) (thyroid 1, psoas muscle 1, posterior chest wall 1, pre-sacral space 1 and left supra-scapular muscle 1), and no evidence of pulmonary metastasis was found in these patients. These patients all received radical surgical management for primary lesion and the metastasis were all detected 36-48 months after hepatectomy. The common presentation is palpable mass or elevated serum AFP level. They all received surgical tumor excision and 2 patients received adjuvant radiotherapy. During the period of follow-up (3.5 years in mean), 3 intra-hepatic recurrence of HCC and one para-vertebral metastasis occurred in 3 patients, but no more extra-hepatic metastasis was noted.

To explain why the unusual situation of isolated metastasis of HCC occurred, an alternative spreading route of cancer cells bypass pulmonary circulation and avoid pulmonary vascular filtration was highly suspected.

According to the Batson's theory, the most likely route of metastases to this muscle in these case is the para-vertebral venous plexus (Batson's venous) (Batson OV. 1940.).

It might be expected that tumor emboli from HCC could reach Batson's venous

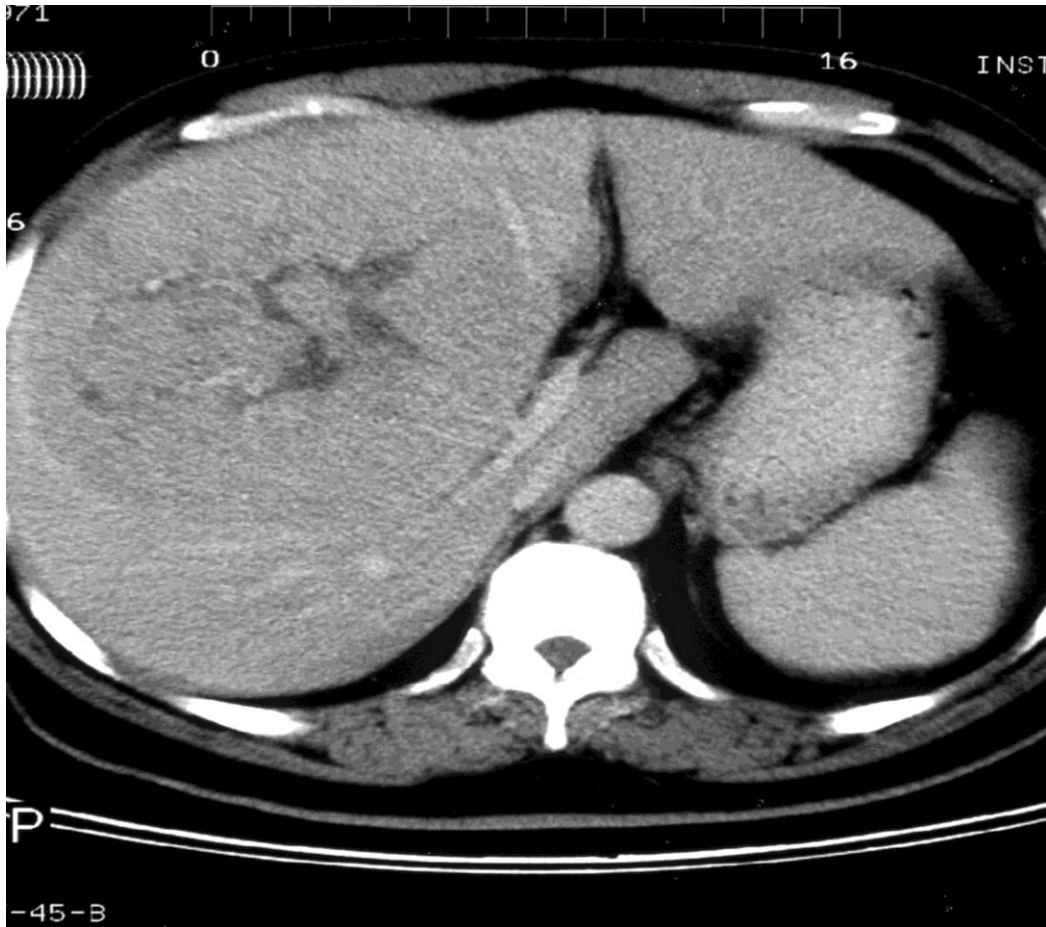
plexus through inferior vena cava or portal vein and thus could travel retrograde toward the para-vertebral area such as thyroid or psoas muscle via the anastomosis between superior intercostals veins and Batson's venous. We supposed that isolated paravertebral metastases seems not to mean a late disease stage, aggressive management made longer survival possible, and it was confirmed by our clinical experience.

Reference:

1. Gwak GY et al. 2004. Long-term survival after pulmonary metastatectomy of hepatocellular carcinoma; treatment outcome or natural history?

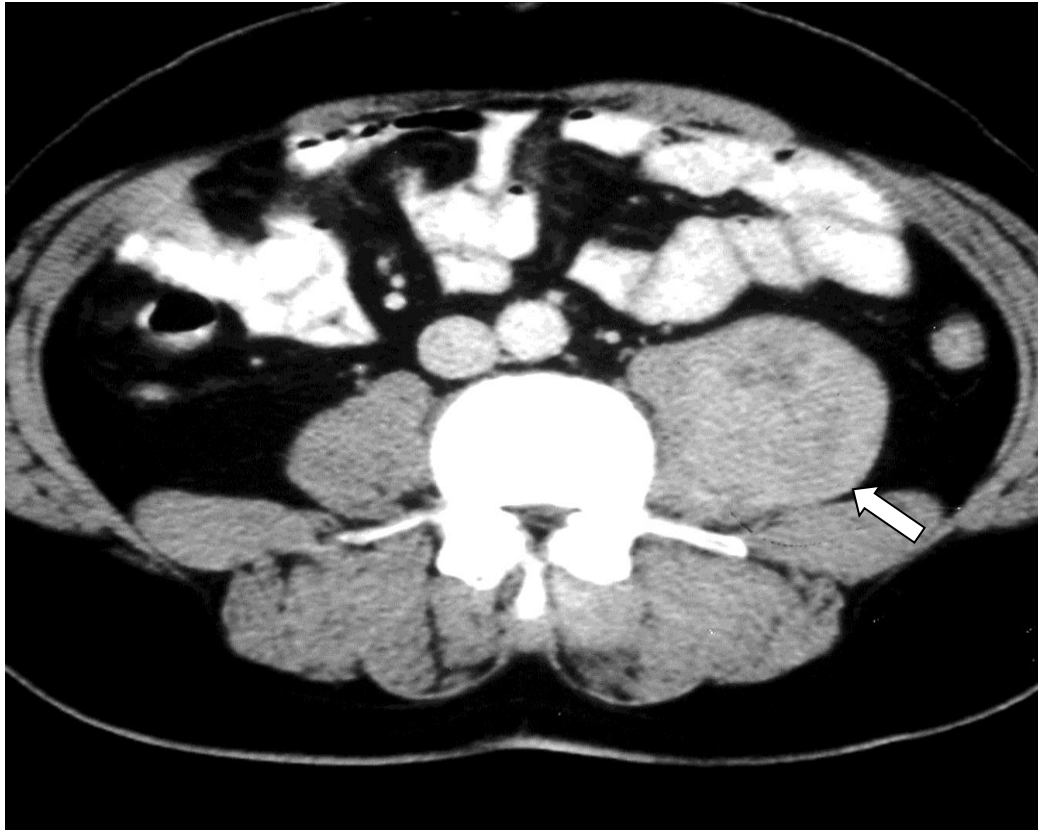
Hepatogastroenterology 51(59):1428-33.
2. Batson OV. 1940. The function of the vertebral veins and their role in the spread of metastases. Annals of Surgery 112:138-145.

Figure 1. The abdominal CT scan for primary liver tumor



A 10.6 x 8.8 cm hepatic tumor was noted over right lobe by contrast-enhanced CT.

Figure 2. The abdominal CT scan for metastatic lesion



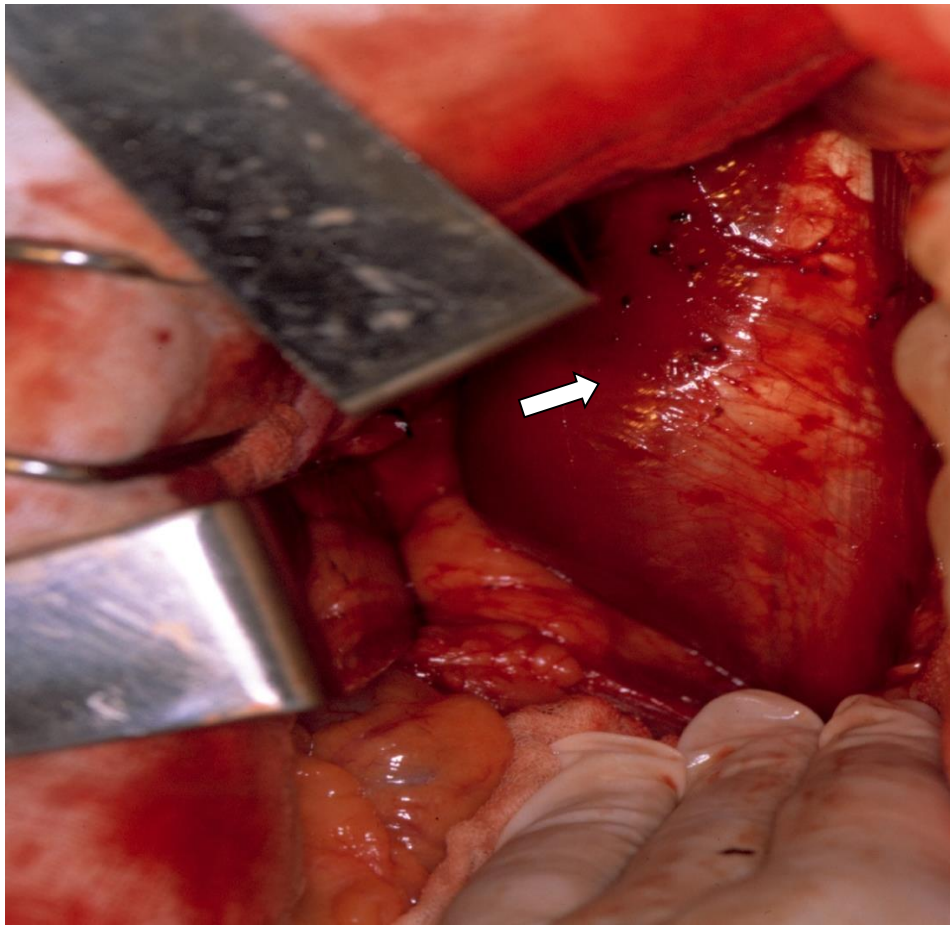
The heterogeneous mass over left psoas muscle was noted by contrast-enhanced CT, the size is 4x4x 3 cm (white arrow).

Figure 3. The abdominal CT scan for metastatic lesion



Hypervascularity of the psoas tumor was proved by abdominal angiography (white arrow).

Figure 4. The gross picture of metastatic lesion



One fragile, reddish mass within the psoas muscle was observed during operation
(white arrow).

Figure 5

The abdominal CT scan for metastatic lesion

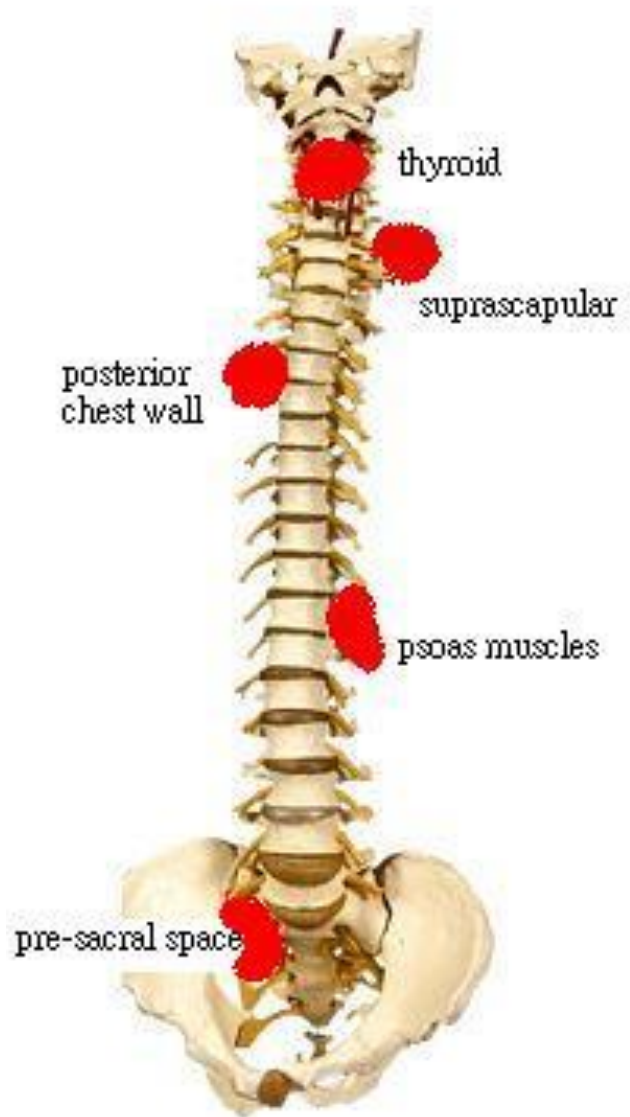


The right para-vertebral mass showed the characteristics of high signal in MRI image

(white arrow)

Figure 6

The metastatic sites noted over para-vertebral area



The metastasis locations (red spot) hint the presence of metastatic route via Batson's venous.