



PARAPLEGIA DUE TO A RARE SPINAL METASTASIS OF HEPATOCELLULAR CARCINOMA: A CASE REPORT

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ABSTRACT

Background: Paraplegia caused by spinal cord compression is a rare but serious condition that can occur in cancer patients, including metastasis from hepatocellular carcinoma (HCC). Hepatocellular carcinoma metastasis to the spine can compress the spinal cord, disrupt nerve function, and lead to motor and sensory impairment in the lower limbs, ultimately resulting in paraplegia.

Case: An 86-year-old man presented with progressive weakness in both lower limbs. He had not previously complained of weakness; his family attributed it to the natural effects of old age. However, the patient frequently complained of low back pain that did not improve with analgesics. Further investigation of the lesion revealed sensory impairment equivalent to the T8 dermatome. A complete physical examination showed an enlarged liver without stigmata of liver disease. CT scan revealed an extradural lesion at the T4 region and a compression fracture at the T8 region. The patient then underwent ultrasonography (USG), which identified a hepatoma suggestive of hepatocellular carcinoma (HCC).

Discussion: Spinal cord compression as an initial presentation of HCC is uncommon and often delays diagnosis, especially in the absence of typical liver symptoms. MRI played a key role in identifying the extradural mass. Early recognition and management are crucial in preventing irreversible neurological damage. Treatment may include corticosteroids, radiotherapy, or surgery to relieve symptoms and improve quality of life; however, the prognosis remains poor without prompt intervention.

Conclusion: These findings highlight the importance of early detection and comprehensive management in cases of paraplegia due to HCC metastasis to minimize neurological complications and improve patient survival.

Keywords: hemorrhagic transformation, polycythemia vera, thromboembolic infarct



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Introduction

Hepatocellular carcinoma (HCC) is a rare malignancy in Western countries but has a relatively high prevalence in East Asia and Southeast Asia.¹ In Indonesia, liver cancer ranks fifth in incidence, with 23,805 new cases (5.8%), and is the second leading cause of cancer-related deaths in 2022.² Hepatocellular carcinoma is often diagnosed at an advanced stage because symptoms are often absent in the early phase. As a result, many patients only discover their condition when it has reached an untreatable stage.³

Spinal metastasis in HCC is rare but can occur, with an incidence rate of 6%.⁴ In other types of cancer, spinal metastasis is relatively common, particularly in patients with advanced-stage cancer. The prevalence of spinal metastasis varies depending on the type of primary cancer. For instance, lung, breast, and prostate cancers are the main contributors to spinal metastasis. The incidence of spinal metastasis has been reported to range from 229 to 302 cases per million population.⁵ In gastrointestinal cancers, the cumulative incidence of spinal metastasis is 1.0% (95% CI: 0.9% to 1.0%) at 1 year, 2.0% (95% CI: 2.0% to 2.1%) at 5 years, and 2.6%

(95% CI: 2.5% to 2.7%) at 10 years.⁵ A retrospective cohort study showed 87.5% of spinal metastases occur in males.⁶ Most patients (63.71%) are between 50 and 69 years old, with a mean age of 58.6 ± 11.6 years (range 13–89 years) and a median age of 59.0 years.⁷

Rarely, bone metastases may exhibit symptoms even before liver disease becomes clinically apparent. In Liaukovich's study, two male patients, aged 64 and 70, presented with initial symptoms of HCC (Hepatocellular Carcinoma) that originated from spinal metastases. Similar findings were observed in cases reported by Kaur J, Malik A, Kaur M, and Goodman J., where two comparative cases of men, aged 60 and 38, complained of bilateral hip and back pain, and lower back and leg pain, respectively. Both instances were manifestations of the metastatic lesions' location.⁸

The survival rates following the diagnosis of both the primary tumor and spinal metastases in the available data of 104 patients out of 147. The mean and median survival after diagnosis of a hepatocellular carcinoma (HCC) spinal metastasis were 14.8 (± 13.1) and 10.6 months (Interquartile Range [IQR]: 10–26), respectively. In contrast, the mean and median overall survival after diagnosis of the primary HCC tumor were considerably longer at 36.9 (± 18.4) months and 39.4 months (IQR: 22.5–48), respectively. Prognostic assessment in these cases can be performed using scoring systems such as the Child-Pugh Score. This can be further supported by evaluating other functional aspects using tools like the Tomita and Frankel scores.⁶

Case Report

An 86-year-old man presented to the Emergency Department (ED) with progressive weakness in both lower limbs after falling three days prior while trying to reach for an item at a high place. Initially, the patient was self-managed at home, but the weakness worsened, accompanied by sensory disturbances in both legs. Other symptoms included the inability to perceive urination and defecation, except during forceful coughing. The patient had a history of frequent abdominal fullness and pain, lower back pain, and had experienced these complaints for six months before hospital admission. The weakness might not be noticed because the patient and family thought the patient's limited movement was due to aging and reduced range of motion caused by pain. Initially, the patient self-managed at home, but the weakness worsened, accompanied by sensory disturbances in both legs. Other symptoms included an inability to perceive urination and defecation, except during forceful coughing during the inpatient period, which had not occurred before the injury.

Physical examination revealed 0/0 muscle strength in the lower limbs with severe sensory impairment. The physiological reflexes were absent, and no pathological reflexes were found. Hepatomegaly was noted, with liver enlargement of four centimeters towards the epigastrium and extending four fingers below the costal margin.

Radiological examination with pelvic and lumbar X-rays was performed to assess the possibility of spinal fractures. The results showed pelvic instability but no suspected fractures in the lumbar region. A comprehensive neurological examination was conducted to determine the boundaries of sensory impairment, revealing intact sensory function up to the epigastrium, but with an unclear boundary.

Magnetic Resonance Imaging (MRI) of the thoracolumbar spine (Figure 1) was performed to investigate potential involvement of the thoracic spinal cord. The MRI findings indicated a compression fracture at T8, accompanied by an extradural mass at T4 and spinal cord edema, supporting the diagnosis of secondary metastasis.



Figure 1. Sagittal thoracolumbar MRI without contrast. The red arrow indicates an extradural mass at the T4 vertebra, resulting in significant compression of the spinal canal and spinal cord. There is increased signal intensity within the spinal cord at this level, consistent with spinal cord edema. Additional findings include vertebral body collapse at T4, compression fracture at T8, and hypointense signal of the L2 vertebral body, supporting the suspicion of secondary metastasis

A further investigation to identify the primary tumor included laboratory testing for Prostate-Specific Antigen (PSA) levels and an abdominal ultrasound (Figure 2). The abdominal ultrasound findings suggested chronic liver inflammation, indicating a diagnosis of hepatocellular carcinoma.

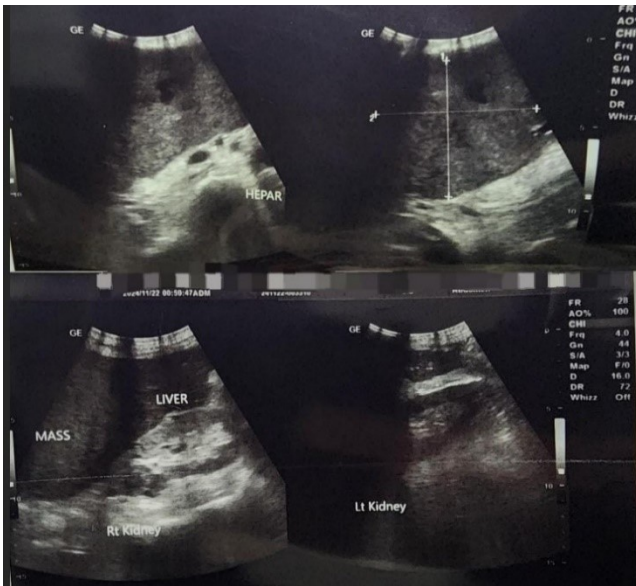


Figure 2. Abdominal ultrasound shows a large, lobulated mass measuring 8.3 × 8.7 cm with heterogeneous internal echogenicity in the right liver lobe. The liver parenchyma appears inhomogeneous. These findings suggest a large right lobe liver mass, supporting the diagnosis of hepatocellular carcinoma (HCC) with possible underlying chronic liver disease

During the ten-day hospital stay, the patient's condition progressively deteriorated, ultimately leading to death. The treatment focuses on symptomatic relief to reduce the patient's pain. Management targeting HCC is not feasible due to the patient's weakened physical condition. The treatment provided includes tramadol injections (administered three times daily), ranitidine injections (administered twice daily), and mecobalamin injections (administered three times daily).

Discussion

Hepatocellular carcinoma (HCC) is the sixth most common malignancy worldwide and the third most fatal cancer.⁹⁻¹¹ This case report describes a patient with paraplegia due to spinal cord compression caused by HCC metastasis. It highlights a rare but potentially severe complication of metastatic hepatocellular carcinoma (HCC) spreading to the spine, leading to spinal cord compression and paraplegia. HCC commonly metastasizes to the lungs, followed by lymph nodes, bones, mesentery and/or omentum, adrenal glands, and brain,¹²⁻¹⁴ and spinal involvement is relatively rare and usually presents at an advanced disease stage.¹⁵ Interestingly, this patient had minimal liver-related symptoms, with spinal cord compression as the first significant malignancy manifestation.

Spinal cord compression due to malignancy is a complication of cancer metastasis. It is estimated that 4,000 patients in England and Wales experience this

condition annually.¹⁶ The incidence is reported at 3-5% of cancer patients and 10% in patients with existing spinal metastasis.⁷ There are two possible mechanisms by which cancer cells metastasize to the spinal cord: via arterial spread, retrograde spread through Batson's plexus, or direct invasion through intervertebral foramina.¹⁷

The initial manifestation of lower limb weakness following a fall posed a diagnostic challenge, as it could suggest a neurological deficit due to trauma. However, the rapid progression of symptoms, including sensory loss and bladder dysfunction, required further evaluation. In spinal metastasis, neurological compression can lead to severe pain, sensory loss, urinary and fecal incontinence, and sexual dysfunction.³ In this case, MRI played a crucial role in identifying spinal cord compression caused by an extradural mass at T4 with an accompanying T8 compression fracture. Patients presenting with radicular pain, limb weakness, difficulty walking (including falls), sensory loss, or bladder and bowel dysfunction should undergo an urgent MRI within the first 24 hours.¹⁸ In this case, the patient experienced radicular pain corresponding to the affected dermatome, with limb weakness marked by difficulty supporting themselves to the point of falling. After the fall, the patient's condition deteriorated further, accompanied by reduced sensory function and dysfunction of the bladder and bowel movements.

The absence of overt liver dysfunction further complicated early diagnosis, leading to delayed recognition of HCC as the underlying cause. Diagnosing spinal cord compression can be performed using several modalities, including MRI and Computed Tomography (CT) scans when MRI is contraindicated. X-ray imaging is not recommended for ruling out spinal metastasis.¹⁹

Management of spinal metastasis from HCC includes surgery, radiotherapy, and other adjuvant therapies.²⁰ A literature review of 152 patients with hepatocellular carcinoma (HCC) who underwent treatment with surgery, radiotherapy, chemotherapy, or observation showed overall survival rates of 95.2% at 3 months, 83.0% at 6 months, 28.6% at 1 year, 2.0% at 2 years, and 1.4% at 5 years. The median survival time after diagnosis was 0.7 months for untreated patients, 7 months for those undergoing surgery alone, 6 months for chemotherapy and/or radiation, and 13.5 months for those receiving a combination of surgery and medical management.⁶

Medical interventions aim to alleviate symptoms and include corticosteroids, analgesics, and antineuropathic agents.¹⁷ Radiotherapy can help reduce pain while halting or slowing the progression of motor dysfunction, improving the patient's quality of life.²¹

Radiotherapy provides high local control rates in unresectable HCC, including cases with central vascular involvement, and can serve as a bridging modality for patients undergoing potentially curative resection or transplantation. In metastatic cases, radiotherapy can offer effective palliative care.²² Systemic chemotherapy benefits patients with certain extrahepatic metastases, with albumin levels and hepatic tumor burden serving as predictive factors for survival.²³ Autonomic dysfunction can significantly impact quality of life; however, recovery may be possible through comprehensive training, including education, rehabilitation, and psychological support.²⁴

Several parameters are used to develop survival prediction models for patients with spinal metastasis from HCC, including age over 60 years, Karnofsky Performance Status, total bilirubin levels, and HCC multifocality.⁴ The prognosis for patients with hepatocellular carcinoma (HCC) that has metastasized extrahepatically is inferior, with significantly lower survival rates and limited treatment options.²³ Therefore, rapid diagnosis and treatment are crucial for spinal cord compression due to metastasis. Delays in management can lead to permanent neurological deficits, with recovery rates below 5%.²⁵ Treatment aims to alleviate symptoms and help patients maintain independence in daily activities.²⁶ Without early intervention, survival is often limited to just a few months. This highlights the need for increased clinical awareness, timely imaging, and the potential for initiating systemic therapy or palliative interventions at an earlier stage.

Conclusion

This case report emphasizes recognizing spinal metastasis as a potential early manifestation of HCC. Additionally, it highlights the diagnostic challenges, therapeutic limitations, and poor prognosis resulting from late-stage detection. Optimizing screening strategies for early detection and evaluating novel therapeutic approaches should be the focus of future strategies to improve the prognosis of patients with spinal metastases from HCC.

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