Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2025; Vol 24: Issue 3s, https://carcinogenesis.com/

Gastric Adenocarcinoma Presenting with Pathological Femoral Neck Fracture and Diffuse Skeletal Metastasis: A Case Report

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ABSTRACT

Gastric cancer rarely presents with bone metastasis, and initial skeletal involvement without gastrointestinal symptoms is exceptional—a 64-year-old man presented with left hip pain after a minor fall. Imaging revealed a femoral neck fracture and diffuse osteolytic lesions. Bone scintigraphy showed a super scan pattern. Further workup identified a gastric cardia mass; biopsy confirmed poorly differentiated adenocarcinoma with signet ring cells. Despite surgical fixation, the patient rapidly declined and died from disseminated intravascular coagulation. The present case highlights the importance of considering gastric cancer in patients with unexplained fractures and diffuse skeletal lesions.

Keywords: *Gastric adenocarcinoma, skeletal metastasis, pathological fracture, signet ring cell, bone scintigraphy*

How to Cite: Mohammed G Felemban, Khalid A ALAhmari, Mohammed A Alafghani, Meshal A Aldhubabian, Jehad Alzahrani, (2025) Gastric Adenocarcinoma Presenting with Pathological Femoral Neck Fracture and Diffuse Skeletal Metastasis: A Case Report, *Journal of Carcinogenesis*, *Vol.24, No.3s*, 417-421.

1. INTRODUCTION

Gastric cancer (GC) is one of the global health burden, ranking fifth in incidence and fourth in cancer-related mortality, with approximately 1.1 million new cases and 770,000 deaths worldwide in 2020 [1]. Although more common in East Asia and Eastern Europe, GC poses a growing challenge in the Middle East. The age-standardized incidence rate in Saudi Arabia is 2.7 per 100,000 individuals, with 4,066 cases recorded between 2004 and 2017, particularly in the Riyadh, Najran, and Eastern regions.[2]

GC typically metastasizes to the liver, peritoneum, and lymph nodes, while bone metastasis remains uncommon. Clinical studies report skeletal involvement in fewer than 4% of cases, though higher rates have been observed in autopsy series [3,4]. The vertebral venous system is believed to facilitate hematogenous dissemination to the axial skeleton [5]. Among the histological subtypes, linitis plastica and signet ring cell carcinoma are associated with a more aggressive course and a higher likelihood of early and distant spread, including osseous metastases.[6]

Initial presentation with bone metastasis is rare and often leads to diagnostic delays. These cases may first appear as unexplained pathological fractures, persistent bone pain, or diffuse osteolytic lesions, commonly without gastrointestinal symptoms [7]. Bone scans may reveal a “super scan” appearance—diffuse skeletal uptake with suppressed renal activity—typically seen in prostate cancer but occasionally reported in GC.[8] Early recognition of these atypical presentations is critical. Although the prognosis in GC with bone metastasis remains poor, prompt diagnosis may allow for symptom control, appropriate staging, and palliative intervention [9,10,11]. This report presents a rare case of gastric adenocarcinoma initially manifesting as a pathological femoral fracture with diffuse skeletal involvement.

2. REPORT OF THE CASE

A 64-year-old male with type 2 diabetes mellitus and hypertension presented to the emergency department after a minor fall, complaining of acute left groin pain and inability to bear weight. He denied constitutional symptoms, neurological complaints, or prior malignancy.

On examination, he was alert, oriented, and hemodynamically stable. Local tenderness and reduced range of motion were noted in the left hip, with no external trauma or skin changes. Distal neurovascular status was intact.

Laboratory results revealed normocytic anemia (hemoglobin 11.3 g/dL), elevated alkaline phosphatase (1063 U/L), calcium of 2.04 mmol/L, and PSA of 22 ng/mL. WBC was 7.36 x10⁹/L, HbA1c was 6.6%, and vitamin D was 54.4 nmol/L. Radiographic evaluation showed a displaced fracture of the left femoral neck with bilateral proximal femoral lytic lesions **[Fig. 1]**. Additional views revealed lytic lesions in the femoral shaft, subtrochanteric, and distal metaphyseal regions **[Fig. 1]**.

CT imaging of the abdomen demonstrated an irregular mass at the gastric cardia **[Fig. 2]**. Ultrasound of the prostate revealed an enlarged gland with a heterogeneous texture and no focal lesion **[Fig. 3]**. Bone scintigraphy showed diffusely increased tracer uptake throughout the axial and appendicular skeleton, which was consistent with a super scan appearance **[Fig. 4]**.

Esophagogastroduodenoscopy identified a large irregular gastric mass in the cardia region **[Fig. 5]**. Histopathology confirmed invasive, poorly differentiated adenocarcinoma with focal signet ring cells. Immunohistochemistry showed positivity for pan-cytokeratin and negativity for HER2 and LCA.

Given the elevated PSA, prostate cancer was initially considered; however, imaging and histopathology findings favored gastric origin. Other differential diagnoses included multiple myeloma, lymphoma, and metastatic breast or renal carcinoma.

The patient underwent orthopedic intervention with gamma nail fixation of the femoral neck fracture **[Fig. 6]**, followed by distal locking at the knee **[Fig. 7]**. Postoperatively, he developed melena with a hemoglobin drop, and fecal occult blood was positive. The diagnosis of metastatic gastric adenocarcinoma was confirmed.

Palliative care was initiated due to advanced metastatic disease. The patient later developed disseminated intravascular coagulation and passed away shortly thereafter. A DNR order was in place following multidisciplinary and family discussions.

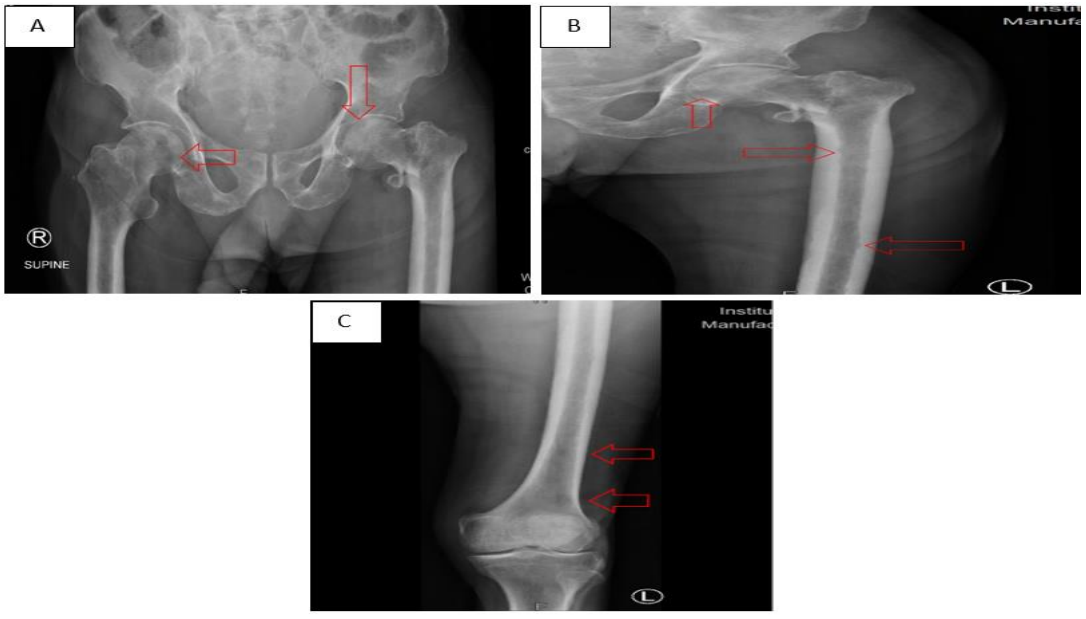

Figure 1: Radiographic imaging of the left femur and pelvis demonstrating metastatic bone disease: (A) AP pelvis view showing a displaced left femoral neck fracture with bilateral proximal femoral lytic lesions; (B) Left femur X-ray revealing lytic lesions in the shaft and sub trochanteric region ;(C) Distal femur X-ray highlighting metaphyseal lytic lesions.

Figure 2: CT abdomen showing irregular mass at the gastric cardia

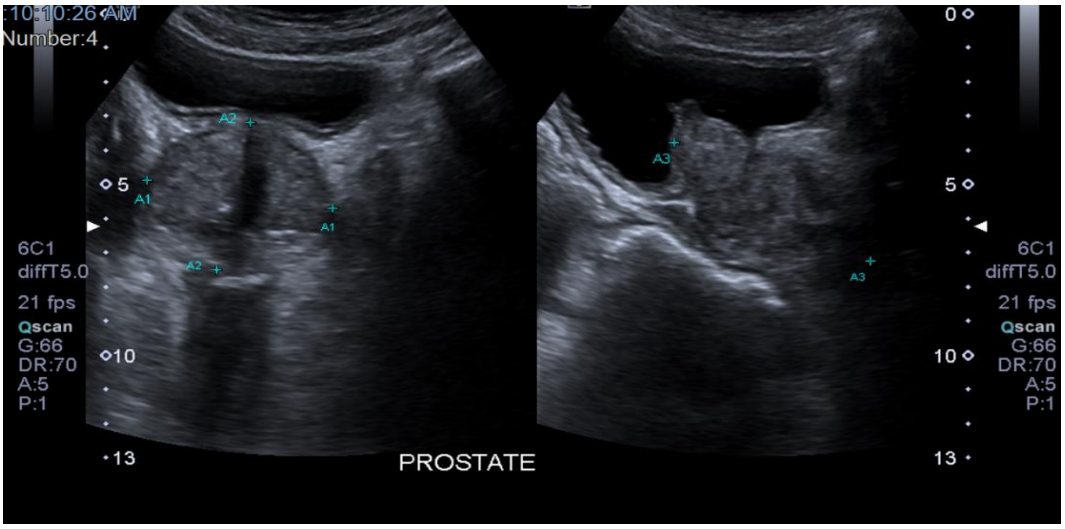

Figure 3: Ultrasound of prostate showing enlarged gland with heterogeneous texture.

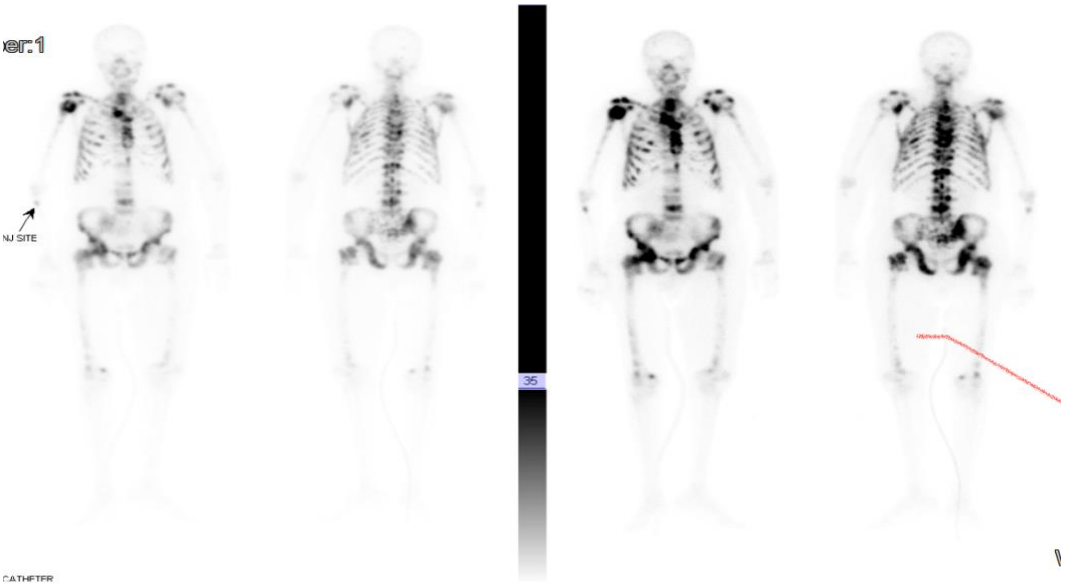

Figure 4: Bone scan revealing diffuse increased uptake across the axial and appendicular skeleton (super scan appearance)

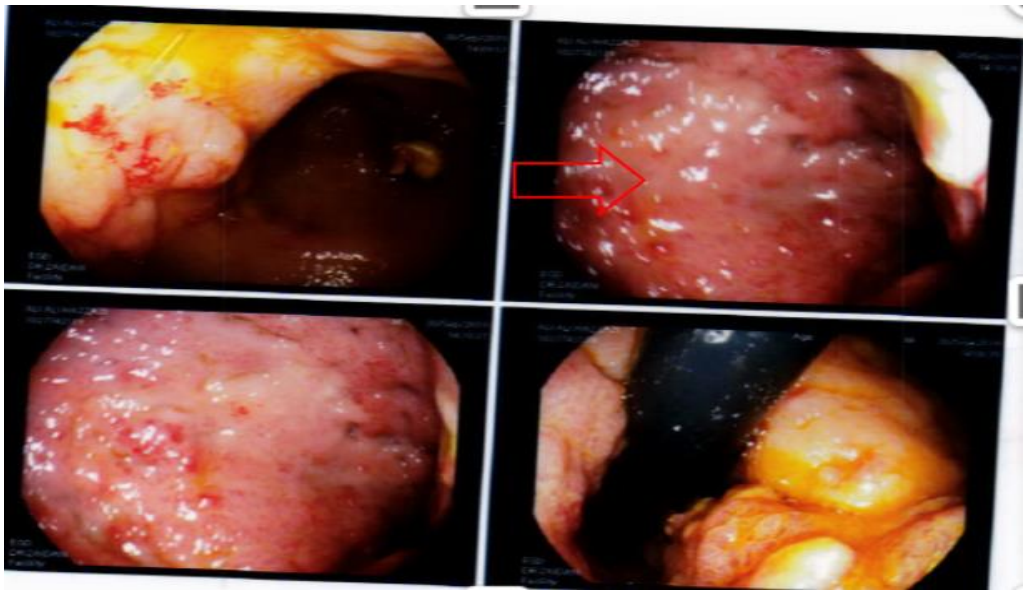

Figure 5: Endoscopic image showing large irregular gastric mass (cardia region)

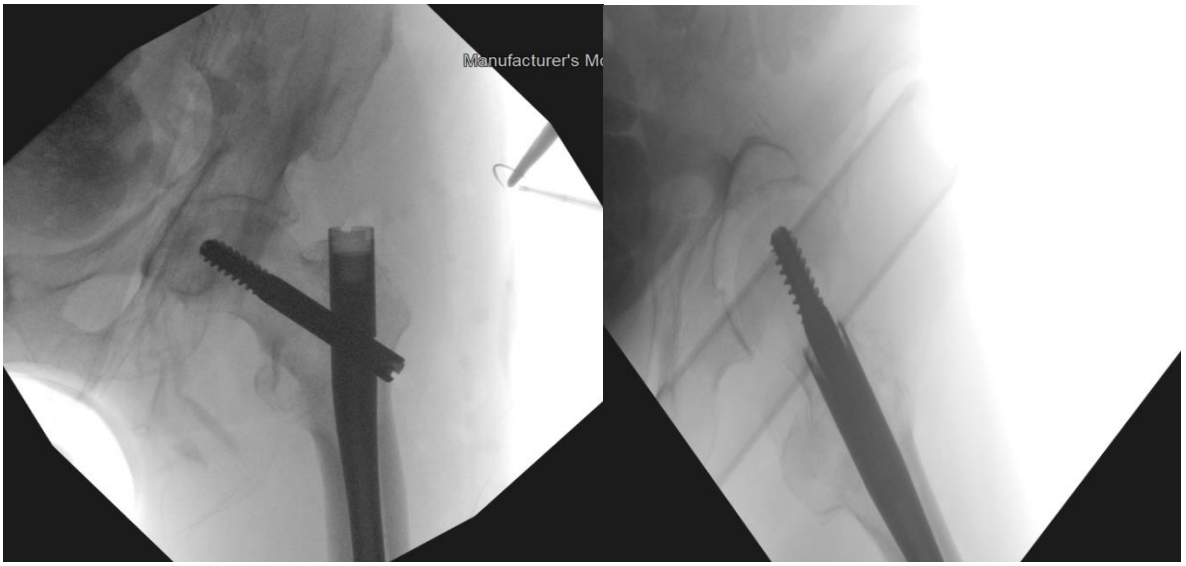

Figure 6: Fluoroscopic views showing gamma nail fixation of femoral neck fracture

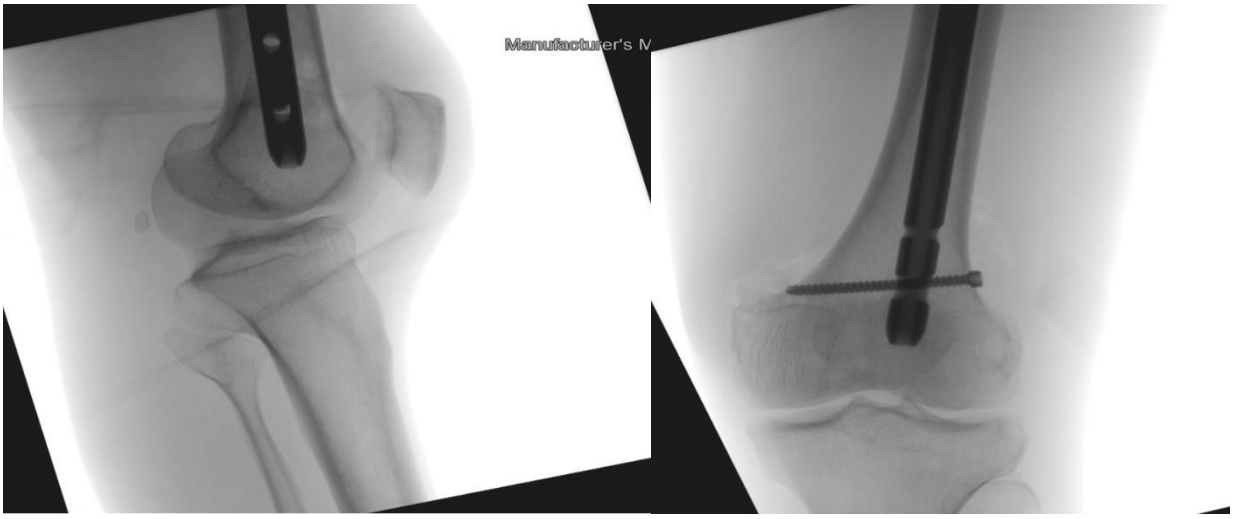

Figure 7: Fluoroscopic knee views showing distal locking of the gamma nail fixation

3. DISCUSSION

Bone metastases from gastric cancer are uncommon, occurring in less than 4% of clinical cases but reported in up to 13–14% of autopsy series [3,6]. Their presence often indicates advanced disease and correlates with poor prognosis. In rare instances, bone metastasis may be the initial presentation, particularly in histological subtypes such as signet ring cell carcinoma or linitis plastica, which are known for early dissemination.[5,6]

The patient described in this report presented with a pathological femoral neck fracture secondary to metastatic gastric adenocarcinoma. Notably, he lacked preceding gastrointestinal symptoms, which is consistent with published cases of gastric cancer initially manifesting in the skeletal system [6,7]. The radiographic findings of multifocal osteolytic lesions and the bone scan revealed a super scan appearance—a diffuse, uniform tracer uptake with suppressed renal visualization—are characteristic of extensive skeletal involvement and have been previously documented in metastatic gastric cancer, although more frequently in prostate cancer.[8,9] Differentiating the primary source of skeletal metastasis can be challenging, particularly when elevated tumor markers such as PSA are present. However, imaging and histopathological confirmation via gastric biopsy ultimately established the diagnosis. The absence of focal prostatic lesions and immunohistochemistry negative for HER2 and LCA helped rule out alternative primary sources. The reported case highlights the need for heightened clinical suspicion of occult malignancy in elderly patients presenting with unexplained pathological fractures, particularly when imaging reveals diffuse skeletal lesions and laboratory values show elevated alkaline phosphatase. Even in cases with limited treatment options, timely diagnosis helps for informed decision-making regarding symptom management and palliative care [10,11].

4. CONCLUSION

Bone metastasis as the initial presentation of gastric adenocarcinoma is exceptionally rare and often leads to diagnostic delays, especially in the absence of gastrointestinal symptoms. This case underscores the importance of considering gastric cancer in the differential diagnosis of elderly patients presenting with unexplained pathological fractures and diffuse skeletal lesions. Early recognition, supported by imaging and histopathology, is crucial for guiding appropriate palliative management and improving patient-centered care.

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