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Case Study

# Bone – A Rare Metastasis Site of GIST

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## Abstract

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract, accounting for 1 3% of all malignant gastrointestinal tumors. The incidence of GIST is in the range of 20 to 40 cases per million per year. Over 90% of GISTs occur in adults over 40 years old. Most GISTs are benign; malignant tumors account for 20 - 30% of cases. The most common location of GIST is stomach (50 - 60%) and small intestine (30 -40%). Metastasis is characteristically the malignant behavior of the GIST. GISTs most frequently make metastasis to the liver (65%) and peritoneum (50%). The frequency of bone metastasis from GIST has been reported to range from 3.2 to 6.0%. Swift treatment is needed for GIST-derived bone metastases in order to prevent pathological fractures, and many cases require emergent treatment. The risk of bone metastases from GISTs should be considered during long term follow up, particularly in the presence of liver metastases. Patients with bone metastasis also have a poorer prognosis than patients with metastasis in any other site.

**Keywords:** Gastrointestinal Stromal Tumors; Neoplasm Metastasis; Magnetic Resonance Imaging

## Abbreviations

GISTs: Gastrointestinal Stromal Tumors; GI: Gastrointestinal; MRI: Magnetic Resonance Imaging; PET-CT: Positron Emission Tomography – Computed Tomography

## Introduction

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract, accounting for 1 3% of all malignant gastrointestinal (GI) tumors [1-6]. Based on size, mitotic index and anatomic location, GISTs are categorized as low, intermediate, and high risk [1]. GISTs are generally defined as c-KIT (CD117; a tyrosine kinase receptor) positive tumors with a characteristic set of histologic features [1,2]. The most frequent gene mutations in GISTs are those in exons 9, 11, 13, and 17 of the KIT gene [4].

The incidence of GIST is in the range of 20 to 40 cases per million per year [1,5]. Over 90% of GISTs occur in adults over 40 years old, in a median age of 63 years and rarely in children in the second decade (< 1%). Most GISTs are benign; malignant tumors account for 20 - 30% of cases [1,7]. The most common location of GIST is stomach (50 -60%) and small intestine (30 - 40%) [1-3,5,6]. Other less common locations are duodenum (4 - 5%), rectum (4%), colon and appendix (1 - 2%), and esophagus (< 1%) [1-3,5,6]. Patients have different symptoms, such as abdominal pain and swelling, nausea, vomiting, abdominal discomfort, bleeding from the GI tract, weight loss, weakness and anemia, but only 70% of patients with GIST are symptomatic [1,2].

## Case Report

Metastasis is characteristically the malignant behavior of the GIST [1]. GISTs most frequently make metastasis to the liver (65%) and peritoneum (50%), whereas bone and lung metastases are uncommon sites [1-3,7]. The frequency of bone metastasis from GIST has been reported to range from 3.2 to 6.0% [3,6,7]. GIST-derived bone metastases are osteolytic lesions and occur most commonly in the spine and pelvis.7 Procedures for diagnosing bone tumors should be rapid and minimally invasive [7].

Computed tomography scan, MRI, and especially PET-CT can be used for staging in the diagnosis and metastases scanning of GIST because of the metastasis at the same time of diagnosis and may enhance the diagnosis of tumor bone metastasis and provide more information for cancer treatment [1]. On radiological images, GIST-derived bone metastasis presents as an osteolytic lesion [7]. They tend to occur in weight-bearing areas, including the spine, pelvis, and femur, and typically involve multiple bones [4].

PET-CT shows the increased metabolic activity of tumor cells and can detect both osteoblastic and osteolytic lesions at an earlier

stage and useful in characterizing bone lesions that require biopsy [1]. GIST-derived bone metastases exhibit characteristic cytological findings [7]. Although the cell shapes of GIST-derived bone metastases can vary, their nuclear findings are relatively consistent [7].

The standard therapy for GIST is surgical complete resection, which is possible in about 85% of patients [2]. However, GIST recurrences and metastases are identified in 50% of patients following complete resection [2,5]. Imatinib mesylate (Kit selective tyrosine kinase inhibitor) can be used in the treatment of advanced, recurrent, unresectable or metastatic GIST [1]. The overall survival rates for patients with advanced or unresectable GISTs who are treated with imatinib is 55% [2]. Other treatments include radiofrequency ablation and embolization [1]. Radiotherapy can be used in patients with bone metastasis for palliative reasons [1].

**Figure 1:** MRI of the left arm in T1 weighted-image sequence in coronal section in A and in sagittal section in B demonstrating multiple oval images with low signal on the humeral head and neck (white arrows).

**Figure 2:** MRI of the left arm in the coronal section in the T2 STIR weighted-image sequence in A and in the T1 SPIR weighted-image sequence with contrast demonstrating multiple oval images with low signal on the humeral head and neck without contrast enhancement (white arrows).

## Conclusion

Swift treatment is needed for GIST-derived bone metastases in order to prevent pathological fractures, and many cases require emergent treatment [7]. The risk of bone metastasis from GISTs should be considered during long term follow up, particularly in the presence of liver metastases [2]. Patients with bone metastasis also have a poorer prognosis than patients with metastasis in any other site [4].

## Acknowledgements

Not applicable

## Conflict of Interest

No financial interest or conflict of interest exists. The written informed consent of the patient was obtained, for the publication of her case.

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