

## Case Report

# Temporary Paraplegia Resulting from Gorham's Disease Involving the Third Lumbar Vertebra and Proximal Femur: A Five-year Follow-up and Review of the Literature

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## Abstract

Gorham's disease is a rare musculoskeletal disease of unknown etiology characterized by progressive osteolysis and massive bone destruction. Here, we report an extremely rare case of Gorham's disease involving two far sites in the lumbar spine and trochanteric region, gradually resulting in paraplegia. The patient underwent cord decompression and chemotherapy, and resumed her normal life; she was followed up for nearly five years.

**Keywords:** Femur, Gorham's disease, paraplegia, spine

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## Case Report

A 32-year-old woman was referred to our clinic in February 2008 complaining of inability to walk since the previous three weeks. She reported a chronic back pain which led to paraplegia after a bending motion three weeks prior to the hospital visit.

Findings on physical examination included pain free range of motion of the lower limbs, numbness in the lower limbs, inability to sit and stand, severe pain with back movements, tenderness of the lumbar spine, and negative bilateral knee and ankle jerks. Muscle strength increased from distal (1/5) to proximal (3/5). There was neither a significant history of trauma nor any medication.

Plain radiographs showed destructive lesions at the L3 level and the right trochanteric region justifying her signs and symptoms. Magnetic resonance imaging (MRI) confirmed these findings and, in addition, showed the Cauda Equina compression and stenosis (Figure 1). Isotope scan showed slightly increased uptake in the L3, right hip, and left parietal bone. Laboratory tests did not show any evidence of infection or malignancy. The chest computed tomography (CT) scan showed the involvement of both lungs.

Spinal cord decompression was performed and one cage and two pedicular screws were used in the L2 and L4 vertebrae joined with a rod to maintain sufficient stability (in the L3) (Figure 2). Required specimens for the biopsy were obtained from the body of L3 and trochanteric region. In the following days after the operation, the patient improved gradually and in the subsequent three weeks she was able to walk. The obtained pathologic blocks and

the X-rays were analyzed by an expert pathologist and an expert radiologist simultaneously.

In the pathologic analysis, the specimens were stained with hematoxylin and eosin (H&E) and other specific staining methods. The report indicated cortical and trabecular bone lysis and replacement of the bone marrow with loose connective tissue including proliferating angiomatous vessels. Furthermore, in some proliferated connective tissue focuses, mature spindle cells were observed. In other connective tissue centers, polynuclear giant cells from osteoclast types had been entered into the plump-shaped stromal cell population (Figures 3A, 3B). In conclusion, based on the clinical, histopathologic, and radiographic features, as well as the disease behavior, a diagnosis of Gorham's disease (GD) was made for the patient.

Due to the histopathologic results and the malignant changes in the involved tissues at the same time, the patient was referred for chemotherapy; she also received calcium and bisphosphonate. The patient was under chemotherapy for three years and currently, after about two years of chemotherapy, continues her normal life. Figure 4 shows recent x-rays of the patient.

## Discussion

GD is an extremely rare disorder of unknown etiology which is characterized by a nonfamilial, histologically benign proliferation of vascular structures originating in bone with progressive bony destruction and often extending into adjacent soft tissues.<sup>1</sup> Various synonyms of Gorham-Stout syndrome are GD, disappearing bone disease, vanishing bone disease, phantom bone disease, progressive osteolysis, acute absorption of bone, primary lymphangioma, and idiopathic massive osteolysis.<sup>2</sup>

The first documented case was in the 19<sup>th</sup> century, and still, we lack an understanding of the etiology, and have no definite treatment. Some studies proposed that hypoxia increases acid phosphatase production, resulting in bone destruction. It has been also hypothesized that the focal hyperemia and mechanical forces or

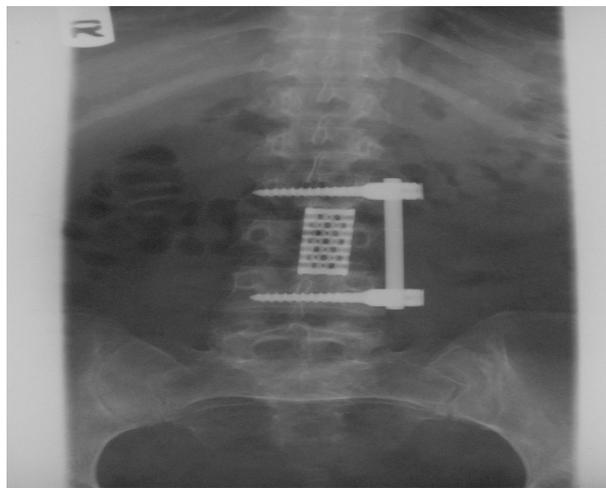
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**Figure 1.** Radiographic examination showing fracture of the L3 vertebra and osteolytic lesion in the proximal part of the right femur which were confirmed by MRI. Also, lumbar MRI showed Cauda Equina compression.



**Figure 2.** Lumbar X-ray showing fixation of the L3 with one cage and two pedicular screws.

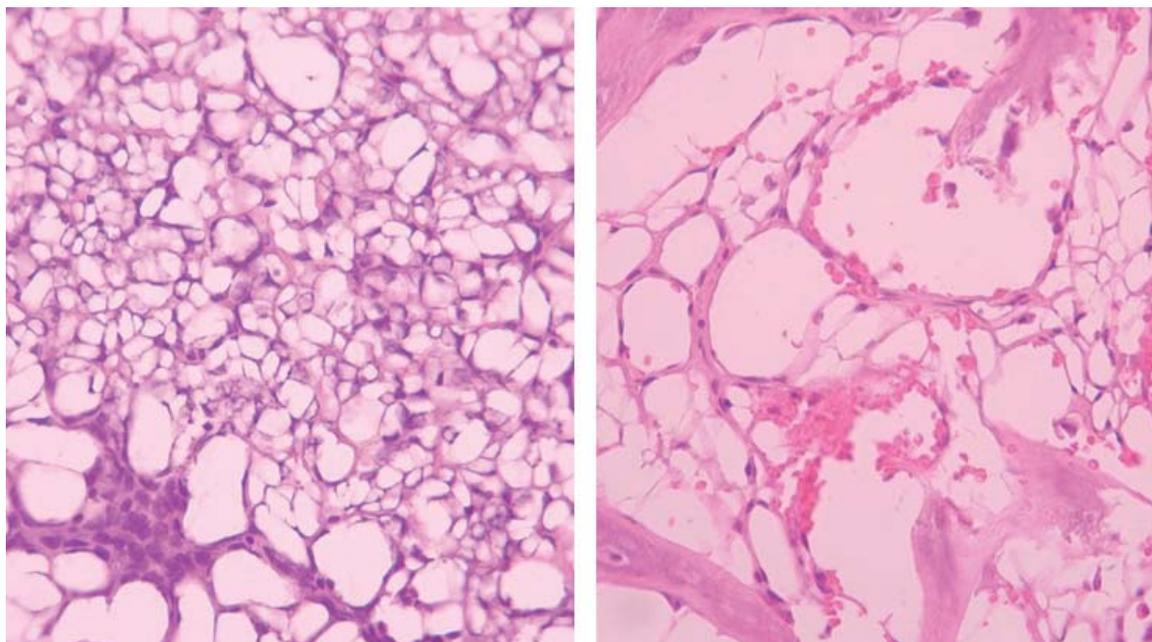
trauma may advance bone destruction.<sup>3-4</sup>

Activation of osteoclasts or mononuclear perivascular cells as well as deranged osteoblastic function has been suggested to stimulate osteolysis through increased IL-6 activity. New bone formation is absent or minimal. In later stages, due to unknown stimulus, the osseous tissue is replaced by fibrous tissue.

The natural history of GD is unpredictable. It may spontaneously stop or progress severely until all osseous tissue disappears. Bone loss can occur in just one bone or extend to soft tissues and contiguous bones. The disease is biphasic in that there are episodes of progressive lysis and discomfort, followed by asymp-

tomatic, latent periods. The clinical presentation varies from the incidental finding of regional osteolysis to massive bone loss with gross abnormalities. The onset is insidious, with dull pain in the affected area.

Although the bone deformity in patients with GD may become severe, serious complications are unusual. A high morbidity and mortality is seen in patients with spinal or visceral involvement. Paraplegia related to spinal cord involvement may occur in patients who have involvement of vertebrae with consequent osteolysis,<sup>5</sup> as it happened in our patient. Spontaneous fractures may also happen.



**Figure 3.** Histopathologic images showing loose connective tissue with proliferating angiomatous vessels, mature spindle cells, and multinuclear giant cells from osteoclast types.



**Figure 4.** Recent X-rays showing that, after nearly five years, lesions in the L3 and right intertrochanteric region have improved without any recurrence.

It may affect any part of the skeleton, but most commonly involves the skull, shoulder, and pelvic girdle.<sup>1,6-7</sup> This disease may occur at any age but most commonly presents in childhood.<sup>2</sup> Regeneration of bone does not occur even when the osteolysis stops<sup>8</sup> and, except in cases of pathologic fractures, bone scans usually show decreased uptake in the affected sites.<sup>9</sup> Spontaneous remission of this disease has been reported only in a few cases.<sup>10</sup>

Heffez, et al.<sup>11</sup> proposed the following diagnostic criteria for GD which accommodates the findings of the present study:

1. A positive biopsy for angiomatous tissue;
2. Absence of cellular atypia;
3. Minimal or no osteoblastic response and absence of dystrophic calcification;

4. Evidence of local progressive osseous resorption;
5. Nonexpansile, nonulcerative lesion;
6. Absence of visceral involvement;
7. Osteolytic radiographic pattern; and
8. Negative hereditary, metabolic, neoplastic, immunologic, or infectious etiology.

GD has four radiographic stages.<sup>12</sup> At first, the disease presents as radiolucent foci which looks like patchy osteoporosis. Bony deformity progressively increases with further loss of bone mass and final disruption of the cortex with endothelial invasion into the adjacent soft tissues and/or across the joints. Finally, there is shrinkage of the ends of the affected bones, producing a “sucked candy” appearance. In our case, the L3 vertebra had been collapsed, thus the radiologic feature was not classical but in the trochanteric region, the radiography showed loss of bone mass in the area which was compatible with classical findings of GD. Depending on the phase of the disease, isotope scan shows variable results. In earlier phases, scan shows normal uptake which decreases with disease progression and in the case of pathologic fracture due to destruction of the bone in last phases, scan shows increased uptake as was seen in our patient. MRI shows only disappearance of bone and angiography fails to exhibit the disease.

Diagnosis of GD is based on clinical and radiologic features of loss of bones with histologic evidence of angiomatous tumor. In most cases, laboratory tests are usually within normal limits. The clinical presentation is different, mainly depending on the site of skeletal involvement. The characteristic radiographic and histopathologic findings are helpful for making an early precise diagnosis. Confirmation of the diagnosis requires biopsy to exclude tumor, infection, and aseptic necrosis.<sup>13</sup> It requires a large specimen and bone fragments are often inadequate. The diagnosis is often delayed in its early stages, as the lesion cannot be recognized radiologically from a localized, nonsclerosing osteolysis due to other causes. The early histopathologic features of the lesions can also be difficult to distinguish from skeletal hemangioma. The diagnosis should be made only after carefully excluding the complicated cause of osteolysis. The differential diagnosis may include Langerhans cell disease, skeletal angioma, and essential and hereditary osteolysis which must be ruled out by radiographic studies and proper blood tests.<sup>14</sup> In a clinically suspicious case, biopsy of the lesion must be performed.

Approximately 200 cases of GD have been reported since first being described in 1838.<sup>15</sup> GD of the spine is extremely rare and, to the best of our knowledge, the spinal involvement has been reported in 28 cases,<sup>16</sup> lower extremity in 22 cases, and multicentric involvement in 11 cases.<sup>17–19</sup>

Spinal involvement can be observed at any level from the cervical spine to the sacrum; however, the thoracic spine was most frequently involved (13 cases). Eight patients died with pulmonary effusion considered as chylothorax and 10 patients had neuropathy. In our patient, the involvement was in the lumbar spine. Paraplegia related to spinal cord involvement may occur in patients who have involvement of vertebrae with consequent osteolysis<sup>20</sup> as it happened in our patient. As mentioned before, cord decompression and lumbar fusion resulted in gradual improvement of the patient in three weeks. We visited the patient after five years and, fortunately, found that she had no problem with the spinal movements and did not experience pain, paralysis, or numbness interfering with her daily life activities.

Unlike other forms of osteolysis, such as syringomyelia, tabes, or leprosy, the osteolysis in GD is usually monocentric. Only a few authors have described a multicentric course.<sup>21</sup> On the other hand, the lesion in GD is classically without skip areas, multiple foci, or metastases, but adjacent bony involvement is usual.<sup>22</sup> Of interest, the process was different in our case. We observed two separate osseous involvements (one in the lumbar spine and another in the right trochanteric region). This can be justified by two theories. First, GD can be multicentric with skip areas; second, our patient was an extremely rare case of GD with involvement of two separate, but distant, regions simultaneously.

Although there have been many treatment modalities for GD such as chemotherapy, radiation therapy, bisphosphonates, calcium supplements, interferon, vitamins, calcitonin, hormones, antibiotics, antivirals, antifungals, embolization, and surgical resection,<sup>23–25</sup> unfortunately no treatment modality has been proven to have satisfactory results. Surgical treatment options include resection of the lesion and reconstruction using bone grafts or prostheses.<sup>26</sup> Conservative treatment has also been recommended in a study.<sup>27</sup> Excision and bone grafting of the affected regions during active phase of the disease usually results in recurrence. Radiotherapy has been used to treat GD, with variable results.<sup>28</sup> Currently interferons have a promising role in the treatment of GD.<sup>29–31</sup> However, due to the variable clinical presentations of this disease, no standard treatment protocol can be advocated and the treatment is still a dilemma.

According to a report, chemotherapy (e.g., with cis-platin or actinomycin-D) can be used as medical therapy.<sup>26</sup> In our case, the treatment modality was chemotherapy after surgical procedures which resulted in successful outcome and, two years after the last session of chemotherapy, the patient had no problem with the disease and continued her normal daily life activities.

This case merits special attention because of several facts. First, GD of the lumbar spine is very rare; second, to the best of our knowledge this case does not fit to any of the yet described patterns of GD as it has involved two separate regions of the skeletal system; and finally our patient could return to her normal life after a successful course of treatment.

## Consent

*A written informed consent was obtained from the patient for the publication of this case report and accompanying images.*

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