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Dr. Mustafa Ranapurwala
Professor, Department of Pathology, Paramukhswami Medical College, Bhaikaka University, Gokalnagar, Karamsad, Gujarat, India

Dr. Keyuri Patel
Professor and Head, Department of Pathology, Paramukhswami Medical College, Bhaikaka University, Gokalnagar, Karamsad, Gujarat, India

Dr. Krishna Panchal
Resident, Department of Pathology, Paramukhswami Medical College, Bhaikaka University, Gokalnagar, Karamsad, Gujarat, India

Dr. Munira Jhabbuawala
Tutor, Department of Pathology, Paramukhswami Medical College, Bhaikaka University, Gokalnagar, Karamsad, Gujarat, India

Corresponding Author:
Dr. Mustafa Ranapurwala
Professor, Department of Pathology, Paramukhswami Medical College, Bhaikaka University, Gokalnagar, Karamsad, Gujarat, India

Gaucher disease: A case study

Dr. Mustafa Ranapurwala, Dr. Keyuri Patel, Dr. Krishna Panchal and Dr. Munira Jhabbuawala

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Abstract
Background: Gaucher disease (GD) is an uncommon lysosomal storage disorder with an autosomal recessive inheritance pattern. Gaucher disease can affect anyone, occurring in up to 1 in 40,000 live births in the general population. It results from the accumulation of glucocerebrosidase in the cells of macrophage-monocyte system because of a deficiency in lysosomal glucocerebrosidase. Here we report a case of Gaucher Disease, rare in the Indian subcontinent.
Case Report: We present a case of a young female who presented with a fracture due to a minor road traffic accident with a history of pallor, weakness, and gum bleeds with massive splenomegaly. Final diagnosis of G.D. was reported after examining the bone marrow smears.
Conclusion: We report this case of GD to emphasize the clinical presentation that it might present with GD should be considered in the differential diagnosis of young adults with unexplained splenomegaly.

Keywords: Gaucher disease, genetic disease, glucocerebrosidase, bone diseases, splenomegaly

Introduction
Gaucher Disease is the commonest amongst the various lysosomal storage disorders; a group of diseases that occur due to accumulation of glucosylceramide/glucocerebroside and some related compounds within the lysosomes. Gaucher disease can affect anyone, occurring in up to 1 in 40,000 live births in the general population [1]. First described by Phillippe Gaucher in 1882, he observed large cells in a splenic aspirate during the evaluation of a large spleen and he thought that it was evidence of a primary neoplasm of the spleen [2]. It was only in 1924 that Epstein first recognized the storage of glucocerebrosides, and Brady *et al*. later delineated that the metabolic defect was due to the deficiency of the enzyme β-glucosidase (GBA) [3]. Molecular Medicine has become the mainstay for diagnosis and management. However, the multi organ and varied presentation of the disease (Figure 1) makes it a challenge to diagnose GD early.
Here, we report a case of GD presented with a fracture with massive splenomegaly and cytopenia as the prodromal symptoms. There is paucity of reported cases in the literature with reference to the Indian subcontinent, we present this case to emphasize the importance of clinical examination and bone marrow finding in the diagnosis of GD.

Case report: Clinical Presentation: A 21-year-old female presented to the Orthopedics department with complaints of pain, swelling, deformity over right side of arm due to alleged history of road traffic accident. However, the nature of the accident, as informed by the attendant, was minor. The parent accompanying, also gave history of pallor, weakness, gum bleeding for one month. Patient had not any relevant history and in family history, death of one sister at age of eight years of life, due to unknown causes. There was no history of fever and other comorbidities. The patient had been taking iron medication on and off from local private practitioners for the weakness and pallor.

Clinical Examination: On general examination, not any remarkable findings were noted. On systemic examination, spleen was palpable and enlarged up to umbilical region which extended to left hypogastric region. Liver was palpable and mildly enlarged. No tenderness and rigidity were present.

Imaging studies: Radiograph of the local part showed displaced mid shaft humerus fracture on right arm.

Ultrasonography of abdomen and pelvis gave an impression of hepatomegaly, gross splenomegaly with few gamma gandy bodies and dilated splenic vein with few peri-splenic collaterals.

Laboratory Investigations: Complete Blood Count revealed pancytopenia (Hemoglobin – 3.7 g/dl, Total Leukocyte Count – 1.7 x10^3 /µL, Platelet Count – 0.5 X 10^6 /µL). Peripheral smear revealed a predominantly normocytic normochromic RBC population with many microcytes, few tear drop cells, elliptocytes, fragmented RBCs, occasional macrocytes, macro-ovalocytes and polychromatic RBCs. The patient had an elevated erythrocyte sedimentation rate (70 mm/1st hour). The basic coagulation profile was within normal biological reference interval. Biochemical investigations deranged Ferro kinetic studies.

Hematologist Reference: Patient was reviewed by the onco-hematologist and advised bone marrow for further workup and medical management.

Initial Management: Patient needed orthopedic management first so that she could be operated for fracture humerus with open reduction and internal fixation. As advised by the hematologist, intraoperative bone marrow aspiration and biopsy was taken from right posterior superior iliac spine.

Marrow assessment: Bone marrow aspiration showed large mononuclear cells with eccentrically placed small, regular nuclei with abundant amount of fibrillary cytoplasm were seen that was suggestive of the presence of the characteristic macrophages suggestive of the possibility of storage disorder histiocytosis (Figure 2). Bone marrow biopsy showed diffuse infiltration of the marrow by sheets of large macrophages with mildly pleomorphic central, dark to vesicular nuclei and abundant amounts of fibrillar eosinophilic cytoplasm (Figure 3). There was conspicuous suppression of trilineage hematopoiesis. PAS stain was used to confirm the nature of the cytoplasmic inclusion which showed the cytoplasm of the macrophages showed PAS positivity. It confirmed the marrow infiltration by large macrophages with PAS positivity suggestive of gaucher disease.

Further follow up: The patient is in follow up for the fracture and has been counselled for enzyme replacement therapy.

Discussion

Clinical research shows that gaucher disease manifests with broad phenotypic variation typical of many metabolic disorders, ranging from neonatal lethality to asymptomatic octogenarians[4]. With an overall incidence of approximately 1:40,000 individuals, it affects all racial and ethnic groups, but prevalence is higher among Ashkenazi Jews[5]. The most common signs and symptoms noted in GD are splenomegaly (95%), hepatomegaly (87%), radiological bone disease (81 %), thrombocytopenia (50%), anemia (40%), growth retardation (34%), bone pain (27%), and bone crisis (9%)[4].

The current case presented with a routine fracture, post a road traffic accident; the only deviation being the severity of the accident, which the parent was stating was not in consonance with the fracture noted. It was only on clinical examination that the hepatosplenomegaly came to be noticed. The pancytopenia combined with the splenomegaly caused an alarm and the possibility of an infiltrative process was raised, and that is when the marrow was investigated. B.M. examination is the hallmark for the diagnosis of GD.

Photograph [s], if any without disclosure of identifying markers

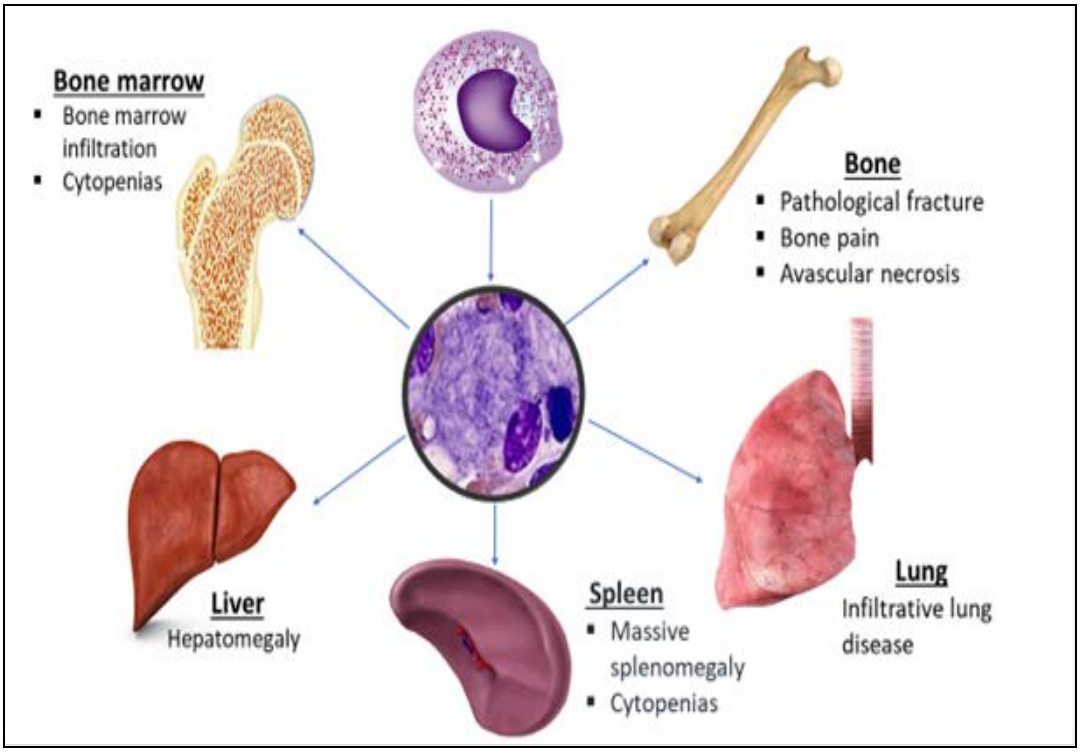

Fig 1: Illustration of the involvement of various organs by gaucher cells.

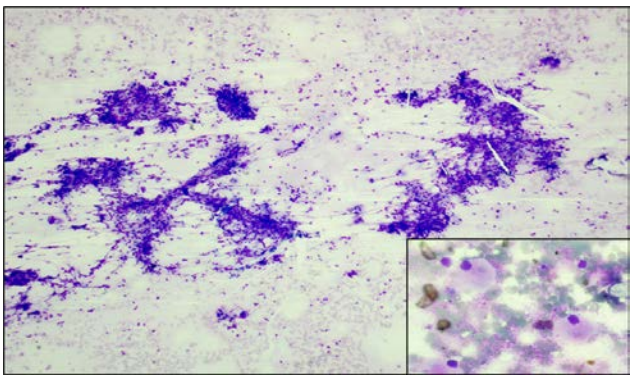

Fig 2: The microphotograph of aspiration smears shows marrow particles with scattered macrophages with fibrillary cytoplasm [40x, Giemsa stain] (Inset shows the characteristic macrophages in a higher magnification) [1000x, Giemsa stain].

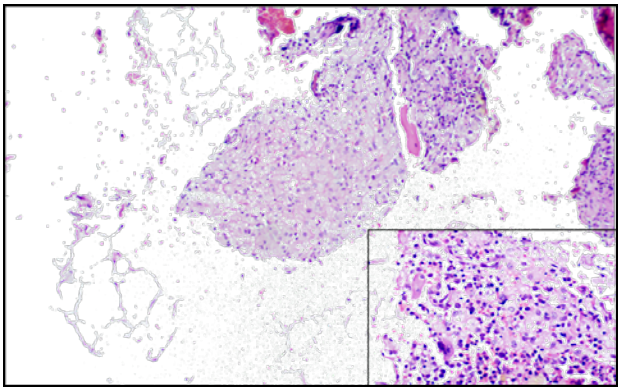

Fig 3: Microphotograph of the marrow biopsy shows sheets of macrophages infiltrating the marrow, which have abundant fibrillary cytoplasm (Inset [400x, H & E stain]) [40x, H & E stain].

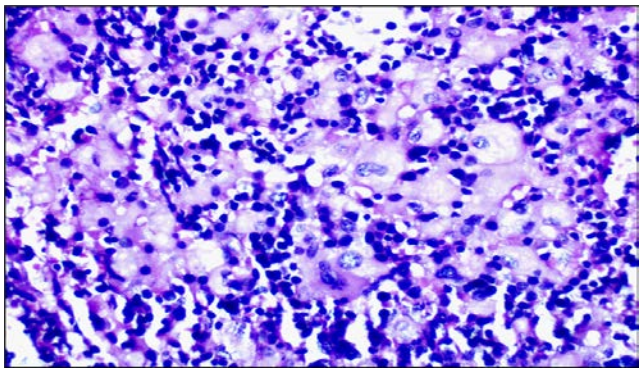

Fig 4: The Microphotograph shows PAS positive cytoplasmic inclusions in the large macrophages of the bone marrow biopsy [400x, PAS Stain].

Conclusion

The present case sheds light on the significance of clinical examination and bone marrow findings in the diagnosis of Gaucher Disease. Since the disease is rare, the possibility that the diagnosis would be made is delayed. An early detection together with treatment using enzyme replacement can considerably reduce morbidity.

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Competing Interests: None

Reference

1. National Gaucher Foundation. 2021. What Is Gaucher Disease? | National Gaucher Foundation. [online] Available at: <https://www.gaucherdisease.org/about-gaucher-disease/what-is/> [Accessed 5 March 2021].
2. Gaucher PC. De l'epithelioma primitif de la rate, hypertrophie idiopathique de la rate sans leucemie. Paris: MD Thesis 1882.
3. Brady RO, Kanfer JN, Shapiro D. Metabolism of glucocerebrosides. II: Evidence of an enzymatic deficiency in Gaucher's disease. Biochem Biophys Res Commun 1965;18:221-5.
4. Binesh F, Yousefi A, Ordooei M, Bagherinasab MA. Gaucher's Disease, an Unusual Cause of Massive Splenomegaly, a Case Report. Iran J Ped Hematol Oncol 2013;3(4):173-175.
5. Rajiv Singla, Abhishek Singla, Suresh Kumar, Anil Agarwal, Premashish Kar. Gaucher's disease with portal hypertension and hypersplenism. Tropical Gastroenterology 2011;32(1):66-68.