

Gaucher's Disease- A case report

Preeti Bajaj^{1*}, Jyoti Kasture² and Balbir Singh Shah³

¹Professor & HOD, Department of Pathology, Dr. Vasant Rao Pawar Medical College, Hospital & Research Centre, Nashik-422013, India; dr.prbajaj@gmail.com

²Assistant Professor, Department of Pathology, Dr. Vasant Rao Pawar Medical College, Hospital & Research Centre, Nashik - 422013, India

³Medical Director, Shri Guru Teg Bahadur Hospital, Ludhiana Formerly Medical Superintendent & Professor, Department of Pathology, Dayanand Medical College & Hospital, Ludhiana - 141001, India

Abstract

Gaucher's Disease (GD) is an autosomal recessive systemic lysosomal storage disorder which is characterized by glucocerebroside deposition in cells of the macrophage-monocyte system as a result of a deficiency in lysosomal β -glycosidase (glucocerebrosidase). GD is a rare genetic disorder. It is the most common amongst the lysosomal storage disorders. GD has been categorised into three types based on the presence of central nervous involvement¹. Type 1 is a non-neuronopathic form that presents in childhood or early adulthood. Type 2 is acute neuronopathic form that presents in childhood. It progresses rapidly and is fatal. Type 3 is chronic non-neuronopathic form that presents in childhood but is slowly progressive. Here we describe a case of a three and a half year old male child in whom a diagnosis of Gaucher's disease was made based on bone marrow biopsy and later confirmed by glucocerebrosidase levels estimation².

Keywords: Gaucher's Disease, Glucocerebroside

1. Introduction

GD, a lysosomal storage disorder is caused by a defect in the housekeeping gene lysosomal glucocerebrosidase which is present on the first chromosome (1q22)³. It was first described by a French physician, Philippe Charles Ernest Gaucher in a 32-year-old woman whose liver and spleen were enlarged. The incidence of GD worldwide is approximately 1/57,000 to 1/75,000 births. In Ashkenazi Jews, the incidence is 1/800 births. In India, GD is believed to be extremely rare and has been reported only in a few case reports⁴. Out of the three types of GD, Type 1 is the most common type, which represents 95% of all cases. It is generally characterised by hepatosplenomegaly, bone and lung disease, hematologic abnormalities such as anemia, thrombocytopenia and coagulation abnormalities. Central nervous system is not involved. It occurs most commonly among Ashkenazi Jews. Type 2 has a severe progression with onset prior to 2 years, with neurologic disease, hepatosplenomegaly and lung disease. Death usually occurs between 2 and 4 years of age due to lung

failure. Patients with Type 3 may have onset prior to 2 years of age, but the progression is not as severe. These individuals may survive into the third and fourth decade. Apart from this, a perinatal lethal and a cardiovascular form of GD also exist.

2. Case Presentation

A three and a half year old male child, Hindu by religion, born to parents of non-consanguineous marriage was admitted to a tertiary care hospital with predominant clinical presentation of bicytopenia and hepatosplenomegaly. The child had delayed milestones. On examination, the child was pale. Liver was 5cm palpable below the right costochondral margin. The spleen was 10 cm palpable below the left costochondral margin. Peripheral blood smear examination revealed bicytopenia. Haemoglobin was 7.2g/dl and Platelet count was 70,000/ μ L. Bone marrow biopsy was done. Bone marrow biopsy showed sheets of Gaucher cells (Figure 1 & 2) seen as histiocytes with abundant granular and

*Author for Correspondence

fibrillar cytoplasm. These cells had small eccentrically placed nuclei were noted. The gaucher cells had a crumpled tissue paper appearance. The diagnosis of Gaucher's disease was given on bone marrow biopsy. Enzyme β -glucocerebrosidase levels were outsourced. β -glucocerebrosidase levels in peripheral leucocytes were reported to be 0.31 nmol/h/mg protein. Values < 8.7 nmol/h/mg protein are consistent with a diagnosis of Gaucher disease.

3. Discussion

GD is usually diagnosed by the demonstration of characteristic "Gaucher cells" in the bone marrow. Pseudo-Gaucher cells have occasionally been described in various hematologic malignancies including multiple myeloma, myelodysplastic syndrome, lymphomas, chronic myelogenous leukemia and thalassemia⁵. Therefore, detection of reduced or absent β -glucosidase (glucocerebrosidase) enzyme activity is the gold standard for the diagnosis of all the variants of GD¹. Absent or reduced activity of this enzyme results in accumulation of undigested materials (primarily in the lysosomes) and interferes with the normal functioning of cells. The excess accumulation of the glucocerebrosidase (glucosylceramide) in the macrophages is the main manifestation in the various visceral organs⁶. GD has a varied and multiorgan presentation. Diagnosing GD may pose a challenge⁷. Serum β -glucosidase levels < 15% of mean normal activity confirms the diagnosis².

Treatment is available in the form of enzyme replacement therapy. For types 1 and 3, substrate inhibition therapy represents a viable alternate approach to enzyme therapy in the treatment of visceral pathology in GD⁸. Bone marrow transplantation may benefit Type 3 individuals. Currently, only supportive therapy is available for Type 2.

Differential diagnosis of GD must be kept while dealing with patients having massive hepatosplenomegaly⁹.

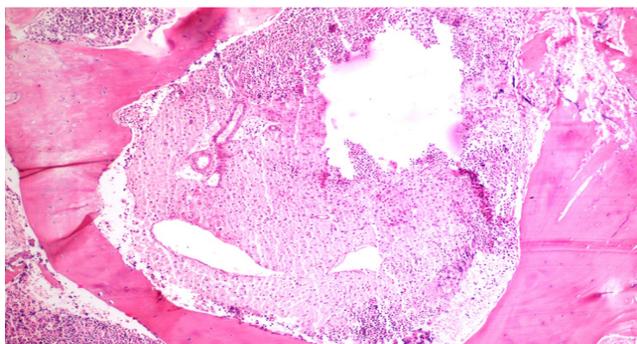


Figure 1. Bone marrow biopsy, low power view: sheets of histiocytes (Gaucher's cells) seen H &E, (x100).

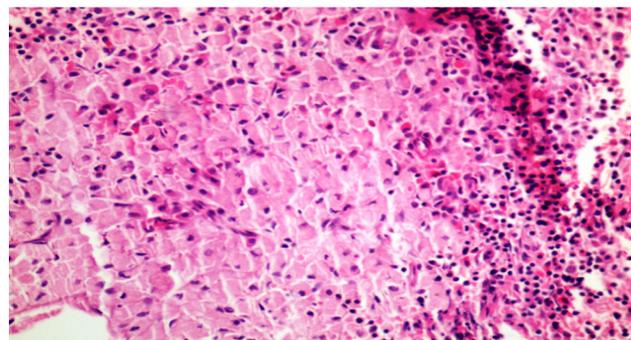


Figure 2. Bone marrow biopsy, high power view: sheets of histiocytes, with the abundant, granular and fibrillar cytoplasm resembling a crumpled tissue paper. Most of them had single nucleus with eccentrically placed nuclei- consistent with "Gaucher cells" H&E, (x400).

4. References

1. Bohra V, Nair V. Gaucher's disease. *Indian J Endocr Metab.* 2011; 15:182–6.
2. Patel AL, Shaikh WA, Khobragade AK, Soni HG, Joshi AS, Sahasrabudhe GS, Chole PV. Gaucher's Disease. *The Journal of the Association of Physicians of India.* 2009 May; 57:410–1.
3. Ahmadiéh, et al. *Journal of Medical Case Reports.* 2014; 8:360.
4. Nagral A, Mewawalla P, Jagadeesh S, et al. Recombinant Macrophage Targeted Enzyme Replacement Therapy for Gaucher Disease in India. *Indian Pediatrics.* 2011; 48:779–84.
5. Ash Image Bank. Waldenstrom macroglobulinemia with pseudo-Gaucher cells. *Blood.* 2010 Nov; 116(18):3388.
6. Beutler E, Grabowski GA. Glucosylceramide lipidosis-Gaucher disease. *The metabolic and molecular bases of inherited diseases.* 8th ed. New York: Mc Graw –Hill; 2001. p. 3635–68.
7. Neelaveni N, Anunayi J, Raju YR, et al. Pediatric Non-neuronopathic Gaucher Disease- A Case Report. *Sch J Med Case Rep.* 2014; 2(2):96–9.
8. Mc Eachern KA, Fung J, Komarnitsky S, et al. A specific and potent inhibitor of glucosylceramide synthase for substrate inhibition therapy of Gaucher disease. *Molecular Genetics and Metabolism.* 2007 Jul; 91(3):259–67.
9. Priyani AAH. Gaucher's Disease: a rare disease with an unusual presentation. *Journal of Diagnostic Pathology.* 2014; 9(1):33–6.