



Case Study

BONE MARROW BIOPSY PICTURE IN A PATIENT WITH MARFANOID HABITUS AND ANOREXIA NERVOSA

S.Vidhya Lakshmi^{1,*}, Pavethira P. Prasanna N Kumar

Department of Pathology, PSG Institute of Medical Sciences, Coimbatore

Correspondence should be addressed to S.Vidhya Lakshmi

Received 20 November 2014; Accepted 10 December 2014; Published 30 December 2014

Copyright: © 2014 S.Vidhya Lakshmi et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACTS

Gelatinous marrow transformation (GMT) is a rare disorder of bone marrow characterized by deposition of extra cellular gelatinous material. There is atrophy of the marrow adipocytes and loss of hematopoietic elements. It is also called as osseous atrophy of the bone marrow. It is not a specific disease but it is seen associated with chronic illness like malnutrition, anorexia nervosa, HIV infection and administration of cytotoxic drugs. Here, we report a case of gelatinous transformation of bone marrow in a 17 year old female presented with severe weight loss and anemia.

KEYWORDS: Gelatinous Marrow Transformation, Bone Marrow Biopsy

INTRODUCTION

Gelatinous transformation of the bone marrow was first reported in 1898. The condition is defined by hypocellularity of bone marrow and deposition of extra cellular gelatinous material (hyaluronic acid). This is associated with various diseases and malnutrition is assumed to be the basic causative factor. We report a patient with unexplained weight loss who had GMT.

CASE REPORT

A 17-year-old female came to the gastroenterology department with history of significant weight loss and amenorrhea for the past one year and vomiting, since 6 months. She had no fever, abdominal pain, diarrhea, jaundice or hematemesis. There was no co morbid illness. Physical examination revealed that she was very emaciated with loss of buccal pad of fat. She had Marfanoid habitus with positive wrist and thumb sign, arachnodactyly and high arched palate. Secondary hair and skin changes, Seborrheic dermatitis and Gottron's papules were present. Her height was 167cm and weight was 27kgs (BMI- 9.68).

Her blood glucose levels, serum urea, creatinine, Bilirubin and liver enzymes were all within normal limits. Serum electrolytes including calcium and magnesium levels were normal.

Urine examination revealed no significant pathology. Her hemoglobin was 13gm/dl with Mean corpuscular volume (MCV) of 98.9fl and packed cell volume of 37.2%. The Erythrocyte sedimentation rate was 5mm/hr. The total WBC count and differential count were within normal limits.

Peripheral smear showed a normocytic to mild macrocytic, normochromic blood picture with no significant findings in leucocytes and platelets

Serology testing for HIV, Hepatitis B and C and VDRL testing did not yield any positive results. Mantoux test was negative. Serum IgG was 1.63g/L, IgA was 6.01g/L and IgM was 1.29 g/L. Stool examination did not reveal any ova or cyst.

Serum Lactate dehydrogenase (LDH) was 212 units/L. Serum B12 level was 469pg/ml and serum folate was > 20.0ng/ml. Serum C3 level was 52mg/dl and C4 level was 17mg/dl. Serum prolactin and TSH levels were within normal limits.

Ultrasound abdomen was normal. Ultra sonogram of the pelvis revealed a small size uterus and the ovaries could not be visualized. Upper GI endoscopy revealed severe esophageal candidiasis, severe antral gastritis with flattened duodenal folds. A dermatology consultation was sought for and their diagnosis was Seborrheic dermatitis with Ichthyosis keratosis pilaris, suggestive of nutritional deficiency.

The working clinical diagnosis of a connective tissue disorder was made. Further workup was done to exclude a collagen vascular disease. Antinuclear antibody (ANA) profile including anti SS, Smith, Anti mitochondrial antibody, PCNA, dsDNA, Ro52 nRNP/Sm, Rib were all negative.

Bone marrow aspiration and imprint study showed mild megaloblastic changes with deposition of a proteinaceous material in the background. The bone marrow trephine biopsy sections showed hypo cellular marrow particles with erythroid hyperplasia and scattered megaloblasts. The myeloid and the megakaryocytic lineages showed normal maturation. There was deposition of an eosinophilic material which stained positively with Alcian Blue at pH 2.5 and Periodic Acid Schiff (PAS). The findings were consistent with gelatinous transformation of the bone marrow.

The patient was referred to psychiatry department with the diagnosis of anorexia nervosa. She was discharged with the prescription of Tab.Fluconazole, T.Olanzapine and T.Folic acid. On follow up after 2 weeks, she reported improvement of appetite and showed a weight gain of 1.5 kg.

DISCUSSION

Gelatinous transformation of bone marrow, also called serous atrophy is defined as loss of hematopoietic cells with atrophy of fat cells and deposition of extra cellular gelatinous material in the bone marrow.

The gelatinous material in the marrow space consists of acid mucopolysaccharides, mainly of hyaluronic acid staining positively with Alcian Blue at pH of 2.5. According to previous case reports in literature [1], the incidence of Gelatinous marrow transformation (GMT) is more common in males around 20 to 30 years of age.

Bohm [2] and his colleagues state that the spectrum of underlying diseases in gelatinous transformation varies with age. In young adults (<40 years of age), anorexia nervosa in women and AIDS in men were associated with GMT, whereas in the age group of 40 to 50 years alcoholism and age group more than 60 years, lymphomas, carcinomas and chronic heart failure were the most common causes. However it is well documented that chronic malnutrition is the source of gelatinous marrow transformation as in anorexia and starvation. A recent study from South India. [3], published that the underlying clinical diagnosis was HIV positivity in 5 cases, 2 with coexistent disseminated tuberculosis (TB), 1 with cryptococcal meningitis, and 1

with oral candidiasis; disseminated TB in 1 case; pyrexia of unknown origin (PUO) in 2 cases; Hodgkin's lymphoma (HD) in 1 case; acute lymphoblastic lymphoma (ALL) with maintenance chemotherapy in 1 case; and alcoholic pancreatitis in 1 case.

Severe metabolic diseases like diabetes mellitus and hypothyroidism and severe infectious diseases like AIDS also may induce gelatinous transformation. Amos et al in 1990 reported that GMT also occurs in patients in intensive care units. In a study involving 33[4] patients, GMT was almost always seen in men and associated with weight loss and anemia.

The deposited gelatinous material was found to consist of randomly aggregated non-amyloid fibrillar and granular material. Cotta [5] suggested that hyaluronic acid replaces fat cells in the marrow once they are lost.

Hutter [6] et al observed that changes of the peripheral blood cell count in patients with Anorexia Nervosa are a frequent observation but the peripheral blood cell count cannot predict the severity of bone marrow atrophy.

Abella [7] et al concluded that changes in stereo logic bone marrow parameters of adipocytes might appear soon in anorexia nervosa.

A large study was conducted in 2002, which involved the analysis of bone marrow changes in 44 consecutive patients diagnosed with Anorexia Nervosa. The marrow was classified as normal in 11%, hypo plastic or aplastic in 39%, with partial or focal gelatinous degeneration in 30%, or with complete gelatinous degeneration of the bone marrow (GDBM) in 20%.

Starvation of carbohydrate and calories cause hypoplasia and reduction of adipose tissue in the marrow [8], which adversely affects hematopoiesis. This is not a fibrotic process and is found to be reversible with the reestablishment of adequate nutritional intake.[9]The spectrum of peripheral blood changes and bone marrow correlates with the amount of weight loss rather than the clinical findings [10]

In our case, the patient is a young female with Marfanoid habitus presenting with severe weight loss and vomiting. She was immunocompetent with no co-morbid illness. Elaborate investigations did not reveal any evidence of a connective tissue disorder. Despite severe gelatinous transformation of the marrow, her peripheral blood picture and the bone marrow aspiration study were relatively normal.

CONCLUSION

This case is reported because of the rarity of association of gelatinous transformation of marrow in anorexia nervosa occurring in a young female with Marfanoid habitus. Bone marrow trephine biopsy should be carried out in any patient with unexplained weight loss to rule out a gelatinous transformation.

REFERENCES

- [1] Osgood E, Muddassir S, Starvation marrow - gelatinous transformation of bone marrow J Community Hosp Intern Med Perspect. 2014; 4(4): 10.
- [2] Böhm, Joachim. Gelatinous Transformation of the Bone Marrow: The Spectrum of Underlying Diseases. American Journal of Surgical Pathology. 24(1):56, January 2000.
- [3] Sreeva Das, Pritinanda Mishra, Rakhee Kar, Debdatta Basu. Gelatinous marrow transformation: A series of 11 cases from a tertiary care centre in South India. Turk J Haematol. Jun 2014; 31(2): 175–179.
- [4] Rafiullah, Islam R, Mahmood R, Sitwala KV. Gelatinous bone marrow transformation secondary to unusual eating habits and drastic weight loss. BMJ Case Rep. 2013 Jul 16;2013
- [5] Cotta CV. Gelatinous transformation. Blood.2012 Sep 13; 120(11):2166.
- [6] Hütter G, Ganepola S, Hofmann WK. The hematology of anorexia nervosa. Int J Eat Disord. 2009 May; 42(4):293-300.
- [7] E. Abella, E. Feliu, Granada. Bone marrow changes in anorexia nervosa are correlated with the amount of weight loss and not with other clinical findings. Am J Clin Pathol 2002; 118:582- 588.
- [8] Mehler PS, Howe SE. Seros fat atrophy with leucopenia in severe anorexia nervosa. Am J Hematol 1995;49:171-2
- [9] Shih-Hsiang Chen, Iou-Jih Hung, Tang-Her Jaing. Gelatinous Degeneration of the Bone Marrow in Anorexia Nervosa. Chang Gung Med J 2004;27:845-9
- [10] Muhajir Mohamed,Alhossain Khalafallah. Gelatinous transformation of bone marrow in a patient with severe anorexia nervosa. International Journal of Hematology. 2013, Vol 97, Issue 2, pg 157-158.

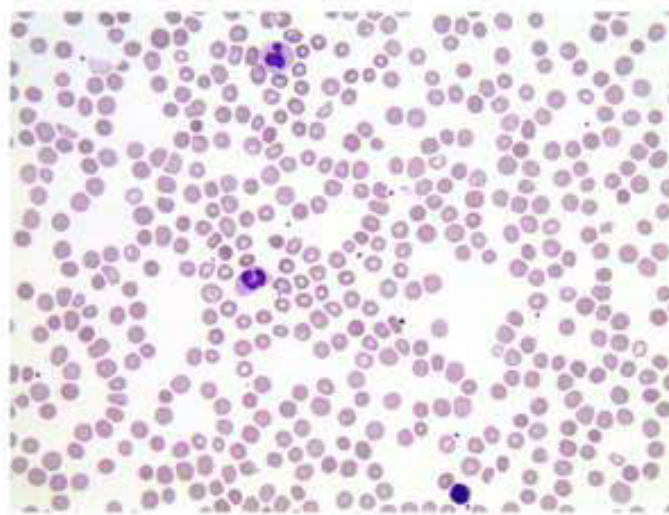


Figure : 1. Peripheral smear showing mild macrocytic normochromic blood picture(Leishman 400X)



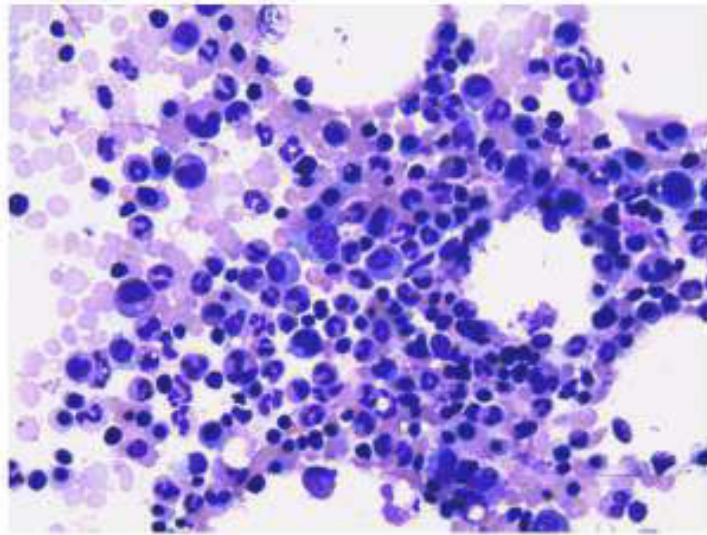


Figure : 2. Bone marrow aspiration smear showing trilineage hematopoiesis with mild megaloblastic change. (Leishman 400X)

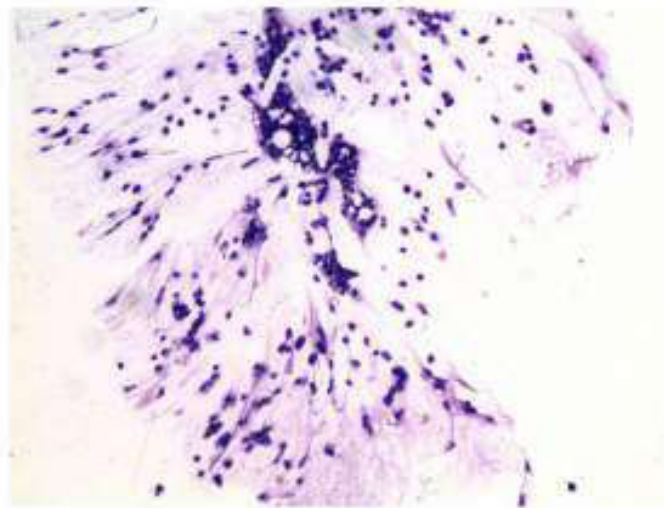


Figure : 3. Bone marrow imprint smear showing proteinaceous material. (Leishman 200X)

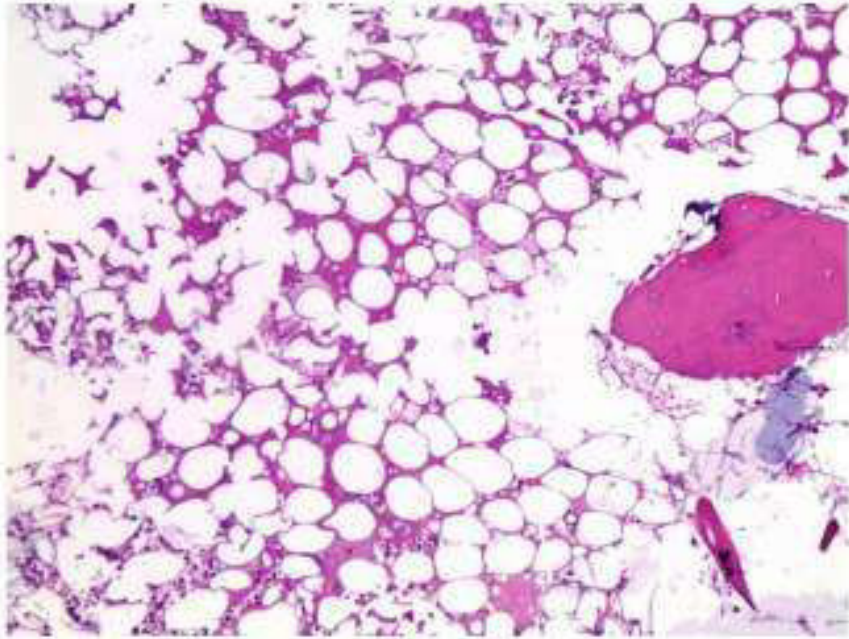
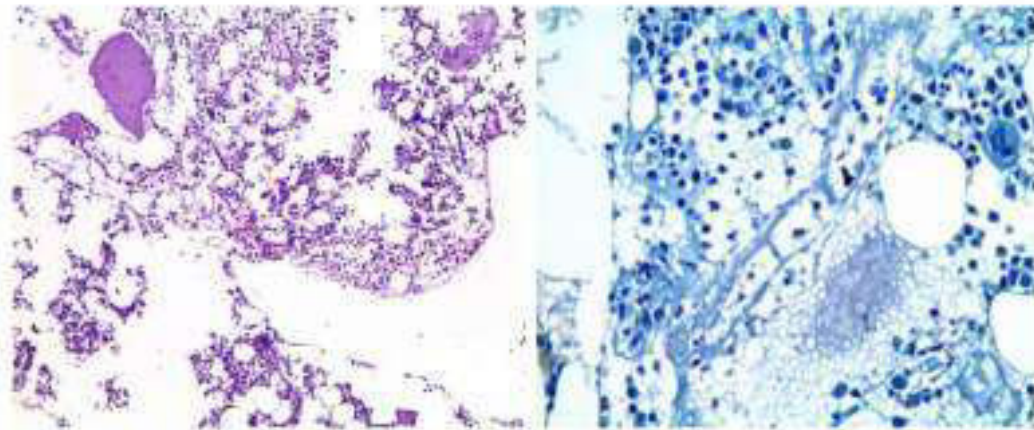


Figure : 4. Bone marrow trephine biopsy showing hypocellular marrow with deposition of eosinophilic gelatinous material (H & E 200 X)



**Figure : 5 (a). Trephine biopsy showing Periodic acid Schiff positive material. (PAS 100X)
5 (b) Trephine biopsy showing Alcian Blue positive material. (Alcian Blue 100X)**

