



Retrospective Study of Serum LDH in Megaloblastic Anemia

KEYWORDS

Megaloblastic anemia, LDH

DR. B. P. GORE

ASSOCIATE PROFESSOR, SMT. KASHIBAI NAVALE MEDICAL COLLEGE & GENERAL HOSPITAL NARHE, PUNE-411041

DR. GAJANAN KURUNDKAR

ASSOCIATE PROFESSOR, SMT. KASHIBAI NAVALE MEDICAL COLLEGE & GENERAL HOSPITAL, NARHE, PUNE-411041

DR. SHREEPAD BHAT

HOD MEDICINE, SMT. KASHIBAI NAVALE MEDICAL COLLEGE & GENERAL HOSPITAL, NARHE, PUNE-411041

ABSTRACT *Megaloblastic anemia is characterised by decreased hemoglobin level with elevated Mean Corpuscular Volume (MCV)^{1,2}. Deficiency of vitamins –B12 and/ or Folic acid leads to impaired DNA synthesis leading to ineffective erythropoiesis and intramedullary haemolysis in patients of megaloblastic anemia. This leads to increased unconjugated bilirubin, serum LDH (Lactate Dehydrogenase) and some degree of cytopenia.^{2,3,4}*

Aims & Objectives: To study level of serum LDH in cases of megaloblastic anemia.

Material and methods: This is a retrospective observational study. The study was conducted on patients admitted in Smt. Kashibai Navale Medical College & General hospital, Pune during the period of 1 July 2013 to 10 December 2014. The medical records of 340 patients of anemia were reviewed and 42 cases of Megaloblastic anemia were selected for study. Patients diagnosed as megaloblastic anemia with Hb \leq 9 gm% & MCV \geq 100 fl whose serum LDH level was measured were selected for the study. This study was aimed to assess the role of serum LDH in diagnosis of megaloblastic anemia.

Conclusion: In this study, serum LDH level was significantly elevated in patients of megaloblastic anemia. Thus serum LDH level may have an important role in diagnosis of megaloblastic anemia.

Introduction: Megaloblastic anemia is characterized by decreased level of haemoglobin with macrocytosis & mean corpuscular volume (MCV) \geq 100 fl. Intramedullary haemolysis in patients of megaloblastic anemia often leads to increased level of certain enzymes including lactate dehydrogenase (LDH). LDH is a marker of tissue breakdown & is abundantly present in RBCs. As a result of lysis of RBCs, LDH is released into circulation^{4,7}. This rise of serum LDH often corresponds to amount of tissue breakdown i.e. haemolysis. The rise of serum LDH in megaloblastic anemia is demonstrated by many authors in their respective studies^{4,6}. High serum LDH is believed to be useful tool for diagnosis of megaloblastic anemia. This study was designed to study the level of serum LDH in megaloblastic anemia, thus an effort to find out usefulness of serum LDH level for diagnosis of megaloblastic anemia.

Aims & Objectives: To study level of LDH (Lactate Dehydrogenase) in cases of megaloblastic anemia.

Material and methods: This is a retrospective observational study. The study was conducted on patients admitted in Smt. Kashibai Navale Medical College & General hospital, Pune during the period of 1 July 2013 to 10 December 2014. The medical records of 340 patients of anemia were reviewed and 42 cases of Megaloblastic anemia were selected for study. Patients diagnosed as megaloblastic anemia with Hb \leq 9 gm% MCV \geq 100 fl whose serum LDH Level was measured were selected for the study. All haematological tests were done on automated coulter machine. Serum LDH estimation was estimated by automated biochemistry analyser.

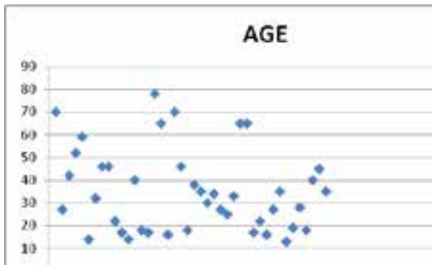
Inclusion criteria: Patients with diagnosis of megaloblastic

anemia, Hb \leq 9 gm % & MCV \geq 100 fl.

Cases fulfilling the above criteria were selected and their medical records were reviewed. Data was collected in the form of age, sex, haemoglobin, MCV & serum LDH level. Data was analysed using standard statistical tests. Results are presented in the form of tables and graphs.

Observations: Out of total 42 patients included in the study, 18 were males & 24 were females. (M: F ratio = 1:1.33). The mean age of the patients was 35.12 years with a standard deviation of \pm 17.81. The age range was 13--78 years. The mean haemoglobin in the study population was 5.416 ± 1.15 . Minimum Hb noted was 2.5 gm% & maximum was 9.0 gm%. The mean MCV was 115 fl; the maximum being 139 fl. Serum LDH was elevated in 38 patients (90 %). The maximum value of serum LDH in this study group was 14870 IU/L. The average serum LDH level was 2386 IU/L, which is more than 5 times the upper limit of serum LDH in our lab. Similar findings were noted by C F Mc CARTHY⁴ & EIVAZI-ZIAEI⁵. T. S. JASWAL⁶ & others in their study pointed out that high serum LDH is present in megaloblastic anemia & level > 3000 could be used for diagnosis of megaloblastic anemia.

Graph I: Distribution of age



Graph II: distribution of MCV

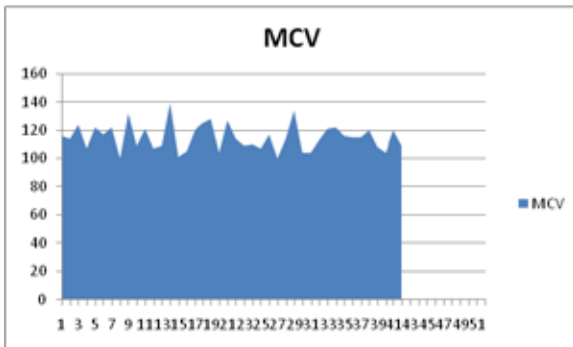
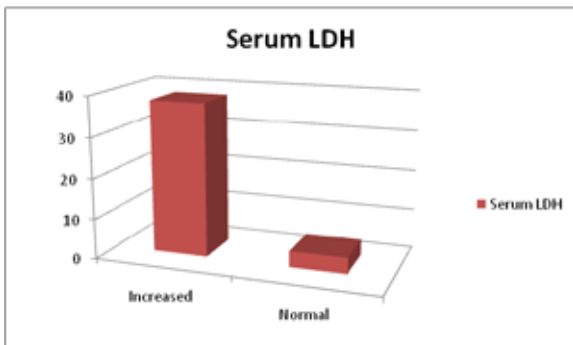
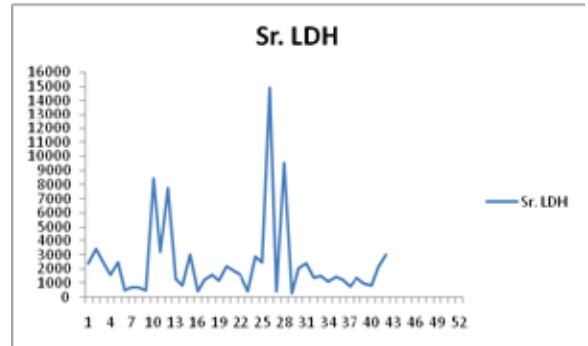


Table I: Serum LDH in study population



Graph III: Distribution of serum LDH



Discussion: Megaloblastic anemia is important public health problem. Megaloblastic anemia is characterised by macrocytosis, anisocytosis & poikilocytosis. MCV in megaloblastic anemia is $\geq 100\text{fl.}$ ¹⁻³ Important causes of megaloblastic anemia are deficiency of vitamin B12 or Folic acid or abnormalities of their metabolism. These vitamins are important for synthesis of DNA & RNA. Deficiency of these vitamins affects nucleic acid synthesis & leads to ineffective erythropoiesis & intra medullary hemolysis.¹⁻³ This ultimately causes megaloblastic changes. As a result of tissue breakdown i.e. intramedullary haemolysis, there occurs rise of serum bilirubin & various enzymes including serum LDH. LDH is a marker of tissue breakdown & is abundantly present in RBCs. As a result of lysis of RBCs, LDH is released into circulation²⁻⁶. This rise of serum LDH often corresponds to amount of tissue breakdown i.e. haemolysis. Most cases of megaloblastic anemia correspond to very high serum LDH. Several tests are usually needed for accurate diagnosis of megaloblastic anemia including peripheral blood smear and bone marrow studies. The differential diagnosis of macrocytic anemia requires reticulocyte counts, vitamin B12 and serum folate levels, thyroid and liver function tests. Increased serum LDH is seen in many other conditions namely haemolytic anemia, ischemic heart diseases, liver and muscle abnormalities⁴⁻⁶ etc. Clinical and other imaging & laboratory finding are helpful to differentiate these disorders. Also the level of serum LDH in other anemic conditions is often not as high as seen in megaloblastic anemia. The expected increased LDH activity is the result of an accelerated turnover of bone marrow cells implying the release of this enzyme from dividing and/or decaying cells^{5,6}.

Conclusion: In this study, serum LDH level was significantly elevated in patients of megaloblastic anemia. Thus serum LDH level may have an important role in diagnosis of megaloblastic anemia.

REFERENCE

1. Vineetha Unnikrishnan, Tarun Kumar Dutta, Bhawana A. Badhe, Zachariah Bobby, Ashish K. Panigrahi, "Clinico-aetiologic profile of macrocytic anemias with special reference to megaloblastic anemia", Indian J. Hematol. Blood Transfus 24(4):155-165 | 2. Hirachand S, Singh R, Gurung P and Thapa R, "Clinico-haematological profile of megaloblastic anemia", Journal of institute of medicine, apr 2014, 36:1, 38-42 | 3. Megaloblastic Anemias, Harrison's Principles of Internal medicine, 18 ed, p.862-866 | 4. C. F. McCARTHY, D. FRASER, AND A. E. READ, "Plasma lactate dehydrogenase in megaloblastic anaemia", J. clin. Path. (1966), 19, 51 | 5. EIVAZI-ZIAEI J, DASTGIRI S, SANAAT Z, "Estimation of the Diagnostic Value of Myeloperoxidase Index and Lactate Dehydrogenase in Megaloblastic Anaemia", Journal of Clinical and Diagnostic Research. 2007 Oct; 1(5):380-384 | 6. Jaswal TS, Mehta HC, Gupta V, Singh M, Singh S., "Serum lactate dehydrogenase in diagnosis of megaloblastic anaemia", Indian J Pathol Microbiol. 2000 Jul; 43(3):325-9 | 7. Henk J. Huijgen, Gerard T. B. Sanders, Rudolph W. Koster, Johan Vreken and Patrick M. M. Bossuyt, "The Clinical Value of Lactate Dehydrogenase in Serum: A Quantitative Review", Eur J Clin Chem Clin Biochem 1997; 35(8):569-579 |