Original Article

Significance of lactic dehydrogenase activity in cerebro spinal fluid in different type of meningitis

Shiv Shankar Bharti[1*], Debjit Mitra[2], Mamta Singh[3]

[1]Tutor, [2]Assistant Professor, Department of Biochemistry, MGM Medical College, Kishanganj, Bihar, INDIA.
[3]Senior Resident, AIIMS, Patna, Bihar, INDIA.
Email: kajal6160@gmail.com

Abstract

Problem statement : Lactate dehydrogenise is and important intracellular enzyme which acts as catalyst in oxidation reduction intracellular enzyme which acts as catalyst in oxidation reduction of living organisms, The CSF is situated in subarachnoid space lying between arachnoids and parameter. The CSF is produced by active transport of Na^+ across the choroids plexus, from the vascular compartment to the cerebral ventricles. The observations made were as follows: The maximum prevalence of different types of meningitis was in the age group 0 to 10 years of age. The LDH level did rise quite significantly in pyogenic meningitis. It was almost concluded that the estimation of CSF-LDH is diagnostic. In case of tuberculosis meningitis also the CSF –LDH level was significantly high but less than of pyogenic meningitis. In viral meningitis the CSF –LDH level was slightly higher than that of normal and significantly lower than that of tuberculosis meningitis and pyogenic meningitis. **Methods:** In ongoing study twenty apparently healthy subjects and sixty patients suffering from meningitis due to different aetiology are selected for estimation of LDH activity in CSF. They year aged 5- 65 Years in between. All patients were admitted in the indoors of medicine and Paediatrics, Department of M.G.M. Medical College and L.S.K. Hospital Kishanganj, Bihar. **Results:** In the present series the cases of study group included those of clear cut diagnosis. The cases with ambiguous cytology and chemistry were excluded, so that the conclusion on LDH level assay may be sharp and precise. Biochemical parameters of CSF fluid – Sugar, Protein, and LDH - value were compared both case and control group and statistical analysis were calculated by the help of SPSS software. **Conclusion:** CSF-LDH estimation is of importance as a diagnostic and prognostic tool as far as the dreaded disease of different type of meningitis are concerned.

Keywords: Pyogenic meningitis, Tuberculous meningitis, viral meningitis, Cerebrovascular, leptomeninges.

[*]**Address for Correspondence:**
Dr. Shiv Shankar Bharti, Tutor, Department of Biochemistry, MGM Medical College, Kishanganj, Bihar, INDIA.
Email: kajal6160@gmail.com

Received Date: 22/02/2016 Revised Date: 10/03/2016 Accepted Date: 07/04/2016

Access this article online

Quick Response Code:

Website: www.statperson.com

DOI: 06 June 2016

INTRODUCTION

After discovery of LDH activity in cerebrospinal fluid (CSF) in 1956 by Bruns *et al*, wroblewski *et al* (1957) first described clinical significance of LDH in CSF and got elevated level in acute meningitis. Thereafter, many workers found significant elevation of CSF-LDH level in meningitis and other cerebrovascular disorders. The reports indicated that an increase in CSF level of this enzyme may be of potential value in diagnosing bacterial meningitis when CSF findings of Protein, Sugar and cells are non-specific. The cerebrospinal fluid, lactate dehydrogenase activity depends upon the nature of lesion, degree of cellular damage produced site of lesion and its accessibility to CSF. Meningitis be defined as an inflammation of the leptomeninges and the fluid residing in the space which it encloses and also that in the ventricles of the brain. Meningitis may be classified into two broad groups: 1) Bacterial meningitis. 2) Non-bacterial meningitis. Bacterial meningitis are two types 1) pyogenic meningitis. 2) Tuberculous meningitis. Our present work has been undertaken with aims to assess whether there is significant difference in LDH activity in CSF in different type of meningitis so that it can differentiate between pyogenic, tuberculosis and viral meningitis, there is correlation between CSF-LDH activity and routinely used parameters like protein, sugar and cells and whether this value in predicting the prognosis.

How to site this article: Shiv Shankar Bharti, Debjit Mitra, Mamta Singh. Significance of lactic dehydrogenase activity in cerebro spinal fluid in different type of meningitis. *International Journal of Recent Trends in Science and Technology* June 2016; 19(2): 212-214. http://www.statperson.com (accessed 05 June 2016).

MATERIAL AND METHODS

Control Group

20 age and sex matched apparently healthy individuals having no evidence of neurological dysfunction formed the control group. Those suffering from hepatic muscular and cardiac disorder were excluded from this group. The CSF samples were control group were examined for LDH level.

Study Group

60 patients admitted to Medicine and Paediatrics word of M.G.M. Medical College and L.S.K. Hospital, Kishanganj with clinical features of meningitis were selected for the study.

The patients were studied as follows

1. Detailed history taking and clinical examination.
2. CSF was examined for Protein, Sugar, Cell, Gram's staining for ordinary bacteria and Ziehl Nelsen's staining for AFB.
3. CSF was examined for LDH level estimation.
4. CSF samples for LDH estimation were collected on the first day of admission in all cases.

Statistical Analysis

Comparison of changes were made with the help of SPSS, t-test was calculated on the basis of mean and standard error of mean. Comparison was made between normal control to other group.

RESULT

The present work "Diagnostic significance of lactic dehydrogenase activity in cerebrospinal fluid of meningitis of various aetiology" aims to evaluate the diagnostic and prognostic significance of estimation of lactic dehydrogenase level in cerebrospinal fluid in different types of meningitis. It included a control group comprising of 20 cases and a study group comprising of 60 cases. Out of these 60 cases of the study group, 23 were of pyogenic meningitis, 25 were of tuberculous meningitis and 12 were of viral meningitis.

Table 1: Showing sex incidence in different group of meningitis

Group of disease	Male	Female	Male : Female
Pyogenic meningitis	28	5	3.6:1
Tuberculous meningitis	18	7	2.57:1
Viral meningitis	8	4	2:1

Table 2: Showing distribution of patients of different types of meningitis in various age group.

Age group in Year	No of case in Pyogenic Meningitis	No of cases in Tuberculous Meningitis	No of cases in Viral Meningitis
0-10	9	12	6
11-20	4	4	3
21-30	5	4	2
31-40	1	3	1
41-50	1	1	-
51-60	3	1	-
61-65	-	-	-

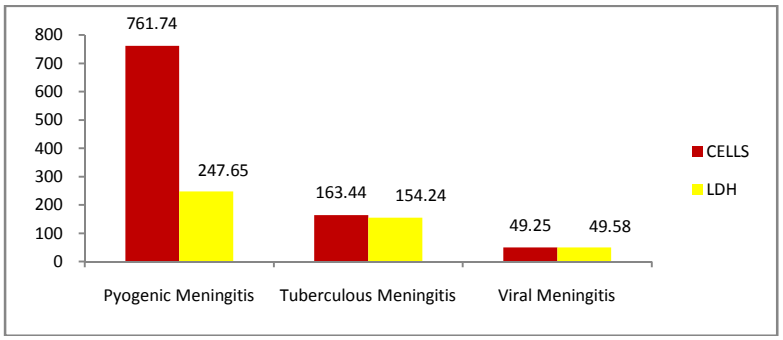

Figure 1: Histogram showing the relationship of csf cells and ldh levels in different types of meningitis.

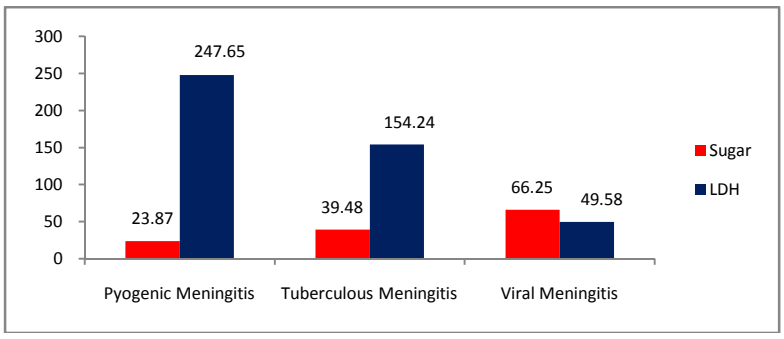

Figure 2: Histogram showing the relationship of sugar and ldh level in different types of meningitis

Table 3: Showing statistical analysis of relationship between CSF – LDH and protein level in different types of meningitis

Type of meningitis	Corelation coefficient	'p'Value	Remarks
Pyogenic meningitis	**0.39**	**>0.05**	**Not Significant**
Tuberculous meningitis	**0.31**	**>0.05**	**Not Significant**
Viral meningitis	**-0.55**	**>0.05**	**Not Significant**

Table 4: Table showing statistical analysis of CSF- LDH level in different types of meningitis in comparison to each other

Between different types of meningitis (Comparison of LDH level)	't' Value	'p' Value	Remarks
Viral Vs Tuberculous	9.43	<0.001	Significant
Viral Vs Pyogenic	4.45	<0.001	Significant
Pyogenic Vs Tuberculous	8.71	<0.001	Significant

CONCLUSION

The observations made were as follows: The overall ratio of male: female in study group was 2.75: 1. The maximum prevalence of different types of meningitis was in the age group of 0 to 10 years age. The LDH level did rise quite significantly in pyogenic meningitis. In case of tuberculous meningitis also the CSF-LDH level was significantly high but less then pyogenic meningitis (Range 95 – 250 IU/L, Mean 154.24 IU/l, $p< 0.001$). In viral meningitis the CSF- LDH level was slightly higher than that of normal and significantly lower than that of tuberculous meningitis and pyogenic meningitis (Range 22 – 73 IU/L, Mean 49.58 IU/l, S.D.15.18 IU/l and S.E.M 4.49 IU/l). So CSF- LDH estimation is of importance as a diagnostic and prognostic tool as far as the dreaded disease of different types of meningitis are concerned.

REFERENCE

1. Aronson, S.M: Enzyme determination in neurologic and neuromuscular disease of infancy and childhood. Paed. Clin. N America, 7 No. 3; 527, 1960.
2. Admas R.D.; Victor M,: Principles of Neurodlogy, 3rd ED., and NewYork. Mc Graw- Hill, 1985.
3. Biochemistry, 5th edition by stryer.
4. Berzelius (1825): Quoted from Text book of Physiology and Biochemistry by Bell, Davidson and Scarbobough, 3rd ed 1956.
5. Brain's diseases of the nervous system, 8th edition.
6. Chatterley s, Sun T., Lien Y: Diagnostic value of lactate dehydrogenase isoenzymes in cerebrospinal fluid. J. Clin. Lab. Anal. 1991; 5(3): 168 – 174.
7. Davidson's principles and practice of medicine 16th edition 1988.
8. Ghai, O.P.: Essential Paediatrics, 6th Ed 2004.
9. Harrison's principles of internal Medicine 18th edition.
10. Knight, J.A.: Dudek S.M. and haymond, R.H.: Early diagnosis of bacterial meningitis – CSF glucose, Lactate and LDH comp[ared. Clin. Chem. 27/8, 1431 – 1434, 1981.
11. Maldane: Quoted from Test Book of Biochemistry, Edward Staunton West, W.R. Todd, H.S. Mason and J.T. Van Bruggen 4th Ed. , P. 419.
12. Wroblewski F., Gregory, K.F. *et al*: Ann. N.Y Acad. Science 94: 912, 1961.
13. Wotton IDP and Heather Freeman: Microanalysis in Medica Biochemistry 6th edition 1982.
14. Wroblewski F., Gregory, K.F. *et al*: Ann. N.Y Acad. Science 94: 912, 1961.
15. Wotton IDP and Heather Freeman: Microanalysis in Medical Biochemistry 6th edition 1982.

Source of Support: None Declared
Conflict of Interest: None Declared