

# THE ROLE OF LACTIC DEHYDROGENASE IN THE CLINICAL EVALUATION OF VIRAL INFECTIONS PRELIMINARY DATA

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**Keywords:** lactate dehydrogenase, viral infections, clinico-evolutive evaluation

**Abstract:** The respiratory pathology represents one of the most frequent pathologies in the pediatric practice. It is the main cause of morbidity and mortality in the pediatric population. The diseases of the respiratory system are among the most frequent diseases of the child, including over 50% of all the conditions met in the pediatric practice. The signs and symptoms of the pulmonary condition in the newborn, baby and small child who suffers from infections of the respiratory tract are often undifferentiated, and clinical data obtained at the physical examination of the respiratory tract are very scarce.

**Cuvinte cheie:** lactat dehidrogenaza infectiilor virale, evaluare clinico-evolutiva,

**Rezumat:** Patologia respiratorie, reprezintă una dintre cele mai frecvente patologii în practica pediatrică. Este principala cauză de morbiditate și mortalitate întâlnită la populația pediatrică. Bolile inflamatorii ale aparatului respirator sunt cele mai frecvente boli ale copilului, incluzând peste 50% dintre toate afecțiunile întâlnite în practica pediatrică. Pentru nou născut, sugar și copilul mic, care suferă de infecții ale căilor aeriene inferioare, semnele și simptomele de afectare pulmonară sunt adesea nespecifice, iar datele clinice obținute la examenul fizic al aparatului respirator sunt foarte sărace.

## INTRODUCTION

The lower respiratory tract infections represent a figure of 6.9% mortality worldwide (World Health Report, OMS 2004). The differentiation between the bacterial infections and the viral ones is important mainly in the view of the treatment: the former require administration of antibiotics, while the latter does not. Administration of antibiotics in a viral infection does not prevent a possible over infection occurred in the case evolution, and the germs which determine the over infection can develop resistance to the antibiotics administered in the first stage.

Resistance to the antibiotics is a worldwide concern, and strategies to discover the most accurate biomarkers to distinguish the bacterial infections from the viral ones are being developed. As a result, antibiotics are expected to be administered more and more judiciously.

Data in the specialised literature confirm the fact that exposition to respiratory infections in the first year of life increases mortality between 55 – 80 years. Only lower respiratory tract infections in the first year of life are associated with cough, productive cough and alteration of the breathing function for the adult and aged persons – irrespective of smoking and socio-economic standard.

The mortality rate due to respiratory chronic diseases of adults over 55 is correlated to bronchitis and pneumonia in early infancy. Therefore, all the research done in order to find new methods of differentiation between viral and bacterial infections is well justified. Accurate and less costly methods should always be found, especially methods to evaluate the progress of these respiratory infections.

## THE AIM OF THE STUDY

The main objective of the present work is to establish whether LDH plays any role in appreciating and monitoring the

evolution of viral respiratory infections.

Starting from these premises, the objectives proposed are the following:

1. Studying the specific/ sensible concentration of the LDH in respiratory infections.
2. Analyzing the LDH variableness – the LDH kinetics - in respiratory conditions.

## MATERIAL AND METHOD

We made a random comparative prospective study, which included 88 patients hospitalised in the Pediatric Hospital Sibiu between 01.09.2009 - 30.08.2010, with the diagnosis of de infections of the respiratory tract (Bronchiolitis, Rhinopharyngitis and Pneumonia). The total number of children was split into 2 groups, one group representing viral respiratory infections and the other group representing bacterial infections.

The criteria of inclusion in the 2 groups were:

- Children under 7 years;
- A respiratory condition;
- probable viral infection: (probability criteria for viral infections have to be present: low value of C-reactive protein- CRP, low value of interleukin 6 – IL-6 - and normal/low value of leucocytes);
- probable bacterial respiratory infections: high CRP, leucocytosis and high IL-6

The criteria of exclusion were:

- absence of liver condition (value of SGTP within normal limits);
- absence of muscle condition (value of SGOT within normal limits);
- no haemolysis (indirect bilirubin within normal limits);
- children over 7 years;
- no intramuscular injections recently;

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## CLINICAL ASPECTS

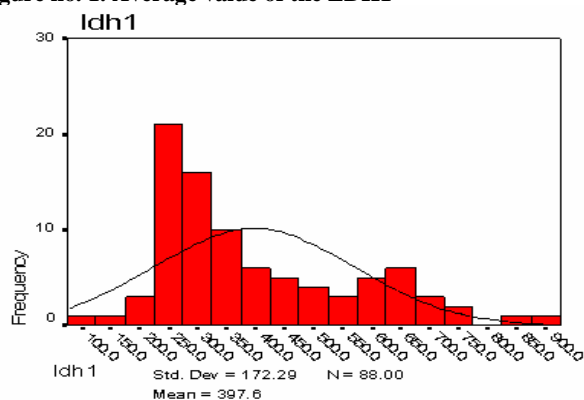
- antibiotic therapy at home;
- no home medication which could determine false high or low values of the LDH.

### RESULTS AND DISCUSSIONS

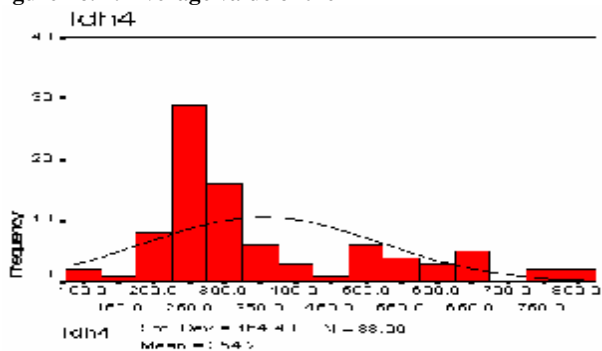
Initially 140 children were enrolled in the study. Those who presented liver condition (high value of SGTP) as well as with muscle condition (high value of SGOP), were excluded from the study lest false high levels of LDH appear. Children with intramuscular injections, haemolysis, or antibiotic therapy at home were excluded from the study. After the laboratory tests, especially the IL-6, 88 patients remained enrolled in the study.

The analysis of the data presented in diagrams no.1 and 2, show that the average value of the LDH in day 1 is of 397,65 (standard deviation 172.29), and the average value of the LDH4 is 354,17 (standard deviation 164,47). One can notice that the average value LDH4 is lower than the LDH1.

**Figure no. 1. Average value of the LDH1**



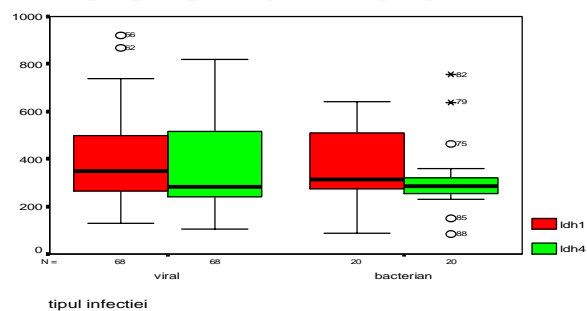
**Figure no. 2. Average value of the LDH4**



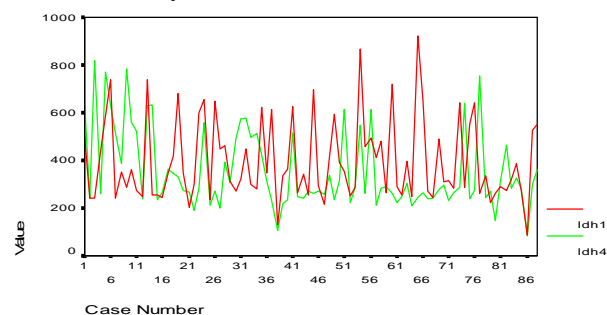
The LDH average value at the beginning of hospitalisation is higher in the group with viral infection, namely 407.00 (standard deviation 178,26), as compared to the group with bacterial respiratory infections, namely 365.85 (standard deviation 149,95), without a significant statistical difference ( $p > 0,05$ ). The LDH average value in day 4 is higher in the group with viral infections, namely 365.00 (standard deviation 167,8456), as compared to the group with bacterial respiratory infections, namely 317.35 (standard deviation 150,6080), according to the data presented in diagram no.3.

The analysis of the data presented in figura no. 4 points out the fact that a greater number of patients with a high LDH concentration at the moment of hospitalization, had a lower value in the 4th day, while a smaller number of patients with a low LDH concentration at the moment of hospitalization, had a higher value in the 4th day. The data presented above apply to the whole group, without distinction between viral bacterial.

**Figure no. 3. Average value of the LDH1 and LDH4, in the bacterial group, respectively the viral group**



**Figure no. 4. The LDH1, LDH4 kinetics in the group of patients in the study**



### CONCLUSIONS

1. The LDH average value at the moment of hospitalization, is higher in the group with viral infections (407,00), as compared to the group with bacterial infections, (365,85), but without a significant statistical difference. The Mann-Whitney test concluded the fact that there is no significant difference between the LDH1 scores for the viral group and the LDH1 scores for the bacterial group; there is no significant difference between the LDH4 scores for the viral group and the LDH4 scores for the bacterial group. As a conclusion, LDH is not a marker of bacterial or viral.
2. High values of serum LDH at the beginning of respiratory infections predict a favourable evolution of the case.
3. Low values of serum LDH at the beginning of respiratory infections predict an unfavourable evolution of the case.
4. As a general conclusion related to monitoring the viral infections of the respiratory tract, we can affirm that we can take into account the usage of the serum LDH in monitoring the clinical evolution of the viral respiratory infections.

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