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**CEFTRIAXONE SULBACTAM VERSUS RANDOM ANTIBIOTIC
TREATMENT IN EARLY AGE CHILDREN WITH COMMUNITY-
ACQUIRED PNEUMONIA**

The purpose of the study was to assess the efficiency of starting empirical treatment with Ceftriaxone sulbactam in children under 3 years in-hospital with a verified diagnosis of severe community-acquired pneumonia. The study is retrospective. The analysis of 65 case histories of patients who were admitted in ARMCCCH (Andijan, Uzbekistan), from 2021 to 2022 was made. The clinical efficacy of Ceftriaxone was 68.7% in severe community-acquired pneumonia in children under 3 years. Cef SLB therapy may be helpful for reducing mortality and morbidity of early age children with CAP.

Keywords: Ceftriaxone sulbactam, pneumonia, children, treatment, efficacy.

**Сравнение цефтриаксона сульбактама и выборочной
антибиотикотерапии у детей раннего возраста с внебольничной
пневмонией**

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Цель данного исследования является оценить эффективность стартового эмпирического лечение цефтриаксоном сульбактамом у детей до 3-х лет в условиях стационара с подтвержденным диагнозом тяжелой внебольничной пневмонии. Исследование является ретроспективным. Проведен анализ 65 историй болезни пациентов, поступивших в АММЦ (Андижан, Узбекистан) с 2021 по 2022 г. Клиническая эффективность цефтриаксона составила 68,7% при тяжелой внебольничной пневмонии у

детей до 3-х лет. Лечение с Cef SLB может быть полезной для снижения смертности и заболеваемости детей раннего возраста с ВП.

Ключевые слова: цефтриаксон сульбактам, пневмония, дети, лечение, эффективность.

Background: Community-acquired Pneumonia (CAP) is an infection of the lung parenchyma that is acquired outside of hospital, [1] involved approximately 150 million new cases annually, among children younger than 5 years old worldwide. CAP is caused by bacteria such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis* or viruses such as influenza virus [2, 3]. The susceptibilities of *Streptococcus pneumoniae*, *Haemophilus influenzae* and methicillin-resistant *Staphylococcus aureus* to β -lactam/ β -lactamase inhibitors were reported as 99.5%, 59.3–78.0% and 7.7–20.2%, and the susceptibilities of these species to third-generation cephalosporins were reported as 96.8, 100 % [2].

Ceftriaxone (CTRX) and ampicillin/sulbactam (ABPC/SBT) are recommended by various guidelines for pneumonia in a number of countries as the first-line antibiotics for CAP [4-8]. According to the International and National Guidelines III generation cephalosporins are the drugs used as starting empirical treatment of uncomplicated severe community-acquired pneumonia in children regardless of age. Ceftriaxone is a drug that has a wide spectrum of antimicrobial activity, low toxicity, and it is easy to dose and economically available. [9, 10]

Methods: The diagnostic criteria for CAP are defined as radiological findings of a new and/or progressive infiltrate(s) and two or more of the following symptoms: cough, sputum or change of sputum character (increased volume and/or purulence), dyspnea, pleuritic chest pain, tachycardia, documented axillary body temperature ≥ 37.5 °C within the past 24 h, rigors and/or chills, general malaise, abnormal breathing sounds, auscultatory findings consistent with the lung infiltrate on chest examination, and white blood cell (WBC) count $< 10 \cdot 10^9$ /ml. Severity of pneumonia was determined according to the pneumonia severity index (PSI) [11].

Exclusion criteria: suspected aspiration pneumonia or hospital-acquired pneumonia; hospitalization within 60 days of symptom onset; active lung cancer (cases other than completely resected ones); terminal illness; immunocompromising disease (human immunodeficiency virus infection, active hematologic malignancies, neutropenia and congenital immunodeficiency) or receipt of immunosuppressive therapy (use of ≥ 10 mg of prednisolone-equivalents, and/or immunosuppressants); pregnant or breastfeeding; known allergy to the indicated antibiotics; or presence of other infiltrative diseases such as organizing pneumonia, radiation pneumonitis, drug-induced pneumonia, obstructive pneumonia, tuberculosis or fungal infection, and empyema.

Ceftriaxone monotherapy was appointed 32 (49.3%) children, in combination with other antibiotics (meropenem, ampicillin, amikacin, gentamycin etc) it was used in 44 children (not included in research) and no Cef SLB treatment was observed in 34 patients. Patients were treated using intravenous CTRX/SBT at 50-70 mg/kg every 12 h for 5–14 days, until their body temperature was < 37 °C for 48 h with clinical stability, and improvements were seen in terms of dyspnea, sputum, or C-reactive protein (CRP) levels. When a patient showed a recurrence of fever > 37.5 °C after initial improvement of fever, the same antibiotic therapy was continued for 4 days from the first day of recurrence. To evaluate the effects of treatment, clinical findings, chest radiography findings, and laboratory test results were collected before, during, and at end of treatment (EOT; days 7–14). The late response to treatment was evaluated at end of study (EOS; days 14-28)

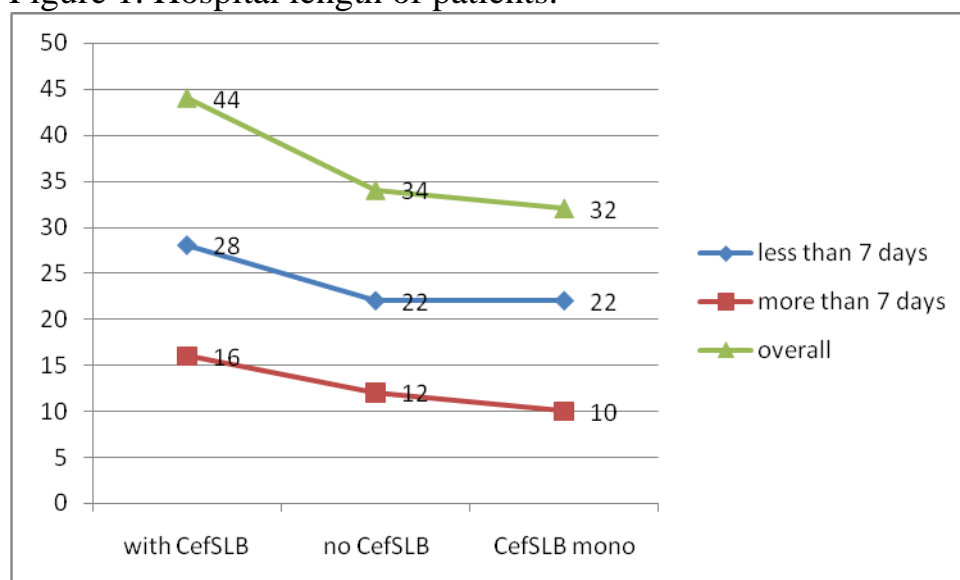
Results: We had 66 patients under 3 years old. The mean age was 0.87 years. We collected laboratory results (Hb level, glucose value, protein and Ca levels), and mean hospital stay was 7.58 days with maximum range 20 days. Effective response on treatment in control group (CefSLB group) was appointed 68.7% while it was calculated in placebo group (no CefSLB group) 64.7%. We also calculated hospital days of these group patients. Mean length of control group in

hospital was 6.59 days where it was equal to 8.55 days in placebo group (p value <0.001).

Tab. 1 Main parameters of both group patients.

	N	Minimum	Maximum	Mean	Std. Deviation
hospital days	65	3	20	7.58	3.508
Hb level g/l	64	68	100	79.78	7.038
glucose mmol/l	47	2	13	5.14	2.257
protein g/l	64	32	73	50.75	9.189
Ca mmol/l	64	.7	2.4	1.516	.2212
age in years	65	.1	3.0	.870	.9222

Figure 1. Hospital length of patients.



Tab 2. Mean comparison of hospital days of two groups.

	CefSLB use	N	Mean	Std. Deviation	Std. Error Mean	P value
hospital days	with CefSLB	32	6.59	1.434	.253	<0.001
	no CefSLB	33	8.55	4.549	.792	<0.001

Conclusion. Ceftriaxon sulbactam monotherapy has showed more efficacy than random antibiotic treatment and it decreased hospital stay although. It may be helpful for reducing mortality and morbidity of Community-acquired pneumonia among children under 3 years old.

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