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Clinical Features and Risk Factors of Community Pneumonia in Children

Artemona Yzeiri[1], Enkelejda Shkurt[2], Diamant Shtiza[2]

[1]Regional Fier Hospital, Albania

[2]University of Medicine, Tirana, Albania

Abstract: ***Introduction: Community pneumonia is a common and potentially serious disease with significant morbidity. Purpose: To assess the epidemiological and clinical characteristics of hospitalized children with community-acquired pneumonia. Material and methods: This is a prospective study conducted at the Durres Regional Hospital during the period 2010-2015 that includes 87 children aged 0-14 years presented in the Emergency Department of the hospital and who were hospitalized with the diagnosis of acquired pneumonia in the community. Sociodemographic, epidemiological, clinical and vaccination data was collected through a file. To assess the risk factors for pneumonia, children are compared with a control group adjusted for gender, age, economic status, and place of residence. Results: The average age of children is 5.9 (± 5.3) years ranging from 6 months to 13 years. 57% of children are male and 42.5% female. The clinical form of pneumonia is mild in 33.3% of cases, moderate in 48.3% and severe in 18.4% of them. Regarding the clinical signs by age group, a significant difference is found for diarrhea (p = 0.03) and dyspnea (p = 0.02) which prevail in the age group <2 years in respectively 53.8% and 61.5% of cases of this age group. Risk factors for pneumonia are found: maternal age 25–34 years (OR = 1.7 p = 0.03), maternal employment in the administration (OR = 1.9 p = 0.04), diarrhea in the last 2 weeks (OR = 1.6 p = 0.02), passive smoking in the family (OR = 2.1 p = 0.01), no. of family members> 3 (OR = 1.6 p = 0.03, Other children in the family (OR = 3.1 p = 0.02) and school attendance (OR = 1.8 p = 0.04). Conclusion: The diagnosis of pneumonia should be considered in infants and children with respiratory symptoms, particularly cough, tachypnea, withdrawal, and abnormal pulmonary examination. Diagnosis can also be made on the basis of the clinic in children with fever and evidence of an infectious process with respiratory detres.***

Keywords: pneumonia, child community, risk factors

1.Clinical Features

Clinical and risk factors of pneumonia (CAP) is a common and potentially serious disease with considerable morbidity.

The clinical presentation of pneumonia depends on the responsible pathogen agent. Host individual characteristics and the severity of the disease. Symptoms are non-specific; any single sign is not pathognomonic for pneumonia in children. [1].

Signs and symptoms of pneumonia are very sharp, especially in neonates and children. The combination of cough and temperature is a suggestion of pneumonia; other respiratory signs (tachypnea, augmentation of respiratory work) may precede the presentation of cough, which may be the first symptom due to the low number of the receptors of cough in the alveoli.

It starts when the infection products irritate the cough receptors in respiratory ways. The more persists the temperature, cough and respiratory signs the more probable are the pneumonia appearance [2].

Neonates may present difficly during feeding, nervousness, and irritation and rarely cough or respiratory pathologica rumors. [3]. On the other hand children may complain pleural pain (inspiration pain), but this is not a common finding. [1].

In several cases the main sign can be the abdominal pain (caused by the pain that is spread from the bottom lobes of the lungs) or the nuchal rigidity (pain referred from upper lobes of the lungs).

In a multicentric study where 2358 children were involved, < 18 years old, hospitalized, with radiological signs for pneumonia: 95% had cough, 90% had temperature, 75% anorexia, 70% dyspnea and 55% retraction of the thoracic walls [4].

Clinical evaluation

The assessment of the child with cough when there is doubt for pathologies of the bottom respiratory tract, should have three objectives: identification of the clinical syndrome (pneumonia, bronchiolitis, asthma), to judge the probable etiological agent and the severity of the disease [3].

The overall status: In neonates, the assessment of the general status includes the ability to cooperate with the environment, to be fed, and to pronounce words. The conscience status and the cyanosis should be evaluated in all children; however the child may be hypoxemic with no cyanosis. The majority of children with confirmed pneumonia appear in a radiological manner very ill [5].

Risk factors

The lower socio-economic categories have a higher prevalence of the infections of the bottom respiratory ways that is related to the dimensions of the family, as a mirror of the environmental accumulation. The school-aged children often bring viral respiratory agents in the family, resulting in secondary infections of their siblings and parents [6].

Some pre-existing cardio-pulmonary disorders and some other pathological situations may predispose the

pneumonia installation and influence its severity. [7, 8]:

- Heart congenital disease
- Bronco-pulmonary displasia
- Cystic fibrosis
- Asthma
- Drepanocitosis
- Neuro-muscular diseases especially the ones related to the conscience damage.
- Some gastro-intestinal disorders (as: gastro-esophageal reflux)

Smoking influences the natural protective mechanisms of the lung, damaging the mucho-cellar function and the macrophage activity [9]. Smoking exposure, especially if the mother is a smoker increases the risk for pneumonia in neonates.

Smoking, alcohol and substance use in adolescents may increase the risk of pneumonia, raising the aspiration risk through provoking cough and epiglotic reflexes. On the other hand, the alcohol use is associated with the augmentation of the colonization of oropharynx with gram-negative bacils.

2.Methodology

The aim of this study was to evaluate the epidemiological, clinical and risk factos of community-acquired pneumonia in hospitalized children.

Objectives

Assessment of characteristics at birth of the neonates the examinations held before hospitalization:

- Clinical characteristics for the total of patients and according to age group
- Assessment of the medial history and vaccination

Defining the risk factors for community-acquired pneumonia.

This s a prospective study performed in the Regional Durres hospital during 2010-2015. The study sample included 87 children, aged 0-14 years old, presented in the Emergency department with the diagnosis of community-acquired pneumonia.

3.Results

Table 1: Clinical features of the total of study participants

Variables	N	%
Ckinical form		
Light	29	33.3
Average	42	48.3
Severe	16	18.4
Signs and Symptoms		0
Duration > 3days	33	37.9
Temperature ≥ 38˚C	52	59.8
Cough	76	87.4
Rhinorrhea	63	72.4
Vomiting	21	24.1
Anorexia	62	71.3
Body weakness	76	87.4
Thoracal pain	31	35.6
Headache	45	51.7
Abdominal pain	29	33.3
Diarrhea	23	26.4
Pulse frequency	136.7±31.2	
Respiratory frequency	38.3±7.2	
Takchipnea	73	83.9
Dispnea	26	29.9
Thoracal retraction	18	20.7
O2 Saturation ≤92%	22	25.3
Pulmonary examination		0
Rale	19	21.8
Pleural effusion	22	25.3
Wheezing	21	24.1
Reduction of sounds	12	13.8
Normal	13	14.9
Ecographic examination		0
Consolidation	36	41.4
Infiltration	41	47.1
No findings	9	10.3
Complications	8	9.2
Hospitalalization days of stay	7.4	Jan-14
Seric markers	±3.1	
CRP (mg/L)	135.2±115.6	
WBC (103)	17.6±7.5	
ESR (mm/h)	68.6±31.4	

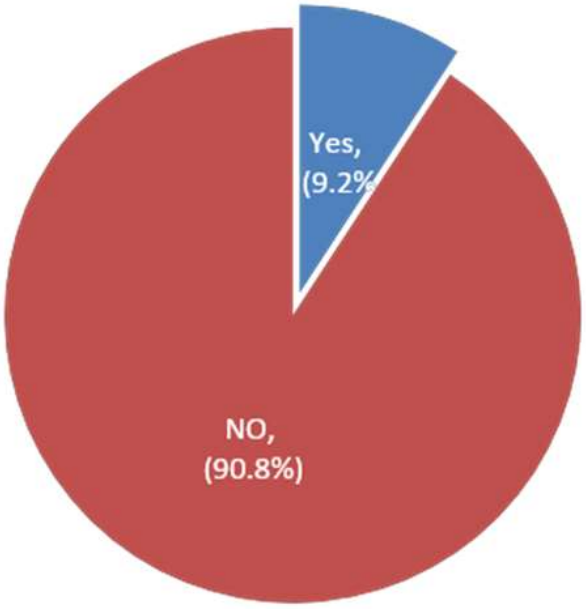

Figure: Complications frequency Complications were found in 9.2% of the children

According to the signs and symptoms the their vomiting 24.1%, anorexia71.3%, corporal weakness 87.4%, thoracal pain 35.6%, headache 51.7%, abdominal pain33.3%, diarrhea in 26.4%. Average frequency of the pulse rate /min was 136.7±31.2 per min; meanwhile the respiration frequency was 38.3±7.2 per min. Tachipnea was observed in 83.9% of the cases, dispnea 29.9%, thoracal retraction 20.7% and saturation O2 ≤92% 25.3% of the cases.

In the pulmonary examination were found rales (21.8%), pleural friction (25.3%), wheezing (24.1%), reductions of pleural rumors (13.8%) normal in 14.9% of the cases.

In the radiographic examination were observed consolidation (41.4%), infiltration (47.1%) while without findings (10.3%).

Average hospitalization days was 7.4 (±3.1) days that varied 1-14 days.

Average values of non-specific seric markers were: CRP (mg/L) 135.2±115.6, WBC (103) 17.6±7.5 and ESR (mm/h) 68.6±31.4.

Table 3: Risk factors for Community-Acquired pneumonia, Multivariate Logistic regression

Variables	**OR**	**95% CI**	P
Mother's age			
18-24	Ref		
25-34	1.7	1.1 - 3.34	**0.03**
≥35	1.3	0.7-5.14	
Mother's profession			
Household	Ref		
Employee	2.4	1.2 - 3.9	**0.03**
Administration	1.9	1.1- 4.6	**0.04**
Diarrhe in two recent weeks			
No	Ref		
Yes	1.6	1.09-5.8	**0.02**
IRP in two recent weeks			
No	Ref		
Yes	1.3	0.8 - 3.3	0.2
Asthma family history			
No	Ref		
Yes	1.6	0.87 - 4.21	0.3
Passive family smoking			
No	Ref		
Yes	2.1	1.2 - 4.5	**0.01**
Economic level			
Low	Ref		
Average	1.5	0.77 - 3.22	0.4
High	1.2	0.64 - 4.1	0.6
Settlement			
Urban	Ref		
Rural	1.2	0.84 - 2.68	0.1
Nr of family members			
≤3	Ref		
>3	1.6	1.1 - 5.5	**0.03**
Other siblings			
No	Ref		
yes	3.1	1.5 - 7.3	**0.02**
Attendance			
Nest	Ref		
Kindergarten	1.3	0.81 - 3.2	0.7
At home	0.8	0.4 - 1.8	0.5
School	1.8	1.2 - 3.6	**0.04**

Using the multivariate logistic regression that controls for the probable confounders and the significant independent factors for community pneumonia was resulted as mentioned below:

The average age of mother: 25-34 years old (p=0.03)

Mother's profession: employee (p=0.03) in administration (p=0.04) Diarrhea in recent two weeks: (p=0.02)

Passive family smoking (p=0.01) Number of family members >3 (p=0.03) Other siblings (p=0.02)

School attendance (p=0.04).

4.Discussion

Important physical findings include temperature, tachypnea, cyanosis, nasal congestion, parenchymal consolidation, egophonia ect.

Tachypnea has to be the most significant sign of community-acquired pneumonia. According to WHO tachypnea is defined as 50 breathing/min in infants 2 months old-12 months, 40 breathings/min in 1-5 years old children and 20 breathings/min in children ≥ 5 years old) in the presence of cough as a diagnostic criteria of pneumonia in developing countries where the access to thoracal radiography is limited. Is should be emphasized that the respiratory frequency may increase to 10 breathings/min per one grade Celsius in the body temperature. In a recent study with 128 children with community-acquired pneumonia were found that only three physical symptoms as: respiratory frequency, the retraction and the wheezing had acceptable levels of the confidence interval. High temperature (> 38, 5ºC), tremors and exacerbations, the toxic appearance, highlighted tachypnea and the localized auscultative findings are more similar to the bacterial pneumonia.

On the other hand, second grade fever, general well-being, runny nose, mialgy, wheezing and the diffuse bilateral auscultative findings show the viral pneumonia.

Even pneumonia is an infection of the respiratory ways, 24% of our patients did not report that had cough and 11% were presented with this disease without having any respirator sign. All these patients without respiratory symptoms had fever, half of them were lethargic, one third of them had headache and vomiting. These results comply with our study where only 55% of the patients with bacterial pneumonia had cough, 49% had nasal symptoms and 11% dyspnea [6].

5.Conclusions

Signs and symptoms of community-acquired pneumonia are non-specific (CAP); no single sign is pathognomic for pneumonia in children. The association of cough and temperature suggest for pneumonia, but the beginning can be very sharp and delicate and sometimes disorienting (as: abdominal pain or the nuchal rigidity).

Data on physical examination that correlate with imaging diagnosis of pneumonia include takypnea, increase of respiratory work (retraction, convulsions of the nostrils, whimper, usage of additional muscles) hypoxemia and pulmonary pathological rumors. Coexistence of several findings (like: temperature, cough, tachypnea) is more predictable compared to the single findings. Lack of tachypnea is useful to exclude pneumonia.

CAP complications in children include pleural effusion and empyema, necrotic pneumonia, pulmonary abces, pneumatocela and hyponatremia.

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