Med. J. Cairo Univ., Vol. 92, No. 3, Accepted 31/3/2024
DOI: 10.22608/MJCU. 729-737, September 2024
www.medicaljournalofcairouniversity.net

Complicated Pneumonia in Children: A Single Centre Experience

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Abstract

Background: Despite advances in health care and the availability of an anti-pneumococcal vaccine, community-acquired pneumonia (CAP) remains a primary cause of morbidity in children. Complicated pneumonia is a major cause of extended hospitalization. Finding risk factors for complex pneumonia can assist adapt treatment.

Aim of Study: This study aimed to describe children hospitalized with community-acquired pneumonia complicated by parapneumonic effusion (PPE), pleural empyema (PE), necrotizing pneumonia, lung abscess, pneumothorax, and hydropneumothorax.

Patients and Methods: 70 children with complicated pneumonia were included from December 2022 to July 2023, documented with chest X-ray, chest computed tomography (CT), or ultrasound, without other comorbidities. The organisms detected by cultures and polymerase chain reaction (PCR) and their antibiotic sensitivity were collected. Their demographic data, laboratory findings, and their length of hospital stay and outcomes were statistically analyzed.

Results: It was observed that pleuraleffusion and necrotizing pneumonia were the commonest complications. PCR was better than cultures in detecting the causative organisms. Streptococcus pneumonia, Klebsiella pneumonia, and Haemophilus influenza were the most causative bacterial organisms detected by PCR, and parainfluenza virus, adenovirus and rhinovirus were the commonest viral co-infections. 60% of patients were admitted to the Pediatric Intensive Care Unit (PICU) with a prolonged duration of overall admission median (IQR) of 20 days (range: 7-55 days). The overall outcome was a complete improvement.

Conclusion: Complicated pneumonia was associated with a prolonged duration of admission and a high rate of PICU admission. PCR was the best and facilitated early detection of the causative organism which contributes to better antibiotic choice and management of the patients.

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Key Words: *Complicated pneumonia – Pleural effusion – Necrotizing pneumonia – PCR.*

Introduction

COMMUNITY-ACQUIRED pneumonia (CAP) is the leading cause of morbidity and mortality in children aged 28 days to 5 years. Although most children with CAP recover, some experience local (pulmonary) or systemic problems **[1].**

Complicated community-acquired pneumonia (CCAP) is distinguished by severe sickness, extensive hospitalization, and a lengthy disease course; nonetheless, most patients recover completely **[2].**

CCAP can have local or systemic complications, with local complications including one or more parapneumonic effusions, empyema, necrotizing pneumonia, and lung abscesses **[3].**

Systemic consequences include sepsis and septic shock, metastatic infection, multiorgan failure, acute respiratory distress syndrome, disseminated intravascular coagulation, and death **[2].**

Abbreviations:

ALT : Alanine aminotransferase.
AST : Aspartate aminotransferase.
CAP : Community-acquired pneumonia.
CCAP : Complicated community-acquired pneumonia.
CRP : C-reactive protein.
CT : Computed tomography.
CXR : Chest X-ray.
LDH : Lactate dehydrogenase.
PICU : Pediatric intensive care unit.
TLC : Total leukocytic count.

In developed countries, a decrease in pneumococcal disease was widely observed after the introduction of the seven-valent pneumococcal vaccine (PCV7) **[4]**; however, some observed an increase in children with CAP complicated by effusion/empyema (cCAP) during this period **[5],** which may have been triggered by the H1N1 influenza pandemic.

Later, the 13-valent pneumococcal vaccination (PCV13) was released, which led to a decrease in pediatric CCAP in some jurisdictions **[6]**, but not in others **[7]**. In this context, we aim to describe children hospitalized with community-acquired pneumonia complicated who were previously completely healthy.

Patients and Methods

This is a prospective, single-center, cohort study, conducted on 70 pediatric patients complaining of complicated pneumoniae.g. lung abscess, pleural effusion, empyema, necrotizing pneumonia from the Ches unit and Emergency Department of Children's Hospital, Ain Shams University, Cairo, Egypt from December 2022 to July 2023. The study got ethical approval (number FMASU MS 801/2022) from the Research Ethics Committee at Ain Shams University, Faculty of Medicine. A written informed consent was obtained from each participant's parents or legal guardian before the start. Children were excluded if they had any of the following: cystic fibrosis, chronic lung disease, tracheostomy, congenital heart disease, history of repeated aspiration or velopharyngeal incompetence, malignancy, conditions requiring treatment with immune suppressants, primary immunodeficiency, advanced Human Immunodeficiency Virus (HIV) infection, chronic renal dysfunction, chronic hepatic dysfunction.A thorough medical history of each participant was obtained, including the clinical symptoms, duration of hospital admission, pediatric intensive care unit (PICU) admission, and outcome (resolved, residuals, surgery, or death). In addition, participants underwent physical examination, including meticulous general examination with vital signs, anthropometric measurements (weight and height) plotted on Z-score, chest auscultation, and grades of respiratory distress (RD) [tachypnea (grade 1 RD), intercostal retractions (grade 2 RD), grunting (grade 3 RD), cyanosis (grade 4 RD)].

From hospital records, data of chest X-ray (CXR) and computed tomography (CT) examinations were collected. In addition, laboratory examinations were done according to the standard methods at the Central Laboratories of Ain Shams University Hospitals, including complete blood count (CBC) with differential count analysis, arterial blood gases, C-reactive protein (CRP), liver function tests, renal function tests, microbiological culture examinations (blood, sputum, pleural effusion),polymerase chain reaction (PCR) and biochemical pleural effusion analysis [glucose, protein, lactate dehydrogenase (LDH), albumin].

Statistical analysis:

The Statistical Package for Social Sciences, version 23.0 (SPSS Inc., Chicago, Illinois, USA), was used to analyze the recorded data. When the distribution of the quantitative data was parametric (normal), it was shown as mean ± standard deviation (SD) and ranges; non-parametric (non-normally distributed) variables were shown as median with inter-quartile range (IQR). Additionally, percentages and numbers were used to represent qualitative data.

Results

The study included 70 pediatric patients with complicated pneumonia; they were admitted to the Chest unit and Emergency Department of the Children's Hospital. The median age of the study subjects was 54 months, 51.4% were males and 48.0% were females, mean birth weight was 2.93±0.31 Kg, and residency was in urban areas more than in rural areas (65.7% and 34.3% respectively). 80% of the mothers of the children were high-school educated, 71.4% of the children were breastfed and 45.7% were exposed to passive smoking (Table 1).

Table (1): Demographic data of the study group.

Personal data	(n=70)
Age (months):	
Median (IQR)	54 (30-72)
Range	8-156
Sex (N, %):	
Male	36 (51.40%)
Female	34 (48.60%)
Birth Weight (Kg):	
Mean ± SD	2.93±0.31
Range	1.8-3.5
Residency (N, %):	
Urban	46 (65.70%)
Rural	24 (34.30%)
Maternal education (N,%):	
High school	56 (80.00%)
Middle school	6 (8.60%)
Illiterate	8 (11.40%)
Feeding (N,%):	
Breastfeeding	50 (71.40%)
Artificial feeding	6 (8.60%)
Breast & artificial feeding	14 (20.00%)
Passive smoking (N,%):	
Yes	32 (45.70%)
No	38 (54.30%)

Using: One-way Analysis of Variance test was performed for Mean ± SD.

Kruskal–Wallis was performed for Median (IQR).

x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate.

Regarding symptoms and signs, 100% were complaining of fever, anorexia, and malaise, while 94.3% were complaining of cough, 22.9% abdominal pain, 17.1% chest pain, 37.1% vomiting, and 25.7% diarrhea (Table 2).

Table (2): Signs and symptoms of the study group.

Sign and symptoms	(n=70)
Fever (N,%)	70 (100.0%)
Cough (N,%)	66 (94.3%)
Anorexia (N,%)	70 (100.0%)
Malaise (N,%)	70 (100.0%)
Abdominal pain (N,%)	16 (22.9%)
Chest pain (N,%)	12 (17.1%)
Vomiting (N,%)	26 (37.1%)
Diarrhea (N,%)	18 (25.7%)

x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate.

Regarding examination, the mean O2 saturation at room air was 91.26±4.45%; the mean respiratory rate was 50.46±13.39 breath/min, the mean heart rate was 134.51±20.91 beats/min, the mean temperature was 38.75±0.67˚C. (Table 3).

Table (3): Examination in the study group.

Examination	(n=70)
O2 Saturation% in room air:	
Mean ± SD	91.26±4.45
Range	80-99
Respiratory rate (cycle/min.):	
Mean ± SD	50.46±13.39
Range	24-96
Heart rate (beat/min.):	
Mean ± SD	134.51±20.91
Range	100-180
Tachycardia	42 (60.00%)
Normal heart rate	28 (40.00%)
Temperature (° Celsius):	
Mean ± SD	38.75±0.67
Range	37.5-40
Signs of Respiratory distress:	
Tachypnea	70 (100.00%)
Retractions	70 (100.00%)
Grunting	54 (77.10%)
Cyanosis	12 (17.10%)

Using: One-way Analysis of Variance test was performed for Mean±SD.
x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate.

Regarding anthropometric measures 50% were normal weight, 5.7% were overweight and 22.9% were underweight. Regarding height 51.4% were normal and 48.6% were stunted (Table 4).

Table (4): Anthropometric measures in the study group.

Examination	(n=70)
Weight (kg):	
Median (IQR)	16 (12-21)
Range	9.5-50
Z-score weight for age:	
Median (IQR)	-0.51 (-0.97-0.11)
Range	-3.65-1.9
Normal weight	50 (71.40%)
Overweight	4 (5.70%)
Underweight	16 (22.90%)
Height (cm):	
Mean ± SD	101.31±23.90
Range	70-159
Z-score height for age:	
Median (IQR)	-1.09 (-2.03-0.27)
Range	-4.35-0.5
Normal height	36 (51.40%)
Stunted	34 (48.60%)

Using: One-way Analysis of Variance test was performed for Mean±SD.
Kruskal–Wallis was performed for Median (IQR).
x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate.

Among the studied children, 32 cases had pleural effusion only, 2 cases had lung abscess, 2 cases had pleural effusion with lung abscess, 14 cases had pleural effusion with necrotizing pneumonia, 12 cases had hydropneumothorax with necrotizing pneumonia, 6 cases had pneumothorax with necrotizing pneumonia and 2 cases had hydropneumothorax.

The organisms detected by blood, sputum, and pleural fluid bacterial cultures are demonstrated in (Table 5). PCR results revealed the organisms in 64 (91.4%) patients, only 6 (8.6%) patients had negative results of PCR. Polyinfections were common in the studied children (54.3%), while mono-infection was (40%) 5.7% of the samples were negative in both bacterial cultures and PCR so we cannot determine the causative organism nor differentiate poly and mono-infection (Table 6).

Table (5): Cultures results among the studied patients of complicated pneumonia.

Cultures	(n=70)
Blood culture:	
No growth	52 (74.30%)
Acinetobacter spp.	4 (5.70%)
Staphylococcus coagulase negative	4 (5.70%)
Enterococci	2 (2.90%)
Klebsiella pneumonia	2 (2.90%)
Staphylococcus hominis	2 (2.90%)
Staphylococcus heamolyticus	2 (2.90%)
Streptococcus pneumonia	2 (2.90%)
Sputum culture:	
No growth	54 (77.10%)
Klebsiella pneumonia	6 (8.60%)
E.coli	4 (5.70%)
Candida albicans	2 (2.90%)
Acinetobacter spp. (MDR)	2 (2.90%)
Pseudomonas aerogenosa	2 (2.90%)
Pleural fluid culture:	
No growth	48 (88.90%)
Pseudomonas & klebsiella (MDR)	2 (3.70%)
Streptococcus Viridans	2 (3.70%)
Streptococcus Pneumonia	2 (3.70%)

*MDR: Multidrug resistance.

Table (6): Respiratory panel PCR distribution among the studied children of complicated pneumonia.

PCR	(n=70)
Streptococcus pneumonia	32 (45.70%)
Parainfluenza virus	12(17.10%)
Klebsiella pneumonia	10 (14.30%)
Haemophilus influenza	10 (14.30%)
Adenovirus	10 (14.30%)
Rhinovirus	10 (14.30%)
Acinetobacter	4 (5.70%)
Influenza B	4 (5.70%)
Enterovirus	4 (5.70%)
Pseudomonas aerogenosa	2 (2.90%)
Staphylococcus aureus	2 (2.90%)
Moraxella catarrhalis	2 (2.90%)
RSV	2 (2.90%)
Human Boca virus	2 (2.90%)
Negative	6 (8.60%)

*RSV: Respiratory syncytial virus.
*PCR: Polymerase chain reaction.

Regarding the management of illness, 60% of the patients were admitted to PICU, 77.1% of them were on nasal prong, 11.4% on high flow nasal cannula, 2.9% on CPAP, and 8.6% did not need support. Regarding the outcome 85.7% were completely improved, 11.4% had residual pleural thickening for follow-up and 2.9% had undergone surgery. The duration of admission was long with a median (IQR) of 20 days (ranging from 7-55 days) (Table 7). According to laboratory results, 80% of patients were anemic, mean ± SD 10.05±1.64, and 20% were normal hemoglobin levels. 71.4% had hypoalbuminemia, CRP was high with a median (IQR) 167 (97-332.7) mg/dl. (Table 8).

Table (7): The management of children with complicated pneumonia.

	(n=70)
PICU (N,%):	
Yes	42 (60.00%)
No	28 (40.00%)
Ventilation Support (N,%):	
Nasal prong	54 (77.10%)
High-flow nasal cannula	8 (11.40%)
CPAP	2 (2.90%)
Mechanical ventilation	0 (0.00%)
Non	6 (8.60%)
Outcome (N,%):	
Improved	60 (85.70%)
Residual pleural thickening for follow-up	8 (11.40%)
Surgery	2 (2.90%)
Died	0 (0.00%)
Duration of admission "days":	
Median (IQR)	20 (15-26)
Range	7-55

Using: U=Mann-Whitney test for Non-parametric data "Median (IQR)".

x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate.

Table (8): Laboratory results of children with complicated pneumonia.

Hemoglobin (g/dl):	
Mean ± SD	10.05±1.64
Range	6.9-15.2
Anemia	56 (80.00%)
Normal hemoglobin	15 (20.00%)
Total Leukocytic Count (x10^3UL):	
Median (IQR)	15 (8.8-19.4)
Range	3-53.3
Neutrophils (x10^3UL):	
Median (IQR)	9 (5.4-13.4)
Range	1.6-48.6
Normal neutrophilic count	32 (45.70%)
Neutrophilia	38 (54.30%)
Lymphocytes (x10^3UL):	
Median (IQR)	3 (1.8-5.2)
Range	0.7-22
Normal lymphocytic count	34 (48.60%)
Lymphopenia	32 (45.70%)
Lymphocytosis	4 (5.70%)
Platelets (x10^UL):	
Median (IQR)	355 (245-548)
Range	85-1171
AST (U/L):	
Median (IQR)	26 (19-39)
Range	12-148
ALT (U/L):	
Median (IQR)	15 (9-27)
Range	5-168
Total serum proteins (g/dl):	
Mean ± SD	6.49±0.81
Range	4.9-8
Serum Albumin (g/dl):	
Mean ± SD	3.14±0.51
Range	2.5-5.2
Normal serum albumin	20 (28.60%)
Low serum albumin	50 (71.40%)
CRP (mg/dl):	
Median (IQR)	167 (97-332.7)

Using: U=Mann-Whitney test for Non-parametric data "Median (IQR)".
t-Independent Sample *t*-test for Mean ± SD.
x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate.

Discussion

Regarding factors that contribute to the development of severe disease, we found that younger age median (IQR) 54 (30-72) months, male sex (51.4%), residency in urban areas (65.7%) (may be due to air pollution), passive smoking (45.7%) are associated with the development of severe complications. Another study by Sonego M et al.. discovered that childhood pneumonia and clinically severe illness are caused by a complex combination of host and environmental risk factors. Infancy, lack of immunization, malnutrition, low maternal education, low socioeconomic position, and smoke exposure/ indoor air pollution are risk factors for the development of community-acquired pneumonia ***[8]***.

Sixty percent of our patients were admitted to PICUand the median (IQR) duration of their hospital admission was 20 (15-26)] days. Another single-center study by Alemayheu et al., found that young children were often hospitalized for prolonged periods at a Canadian Children's Hospital because of CAP complicated by effusion/empyema during 2015–2019 ***[9]***.

Regarding anthropometric measures, we found that 22.9% were underweight and 48.6% were stunted. Lin et al., found that low anthropometric z scores were associated with more complications and prolonged length of hospital stay in children with severe pneumonia ***[10]***. Another study discovered that the most important risk factors for complicated pneumonia were malnutrition, household air pollution, ambient particulate matter, and inadequate breastfeeding ***[11]***.

Regarding the symptoms, the association between anorexia and the high prevalence of complicated pneumonia in pediatric patients was not explored previously well although we found that all our patients had anorexia ***[12]***. Previously, Kirovski et al., found that acute abdominal pain was present in 8.5% of children with pneumonia, and prompt diagnosis through chest radiography was crucial to avoid unnecessary surgical intervention ***[13]***. Also, Koochak et al.presented a case report of an adult patient who initially presented with abdominal pain and was later diagnosed with pneumonia ***[14]***.

The World Health Organization (WHO) defines pneumonia as cough, difficulty breathing, tachypnea, or chest indrawing and may be treated as outpatients. While, children with these symptoms and an associated "general danger sign," such as dehydration, are considered to have "severe pneumonia" and hospitalization is recommended ***[15]***. The signs of respiratory distress in children are a critical part of the evaluation. Signs of respiratory distress in children include age-specific tachypnea, dyspnea, chest indrawing or retractions, grunting, nasal flaring, apnea, altered mental status, or sustained hypoxemia (oxygen saturation less than 90%in room air) ***[16]***. Shah et al., reported that hypoxemia (less than 96%) and increased work of breathing increased likelihood ratios for radiographic pneumonia (LR, 2.8 [95% CI, 2.1–3.6] and LR, 2.1 [95% CI, 1.6–2.7], respectively), while normal oxygen saturation (>96%) was a negative predictor for pneumonia (LR 0.47 [95% CI, 0.32–0.67]) ***[17]***.

In our study, it was observed that pleural effusion and necrotizing pneumonia were the commonest complications. Among the 70 cases of complicated pneumonia, 32 cases with pleural effusion, 20 cases (63%) were injected with tissue plasminogen activator (Alteplase), and 4 cases only (20%) developed complications (pneumothorax) after alteplase injection.

Regarding pleural fluid analysis, LDH is a marker of inflammation or cellular injury, so is a sensitive, but non-specific pathological marker *[18]*. LDH levels greater than three times the upper limit of normal (often >1,000U/L) are often indicative of pleural infection *[19]*.

Regarding cultures 74.3% of blood cultures didn't result in any growth, also 77.1% and 88.9% of sputum cultures and pleural effusion cultures respectively didn't show growth, this may be due to the empirical use of antibiotics before culture collection. Regarding PCR results 91.4% showed positive results and 8.6% negative results which means that PCR is a better diagnostic tool that helps early detection of organisms. Pneumonia, with or without complications, is rarely associated with bacteremia *[20]*. In a retrospective research by Erlichman et al. on 144 children with complicated CAP in Jerusalem, past antibiotic usage lowered the proportion of positive cultures from 63% to 22% *[23]*. Another retrospective study by Stankey et al., on 369 children with empyema in North America found that previous antibiotic usage lowered the proportion of positive cultures from 67% to 30% *[24]*. Molecular diagnostic methods, which rely on DNA amplification and gene identification, have made significant advances in the diagnosis of respiratory infections *[25]*. PCR also has the benefit of producing results and serotyping within a few hours *[26]*. The inability to separate colonizing organisms from pathogenic organisms limits the use of several specimens, including induced sputum, nasopharyngeal samples, and oropharyngeal samples *[27]*.

The sputum induction test is not an effective diagnostic tool for childhood CAP *[28]*. The Paediatric Infectious Diseases Society and the Infectious Disease Society of America recommend flexible bronchoscopy with bronchoalveolar lavage for patients with CCAP who do not have a microbiological diagnosis on initial testing or are not responding to treatment *[29]*. However, pathogenic yield is extremely low in a child with intact immunity *[30]*, and this technology is not widely available in many centers, particularly in low- and middle-income countries.

In our study, the most common bacterial organism organisms were Streptococcus pneumonia, Klebsiella pneumonia, Haemophilus influenza and Acinetobacter, and less common Pseudomonas aerogenosa, Staphylococcus aureus and Moraxella catarrhalis. The most common viral infection was Parainfluenza virus, Adenovirus, Rhinovirus, Flu B, Enterovirus, and less common RSV and Human Boca virus. Poly-infections accounted for 54.3% and mono-infections were 40% and 5.7% were unknown as cultures and PCR results were negative. Tran Quang et al., discovered that the positive RT-PCR rate was 90.5%. Viral and bacterial co-infection was the most common (43.1%), followed by bacterial co-infection (33.7%), viral infection (7.4%), bacterial infection (6.3%), and the remaining 9.5% was unclear. The five predominant bacteria species discovered by PCR in the co-infection groups were Streptococcus pneumoniae, Haemophilus influenzae, MRSA, Moraxella catarrhalis, and Mycoplasma pneumoniae *[31]*.

Regarding the outcome 85.7% were completely improved, 11.4% had residual pleural thickening for follow-up, and 2.9% had undergone surgery and had no mortalities. Erlichman et al. (2017) reported that almost all previously healthy children with CCAP recover entirely, and chest radiographs and CT scans return to normal or improve significantly within 6-9 months after discharge *[23]*. Another study by Tsai and Ku found that in comparison to adults, children have a low death rate from complicated CAP (<0.5%) *[32]*.

In our study we found that 80% of patients were anemic, mean ± SD 10.05±1.64g/dl. Chen et al.discovered that anemia is a biomarker associated with poor outcomes in CAP in children, and patients with iron deficiency anemia (IDA) or normocytic anemia should be closely monitored and handled since they may have a greater illness severity. IDA and normocytic anemia were linked to these negative consequences *[33]*. Conversely, Sukarno et al., recently did not find a correlation between hemoglobin levels and severe pneumonia in children *[34]*. Lastly, Chen et al., found that anemic COVID-19 patients had a higher likelihood of developing severe pneumonia *[33]*.

In the current study, we found that hypoalbuminemia is a common association in 71.4% of patients with complicated community-acquired pneumonia. This percentage points to severe inflammation and potential liver dysfunction, indicating a more intense inflammatory response in complicated pneumonia. Monitoring and addressing hypoalbuminemia are vital, impacting fluid balance and immune function, necessitating targeted nutritional and medical interventions. This finding was aligned with the Prais et al., study, which found that significant hypoalbuminemia is common in children with parapneumonic pleural effusion *[35]*. Large effusions are associated with low serum albumin levels, which might be explained in part by a shift from blood to pleural fluid. Other studies by Washio et al., and Matsuo et al., found that hypoalbuminemia is associated with the acquisition and severity of com-

munity-acquired pneumonia ***[36,37]***. Also, Viasus et al., 2013, found thatsignificantly decreased albumin levels are associated with increased time to clinical stability, prolonged hospital stay, admission to the ICU, mechanical ventilation, and 30-day mortality ***[38]***.

Elevated CRP (median: 167mg/dl) reflects an intense inflammatory response, indicating a severe acute phase reaction. Monitoring CRP is vital for treatment response evaluation and guiding therapeutic interventions' duration and intensity. CRP is an acute-phase protein, and it is associated with the severity of pneumonia. For instance, Korppifound that higher serum CRP levels were associated with a complicated course in children's pneumonia ***[39]***.

Acknowledgments:

We thank all guardians of children who participated in the study and supported the project.

Declarations:

Funding:

This project was not supported financially.

Ethics declarations:

Before conducting the study, the ethical approval of the Research Ethics Committee, Faculty of Medicine, Ain Shams University was obtained (FMASU MS 801 / 2022). A written informed consent was taken from the legal guardians of the children. All patients' data were kept confidential and parents/legal guardians had the right to keep them. All patients' parents had the right to withdraw from the study at any time without affecting their course of treatment.

Consent for publication: Not applicable.

Competing interests: The authors do not have any competing interests to disclose.

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مضاعفات الالتهاب الرئوى فى الاطفال : خبرة مركز واحد

بالرغم من التطورات فى العناية الصحية وتوافر تطعيم ضد الالتهاب الرئوى يعد الالتهاب الرئوى المكتسب من المجتمع احد الاسباب الاولية للوفيات فى الاطفال. تعد مضاعفات الالتهاب الرئوى احد اهم الاسباب المؤدية لطول مدة الاقامة بالمشفى. ايجاد الاسباب المؤدية الى المضاعفات فى الالتهاب الرئوى يساعد فى تحديد العلاج المناسب لحالة المريض. فى هذا البحث نهدف الى وصف الاطفال المقيمين بالمشفى المصابين بمضاعفات الالتهاب الرئوى والتى تتضمن : خراج الرئة، الانصباب الرئوى الجانبى، الدبيلة الجنبية، الالتهاب الرئوى الناخر، الاسترواح الصدرى، استسقاء الصدر.

الطرق: تم تضمين ٧٠ طفلا مصابين بمضاعفات الالتهاب الرئوى فى الفترة من ديسمبر ٢٠٢٢ الى يوليو ٢٠٢٣، وتم توثيق التشخيص بالاشعة السينية للصدر، التصوير المقطعى للصدر، الموجات فوق الصوتية، دون امراض مصاحبة اخرى. تم التعرف على الميكروبات المسببة للمرض عن طريق تفاعل البوليميريز المتسلسل والمزارع (دم، بصاق، السائل البلورى) و تم عمل اختبار حساسية الميكروبات للمضادات الحيوية. وقد تم تحليل بيانتهم الديموغرافية، والنتائج المختبرية، ومدة اقامتهم بالمستشفى والنتائج احصائياً.

النتائج: لوحظ ان الانصباب الجانبى والالتهاب الرئوى الناخرهما اكثر المضاعفات شيوعاً. و كان تفاعل البوليميريز المتسلسل افضل من المزارع فى الكشف عن الميكروبات المسببة للمرض. كانت المكورات العقدية الرئوية و الكلبسيللا والهيموفيلس انفلونزا البكتيريا المسببة للمرض فى معظم الحالات. والبارا انفلونزا والادينوفيروس والراينوفيروس هى اكثر انواع العدوى الفيروسية شيوعاً. تم ادخال ٦٠٪ من المرضى الى وحدة الرعاية المركزة للاطفال مع فترة اقامة كلية طويلة بالمستشفى متوسط الاقامة ٢٠ يوم (المدى :٧–٥٥ يوم). وكانت النتيجة الاجمالية تحسن كامل للحالات.

الاستنتاج: ارتبطت مضاعفات الالتهاب الرئوي بطول مدة الاقامة بالمستشفى وزيادة معدلات دخول الرعاية المركزة للاطفال. كان تفاعل البوليميريز المتسلسل هو الافضل والاسهل فى الكشف المبكرة عن الميكروبات المسببة مما يساهم فى تحسين اختيار المضادات الحيوية و علاج المرضى.