Article

PAMJ Clinical Medicine

Case report

Severe pleuropulmonary infection by *Staphylococcus aureus* in children: case report and review of the literature

Yassine Smiti, Khaoula Sibbou, Anas El Bouti, Yassine Haimere, Abdelaziz El Hadloussi, Siham El Haddad, Nazik Allali, Latifa Chat, Aziza Bentalha, Alae El Korraichi, Salma Ech-Cherif Kettani

Corresponding author: Yassine Smiti, Pediatric Care Unit, Children's Hospital in Rabat, Rabat, Morocco. yassin.smit@gmail.com

Received: 28 May 2020 - **Accepted:** 27 Jun 2020 - **Published:** 16 Jul 2020

Keywords: Pleuro-pulmonary staphylococcus, hydropneumothorax, septic chock

Cite this article: Yassine Smiti et al. Severe pleuropulmonary infection by *Staphylococcus aureus* in children: case report and review of the literature. PAMJ Clinical Medicine. 2020;3(119). 10.11604/pamj-cm.2020.3.119.23812

Available online at: https://www.clinical-medicine.panafrican-med-journal.com//content/article/3/119/full

Severe pleuropulmonary infection by *Staphylococcus aureus* in children: case report and review of the literature

Yassine Smiti[1,&], Khaoula Sibbou[2], Anas El Bouti[1], Yassine Haimere[1], Abdelaziz El Hadloussi[1], Siham El Haddad[2], Nazik Allali[2], Latifa Chat[2], Aziza Bentalha[1], Alae El Korraichi[1], Salma Ech-Cherif Kettani[1]

[1]Pediatric Care Unit, Children's Hospital in Rabat, Rabat, Morocco, [2]Mother and Child Imagery Service in Rabat, Rabat, Morocco

[&]**Corresponding author**

Yassine Smiti, Pediatric Care Unit, Children's Hospital in Rabat, Rabat, Morocco

Abstract

Staphylococcus aureus is an uncommon germ responsible of the childhood pneumonia. It has some particularities like the severity and the pathophysiological characteristics. It is frequently located in pleuropulmonary, osteoarticular or pericardial areas. Therapeutic management requires drainage of abscesses. The choice of the antibiotic is based on the antibiogram and mortality remains high. The main prognosis factors are: young age (the first months), leukopenia, thrombocytopenia and the lack of effective initial treatment. We report the case of a 13-year-old child who presented a pleuropulmonary staphylococcal infection complicated by septic shock.

Introduction

Staphylococcus aureus is not a common etiology of the pleuro-pulmonary infections in children. The etiologies are dominated by viruses, pneumococcus and mycoplasma. *Staphylococcus aureus* pneumonia in children has certain peculiarities, namely the pathophysiological characteristics [1]. The improved use of antibiotics has contributed to the decrease in cases of pleuropulmonary staphylococci (PPS). Much less in developing countries [2]. We report the case of a 13-year-old child with a respiratory distress due to a Pleuropulmonary staphylococcal infection following an acute osteomyelitis.

Patient and observation

Our patient is 13 years old, with no particular history. She had a right knee pain with fever. She was put on non-steroidal anti-inflammatory drugs and corticosteroid infiltration. The patient was admitted to intensive care the next day because of a septic shock, polypneia was at 40 cycles/minute, heart rate was at 120 bmp and blood pressure at 80/46 mmHg. The right lower limb was inflamed. A chest X-ray (Figure 1) was realized and found some left alveolar condensations with difference in transparency on the right side. Bilateral hydro pneumothorax was confirmed by a chest CT scan (Figure 2, Figure 3). The bacteriological examination of the pleural liquid found an S. aureus. An ultrasound of the lower limb showed a diffuse soft tissue inflammation, with no signs of thrombophlebitis. The PCR was at 230 with a hyper leukocytosis at 22 G/l predominantly neutrophil. There were no hydro electrolytic disorders or kidney failure. The hemoculture showed an S.aureus too. The treatment consisted on draining the hydro-pneumothorax and the administration of 30 mg/kg day of vancomycin. We put the patient on mechanic ventilation and vasoactive drugs, and a surgical drainage of the lower limb abscess was done once the patient was stabilized. During her hospitalization, the patient continued her antibiotic therapy with a transfusion of 2 red blood cells, which improved her clinical state. The patient was extubated the next day and quitted the care unit after 2 days.

Discussion

Staphylococcus aureus is not a common etiology of the pleuro-pulmonary infections in children. The etiologies are dominated by viruses, pneumococcus and mycoplasma. *Staphylococcus aureus* pneumonia in children has certain peculiarities, namely the pathophysiological characteristics [1]. During PPS, the initial prebullary lung lesions progress despite the antibiotic therapy. There is a reduction of the pulmonary hematosis, which explains the worsening of the respiratory state. The presence of bubbles, as well as the occurrence of a pneumothorax are aggravating factors prognosis. The absence of an infection during the young age explains the severity of the PPS [2]. Clinically, it is a severe bilateral pneumonia with a pneumatoceles, giving a radiological appearance of very characteristic bubbles in 85% of cases. The rupture of these bubbles gives the appearance of purulent pleurisy or pyopneumothorax, responsible of its designation “pleuropulmonary staphylococcia” [1]. Clinically, it is a rare isolated septicemic syndrome. The symptomatology depends on the different secondary locations, pleuropulmonary, osteoarticular and pericardial. These secondary locations are themselves gravity factors [3,4]. Lepercq notes that the maximum time between the first clinical signs and the appearance of radiological signs is 3 days [5]. Pediatric pleuropulmonary staphylococcal disease presents pathognomonic radiological aspects [6]. Chest X-Ray can find pure pulmonary images or associated with pleural images. The thoracic CT scan makes it possible to determine the number of bubbles or abscess and to differentiate between pneumothorax and bubble in case of doubt. Pleuropulmonary staphylococcal disease can

manifest as: [2-7]; bullous images: multiple with a generally thin wall; pleural effusion; lung abscess: multiple and bilateral excavated opacities with a regular internal limit and an external limit, not visible because it is embedded in a focus of pneumonia; pyo-pneumothorax. The therapeutic management required heavy measures as the drainage of the abscesses [1]. The choice of the antibiotic is based on the antibiogram. Vancomycin is used at the initial dosage of 20 to 30 mg/kg/a day with secondary adjustment. Vancomycinemia rates are higher than 30 mg/l, they should be avoided because of the risk of kidney and hearing toxicity, especially if an aminoglycoside is associated [8]. Mortality remains high. The main prognosis factors found in the literature are young age (especially the first months) leukopenia, thrombocytopenia and the absence of initial treatment [8].

Conclusion

Pleuropulmonary staphylococcal disease is a medical emergency. Early diagnosis and management in a hospital taking into account the antibiogram, could avoid the occurrence of visceral complications, which worsen the prognosis and require specific treatment.

Competing interests

The authors declare no competing interests.

Authors' contributions

Yassine Smiti, Khaoula Sibbou, Anas El Bouti, Yassine Haimere, Abdelaziz El Hadloussi, Siham El Haddad, Nazik Allali, Latifa Chat, Aziza Bentalha, Alae El Korraichi, Salma Ech-Cherif Kettani, contributions to conception and design, acquisition of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published.

Figures

Figure 1: frontal chest X-ray showing left alveolar condensations with difference in transparency on the right side

Figure 2: axial section of a chest CT in a parenchymal window showing multiple diffuse bilateral nodular lesions, some excavated and of peripheral location, complicated by right anterior hydropneumothorax

Figure 3: coronal section of a chest scanner in parenchymal window showing multiple parenchymal cavities with right hydropneumothorax

References

1. Gillet Y, Issartel B, Vanhems E, Lina G, Vandenesch F, Etienne J *et al*. Severe staphylococcal pneumonia in children. Arch Pediatr. 2001;8 suppl 4: 742-6. **PubMed**| **Google Scholar**
2. Tchokoteu PF. Pediatric pleuro-pulmonary staphylococcal disease. Méd Mal Infect. 1995;25: 551-4.
3. Armengaud M. Semiological varieties of staph infections. Rev Prat. 1982;32: 3135-3139.
4. Coquin Y. Staph infections. Rev Prat. 1982;32: 3202-320.
5. Lepercq G, Steinschneider R. Infant pleuropulmonary staphylococcal disease. Normal Initial Radiological Aspects Ann Pod. 1972;19(1): 3541. **PubMed**
6. Arrea C, Tristan D, Galva R. Pleuro-pulmonary complications in children with special emphasis on those with staphylococcal origin. Ann Chit Inf. 1972;13(4): 219-24. **PubMed**| **Google Scholar**
7. Mama N, Dhifallah M, Ben Aicha S, Kadri K, Arifa N, Hasni I *et al*. Computed Tomography Imaging of excavated lung lesions. Radiology Sheets. 2014;54: 69-83.

8. Martinot A, Leclerc F, Chenaud M, Pezier C, Gaudier B. Pleuro-pulmonary staphylococcal disease, therapeutic proposals for children. Medicine and Infectious Diseases. 1985;10: 533-539.

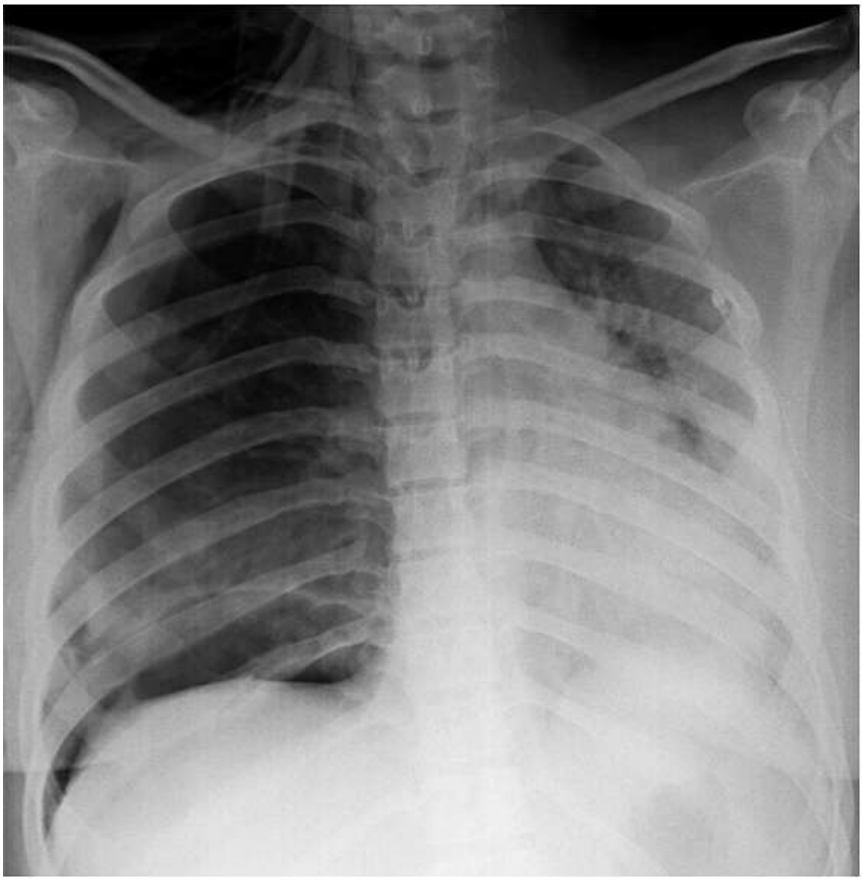

Figure 1: frontal chest X-ray showing left alveolar condensations with difference in transparency on the right side

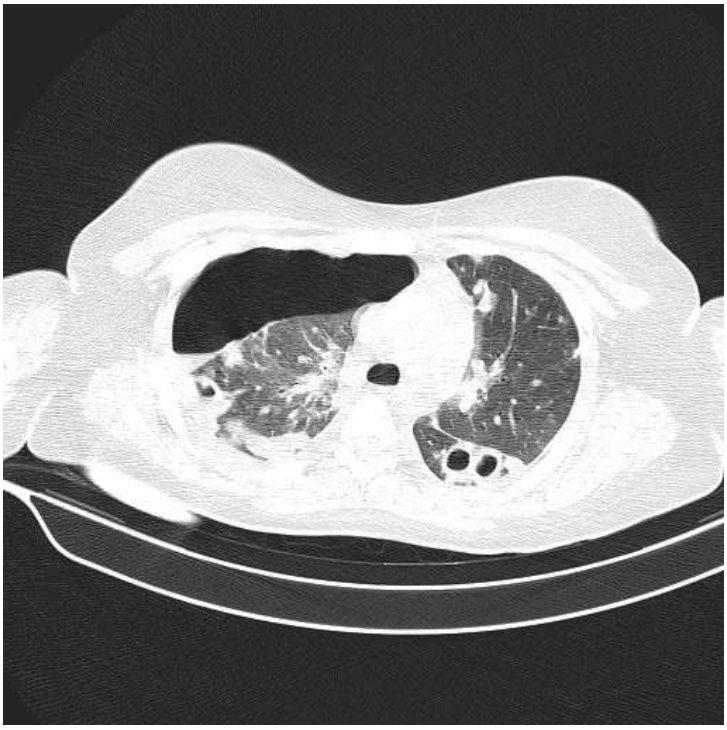

Figure 2: axial section of a chest CT in a parenchymal window showing multiple diffuse bilateral nodular lesions, some excavated and of peripheral location, complicated by right anterior hydropneumothorax

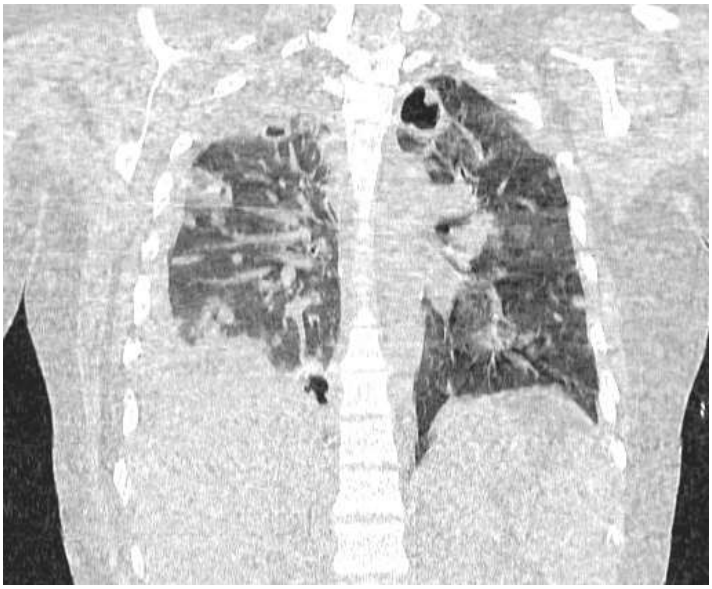

Figure 3: coronal section of a chest scanner in parenchymal window showing multiple parenchymal cavities with right hydropneumothorax