Residência RP Pediátrica
Publicação Oficial da Sociedade Brasileira de Pediatria
ISSN-Online: 2236-6814

Submitted on: 04/27/2020
Approved on: 06/14/2020

CASE REPORT

Pneumonia with empyema: rare complication after sea urchin injury

Maria Maria Mendes[1], Ana Teresa Teixeira[1], Pedro Sampaio Nunes[1], Helena Cristina Loureiro[1]

Keywords:
pneumonia, *Staphylococcal*, pleural effusion, bites and stings.

Abstract

Staphylococcal pneumonias are rare, especially in immunocompetent children. They can represent a complication of tissue infection with hematogeneous dissemination. Sea urchin injuries can result in local reactions, granulomas and, unfrequently, systemic disease. We describe the case of a 16-year-old boy with a four-day fever and left-sided chest pain, with referral to a sea urchin injury five days before admission. Physical examination revealed diminished pulmonary sounds and crackles in the left lower hemithorax. The chest radiograph showed a pleural effusion. Blood tests showed leukocytosis, neutrophilia, and an elevated C-reactive protein. Empyema was diagnosed after performing a thoracentesis. Subsequently he initiated inflammatory signs with fluctuation on his right heel, with purulent drainage. Suspecting on a staphylococcal etiology, he was treated with flucloxacillin, a suspicion that was confirmed by the isolation of *Staphylococcus aureus* in pleural liquid and abscess material. After antibiotic treatment was established, there was a favorable clinical and radiological evolution. With this case report, we would like to draw attention to the possibility of hematogenous dissemination of a microorganism after local skin infection, even in immunocompetent individuals.

[1] Hospital Professor Doutor Fernando Fonseca, EPE, Pediatria - Amadora - Lisboa - Portugal.

Correspondence to:
Maria Maria Mendes.
Hospital Professor Doutor Fernando Fonseca. IC19, 2720-276 Amadora, Portugal. E-mail: mariamariadamendes@gmail.com

Residência Pediátrica; 2022: Ahead of Print.
DOI: 10.25060/residpediatr-2022.v12n2-304

This work is licensed under a Creative Commons Attribution 4.0 International License.

INTRODUCTION

Sea urchins belong to the phylum of organisms known as echinoderms and are found exclusively in saltwater bodies worldwide[1]. Their circumferential protective spines can cause penetrative injuries leading to skin and soft tissue infections. Non-venomatous spines may cause localized pain, bleeding, erythema, edema, myalgia, aching and temporary blue black staining, whilst toxin-related injuries may cause a systemic response, manifested by paresthesias, hypotension, paralysis, and respiratory distress[1]. The main therapeutical recommendation is early removal of the spines to prevent late complications, such as infections and the formation of foreign body granulomas[2]. Skin and soft tissues infections have a broad spectrum of manifestations, which can include local mild cellulitis, necrotizing fasciitis, synovitis, and septic arthritis[3-5]. Bacteraemia can be associated with focal or systemic complications including osteomyelitis; arthritis; endocarditis; pneumonia; pleural empyema; pericarditis; soft tissue, muscle, or visceral abscesses; and septic thrombophlebitis of small and large vessels[6]. Despite extremely uncommon, eosinophilic pneumonia has been reported[1].

To the date, there is no case described of a sea urchin injury causing a bacterial pneumonia.

METHODS

Information obtained through paper and digital process consultation.

CASE REPORT

The patient is a 16-year-old boy, born and resident in Lisbon, Portugal. His past medical history is irrelevant except for celiac disease, with follow-up at a pediatric gastroenterology outpatient clinic and on a gluten-free diet. The patient was fully immunized according to the Portuguese immunization program and had received *pneumococcal* vaccination. He was a high school student with good academic results and practiced surf as a hobby.

Three days before admission he complained of fever (39ºC) and right hemithoracic pain. He mentioned a sea urchin injury in the right heel five days before admission while surfing at a Portuguese beach (Ericeira). He had proceeded to spine extraction and cleansing of the wound at home, shortly after the accident, referring only a slight discomfort afterwards. Physical examination on admission was remarkable for diminished breath sounds and crackles at the lower left hemithorax and a slight erythema of the heel. Blood analysis revealed leukocytosis (15,600 x 10^6u/L, N 78.8%) and an elevated C-reactive protein (39.2mg/dL). The chest X-ray was compatible with a pleural effusion of the left lung (Figure 1) and the patient was admitted to the pediatric intensive care unit.

Chest CT-scan and chest ultrasound revealed bilateral loculated pleural effusion, larger on the left lung, measuring 4cm, along with consolidation areas of the lower and middle lobes of the left lung, and basal segments of the lower lobe of the right lung.

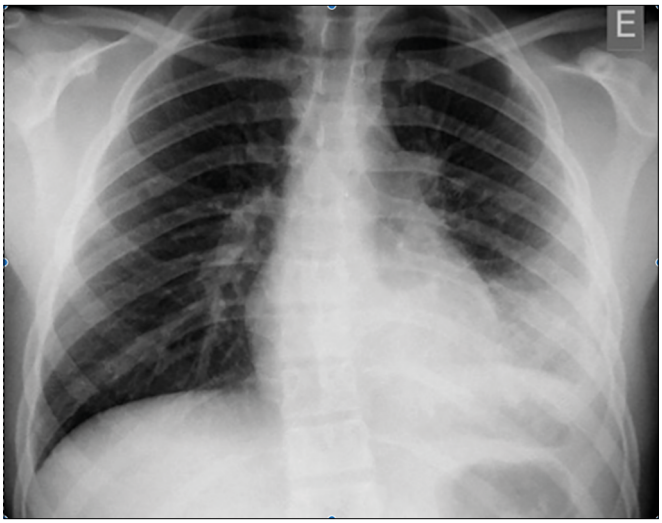


Figure 1. X-ray showing left-sided pleural effusion.

Left hemithorax thoracocentesis was performed one day after admission and revealed a purulent pleural fluid with a pH 6.9, proteins 4.6g/dL, glucose <1mg/dL, LDH 1,372mg/dL, cell count 2,784/mL, neutrophils: 93.8%, lactate 10. He started penicillin and azythromicin.

48 hours after admission, there was clinical and analytical aggravation, with fever and elevation of inflammatory markers. The patient also complained of swelling, erythema, and pain of the right heel. An ultrasound was performed revealing multiple small cutaneous and subcutaneous abscesses. A drainage was performed and purulent material was collected for microbiological studies. Suspecting of a staphylococcal infection, antibiotics were changed to flucloxacillin and clindamycin. A methicilin-sensitive *S. aureus* was cultured in the pleural fluid and in the purulent material collected from the heel. Blood cultures were negative.

There was gradual clinical improvement, although fever persisted.

On the 6th day after admission, a video-assisted thoracoscopic surgery (VATS) and surgical debridement of the pleural loculation was performed by the surgical team. Two chest tubes were placed in the left hemithorax (apical and posterior position), remaining *in situ* for 6 days. The patient needed supplementary oxygen and remained febrile until day 9.

On the 13th day, the patient restarted fever and the chest X-rays showed a round image, raising the suspicion of a lung abscess. However, this suspicion was not confirmed in the subsequent studies (chest ultrasound and serial chest X-rays). After discussion with the pediatric surgery team, a conservative approach was decided, with longer intravenous antibiotic treatment with gentamicine and clindamycin. The patient was afebrile from day 16 onwards. There was both

clinical and radiologic progressive improvement, and the patient was discharged after 30 days, completing two weeks of treatment with ciprofloxacin at home.

The patient kept follow-up at the outpatient clinic and remained asymptomatic, with normal chest X-rays during the year following discharge. There were no other relevant infectious episodes after discharge. Studies for exclusion of immunodeficiencies (both primary and secondary) were undertaken and included HIV antibodies, which were negative, response to vaccinal antigens, which were normal and serum immunoglobulins and lymphocyte populations that were also normal.

DISCUSSION

With fever and right-sided thoracic pain as the presenting symptoms and diminished pulmonary sounds and crackles in the left lower hemithorax on physical examination, the first diagnostic hypothesis was a pneumonia complicated with pleural effusion, which was sustained by blood and imagiological findings (elevated inflammatory parameters and pleural effusion image on chest X-ray). Respiratory tract infections occur most frequently in the cold months of the year and common etiologic agents include *Streptococcus pneumoniae* and *Haemophilus influenzae*. Although *Staphylococcal* etiology in a previously healthy 16-year old adolescent is an extremely rare condition, the reference to a sea urchin injury before the onset of the symptoms, and the exuberant local infection, raised the suspicion of it. Sea urchin injuries usually can lead to mild local infection or cellulitis, but they rarely cause bacteraemia. In this case, a methicilin-sensitive *S. aureus* was isolated in the purulent material collected from the heel, identical to the one cultured from the pleural fluid, raising the suspicion of a hematogenic spread after the sea urchin injury, resulting not only on a soft tissue infection, but also in a complicated pneumonia with empyema.

We found no descriptions of bacterial pneumonias secondary to sea urchin injuries during our research. Probably in this case, if proper early removal of the spines had been done, it would have prevented the complications that occurred.

CONCLUSION

Staphylococcal pneumonias are uncommon, specially in immunocompetent children. Skin and soft tissue infections are common infection syndromes that can be caused by a large number of microorganisms and can lead to a wide spectrum of manifestations, the most common consisting of local cellulitis and granuloma formation. There can occur bacteraemia and focalization at a distant specific site, as the lung. Sea urchin injuries have been associated with local inflammatory reactions, foreign body synovitis and septic arthritis and, most rarely, with eosinophilic pneumonias, but no cases describe bacterial pneumonias.

A detailed clinical history and examination was of utmost importance in this case, as were the cultures of the pleural fluid and the purulent material collected from the heel.

Systemic complications in immunocompetent patients are not usual, so it was also important to discard immunodeficiency diseases.

Patient Note:

"In three days, what I thought was a simple muscle contracture from the previous week's physical exertion turned out to be a rare case of staphylococcal pneumonia. The emotional help provided by the team and my willingness to get out and live a normal life played a pivotal role in my recovery, considering there were times when I felt I wouldn't be without limitations. Fortunately, everything turned out well and the recovery was complete."

REFERENCES

1. Schwartz Z, Cohen M, Shari RR. Lipner. Sea urchin injuries: a review and clinical approach algorithm. J Dermatolog Treat. 2021 Mar;32(2):150-6
2. Haddad Junior V. Observation of initial clinical manifestations and repercussions from the treatment of 314 human injuries caused by black sea urchins (Echinometra lucunter) on the southeastern Brazilian coast. Rev Soc Bras Med Trop. 2012 Mai/Jun;45(3):390-2.
3. Finkelstein R, Oren I. Soft tissue infections caused by marine bacterial pathogens: epidemiology, diagnosis, and management. Curr Infect Dis Rep. 2011 Out;13(5):470-7.
4. Kucewicz A, Miller MA. Eosinophilic pneumonia associated with foot injury from a sea urchin. Am J Emerg Med. 2007 Set;25(7):862.e5-e6.
5. Diaz JH. Skin and soft tissue infections following marine injuries and exposures in travelers. J Travel Med. 2014 Mai/Jun;21(3):207-13.
6. American Academy of Pediatrics (AAP). Committee on Infectious Diseases. Red book: report of the Committee on Infectious Diseases. 31st ed. Elk Grove Village: AAP; 2018.