



## Chest Wall Abscess: A Rare Complication of Influenza

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### Abstract

Every year, the influenza virus affects thousands of children, most of whom have mild disease requiring only symptomatic treatment. A small percentage of those children go on to develop more severe complications, including pneumonia, empyema, myositis, and sepsis. We present the case of a previously healthy 6-year-old female who developed an extra-pulmonary, extra-muscular right anterior chest wall abscess following infection with influenza. To our knowledge, this sort of abscess has never been described in a pediatric patient in the literature.

**Keywords:** Influenza; Abscess; Pyomyositis

### Case Presentation

A six-year-old female presented to the Pediatric Emergency Department (PED) with complaint of a right-sided chest “lump.” Nine days earlier, she began having cough and fever, with a maximum temperature of 104°F. She went to an urgent care center, where a rapid flu test was positive, and was sent home with a prescription for oseltamivir. Despite treatment, the patient continued to have non-productive cough and fever and began to develop right shoulder pain. Four days later, she went to her pediatrician, who ordered an X-ray of her shoulder and clavicle to evaluate the pain, as well as a chest X-ray for the cough. X-ray of the shoulder and clavicle was reportedly normal, but the chest X-ray showed “fuzziness.”

The next day, the patient visited the PED on her pediatrician’s recommendations. Her fever, cough, and right chest wall and shoulder pain had persisted, and she had also developed diarrhea, occasional vomiting, and anorexia. At that time, the patient was febrile with a temperature of 100.7°F with a pulse of 110, respiratory rate of 50, blood pressure of 80/52, and oxygen saturation of 100% on room air. On exam, the patient was tender to palpation along the right pectoralis major with decreased range of motion in the right shoulder secondary to pain. The remainder of her physical exam was normal. CBC and CMP were normal. C-Reactive Protein (CRP) was elevated at 12.6. Chest X-ray in the PED showed right middle lobe pneumonia and the patient was discharged home with amoxicillin-clavulanic acid.

Four days later, at our initial interaction with the patient, she returned complaining of a right-sided chest “lump”. While her fever was persistent, the fever curve and her cough had improved. The primary concern at this visit was that the diffuse chest wall swelling that was noted on her first PED visit had become much more consolidated, forming a “lump” on the right side of her chest. Additionally, she experienced pain in this “lump” that radiated to her right shoulder, causing decreased range of motion. The patient’s mother reported compliance with medications previously prescribed. The patient’s vital signs on presentation were within normal limits. On physical exam, the patient was holding the right shoulder higher than the left and fullness was visible in the right supraclavicular area. A 3 cm × 3 cm area of edema was palpable in the right parasternal region, covering the third and fourth intercostal spaces (Figure 1). While the swelling was tender to palpation, there was neither discrete mass palpable nor erythema to the area. CBC was normal except for a mild thrombocytosis of 512. CMP was entirely within normal limits. CRP was improved from prior visit but still elevated at 6.5 and ESR was increased at 68. LDH, uric acid, and creatine kinase were all normal.

Given the patient’s physical exam findings with worsening swelling and pain, a bedside ultrasound was obtained to evaluate the area, which revealed an abscess in the right anterior chest wall (Figure 2). Subsequently, a CT of the chest was obtained, which showed a 6 cm × 2 cm × 4.3 cm lobulated abscess in the right upper chest wall, extending from the tissue posterior to the clavicle to the level of the anterior second rib (Figure 3).

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Figure 1: Visible Swelling of Patient's Right Anterior Chest Wall.

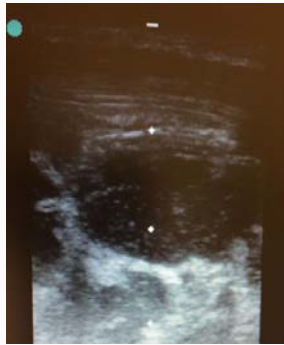


Figure 2: Bedside Ultrasound with Visualized Fluid Collection.

The patient was admitted to the pediatric surgical service. The day after admission, the abscess was drained in the operating room; wound cultures subsequently grew Methicillin Resistant *Staphylococcus aureus* (MRSA). After a two-day hospitalization, the patient was discharged home on oral clindamycin. She recovered without any complications. On surgery follow up, she had returned to her baseline state of health.

## Discussion

While our patient ultimately developed a serious complication, her initial illness was infection with the influenza virus. The influenza virus is an orthomyxovirus that is primarily spread by droplet transmission, although contaminated surfaces can also cause contact transmission. The incubation period ranges from 1 to 4 days once a host is infected [1]. Once infected, viral shedding begins 24 h prior to fever onset and then correlates with fever severity [1]. However, young children and immunocompromised children can have a prolonged shedding period. In temperate parts of the world, peak influenza season is typically in January or February; however, in equatorial locations, there is no clear influenza season as the virus tends to persist year-round [1].

Influenza is, in addition to the name of the virus, also the syndrome caused by the virus. Classically, infection results in sudden fever, chills, and myalgia. The initial symptoms are followed by the development of severe cough, pharyngitis, and rhinorrhea. It is important to remember, however, that young children and particularly infants may not develop this typical presentation [1]. Infants may only present with irritability and fever, while young children may present with pneumonia, croup, bronchiolitis, or a non-specific viral upper respiratory tract infection [1]. While adults rarely have gastrointestinal symptoms, these may be a prominent feature of children's disease [1].

Diagnosis of influenza is most commonly done with rapid antigen testing, which measures reaction between the patient's influenza antigens in their secretions and influenza antibodies in the testing material [1]. Of note, nasopharyngeal samples are preferable to those



Figure 3: CT Chest Revealing Right Anterior Chest Wall Abscess.

obtained from the patient's throat. Main advantages of rapid antigen testing including swift results, being able to distinguish between types of influenza (A vs. B), ease of bedside testing, and high specificity [1]. Despite these advantages, though, shortcomings of the test must also be considered—a sensitivity that varies between 20% and 90% and accuracy that depends on disease prevalence within the community [1].

While most cases of influenza are relatively mild and self-resolving, some patients do go on to develop more serious complications. One study of nearly 7000 pediatric patients that were hospitalized due to influenza in 10 states between 2003 and 2010 evaluated the frequency of various complications. They found that the most common complication was sinorespiratory disease, which occurred in 40% of children [2]. Within this broad category, secondary pneumonia was the most common complication, occurring in 28% of all children, followed closely by asthma exacerbations, which developed in 18% of all children [2]. *S. aureus* and *S. pneumoniae* were the most common bacterial pathogens identified in patients with pneumonia, which is consistent with previous reports [2]. Of the two, infection with *S. aureus* is less common, but more serious, especially if caused by methicillin-resistant *S. aureus*. Other, less common sinorespiratory complications included otitis media, croup, and acute bronchitis [2]. The second most common complication was dehydration and volume depletion, occurring in 22% of all children hospitalized with the flu [2]. Other notable complications occurring in >1% of patients include seizures (both febrile and non-febrile), bacteremia, and sepsis [2].

While lung abscess and empyema are widely considered to be common complications of influenza, this multi-center study found them to be present in <2% of children hospitalized with the flu [2]. Similarly, myositis—a reportedly common complication—was found to be present in only 1% of hospitalized patients [2]. However, this report may be falsely decreased as myositis is likely diagnosed in the outpatient or emergency room setting in patients that do not require hospitalization. There is no mention of extra-pulmonary abscesses in this study, suggesting that this is an extremely rare complication.

Three case reports do exist that describe similar cases of pustular accumulation outside the lung. In the adult literature, there is a report of a previously healthy 31-year-old male who developed multiple intramuscular abscesses in all four extremities following H1N1 infection [3]. Another report exists that describes an immunocompromised 81-year-old female on long-term steroid therapy with development of intraperitoneal free air and a retroperitoneal abscess after Influenza B infection; the authors theorized that the insult of viral infection weakened her already damaged intestinal mucosa, leading to micro-perforations [4]. To our knowledge, the only report of a pediatric patient with abscess formation following influenza describes a 5-year-old female with

acute osteomyelitis and subperiosteal abscess during an infection with Influenza A [5].

In the patient we present here, the exact etiology of her symptoms is unclear. The relatively high prevalence of post-influenza MRSA pneumonia and location of this patient's abscess raises the possibility of direct translocation of bacteria across already damaged pleura. A second possibility would be hematogenous spread in a patient whose immune system was already taxed by the influenza virus. Lastly, a completely unrelated process is possible; however, there was no history of trauma to the skin or superficial skin findings such as pustule or cellulitis to suggest a simple cutaneous abscess. Purulent collection was deep to muscle, suggesting a non-dermatologic source of bacteria.

## Conclusion

Influenza is a common virus that infects thousands of children annually. The majority of these children recover without any significant sequelae. Of those that do have further complications, pneumonia, asthma exacerbation, and dehydration are among the most common. Purulent infection in the form of empyema occurs in less than 2% of patients. To our knowledge, this is the first

intramuscular abscess following influenza infection that is described in the literature. Increased awareness of rare complications, like this case, may prompt providers to consider patients with recent influenza in a different light.

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