

Appendicitis in a Six-Month-Old Child With Coincidental Pneumonia

Seth J. Deskins¹, Cassie Abbey², Amber Vozar², Richard Brant²

¹. Internal Medicine-Pediatrics, West Virginia University School of Medicine, Morgantown, USA ². Pediatrics, West Virginia University School of Medicine, Morgantown, USA

Corresponding author: Seth J. Deskins, sjdeskins@hsc.wvu.edu

Review began 05/16/2023

Review ended 05/22/2023

Published 05/24/2023

© Copyright 2023

Deskins et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Appendicitis is an exceedingly uncommon diagnosis in infancy and, thus, is typically not considered a differential diagnosis for this population. Its atypical presentation, with a wide range of clinical manifestations, creates a diagnostic challenge for physicians. Along with this, a patient's inability to articulate their pain adds another layer of diagnostic challenge. Here, we present the case of a six-month-old infant with a complicated hospital course of pneumonia and subsequent ileus, who was later found to have appendicitis with a surrounding abscess.

Categories: Pediatrics, Pediatric Surgery, Gastroenterology

Keywords: surgery, ileus, pediatrics, pneumonia, appendicitis

Introduction

Appendicitis rarely manifests in infants, but when it does, the presentation is highly variable, ranging from abdominal distension to respiratory distress [1,2]. The classic presentation of appendicitis with periumbilical pain radiating to the right lower quadrant only presents in less than half of patients under 12 years of age and is nearly impossible to appreciate in a nonverbal child [1]. Appendicitis would typically be low on the differential list in the infant population, making diagnosis difficult. Here we discuss the case of a six-month-old male infant who presented initially with right upper lobe pneumonia with associated emesis that evolved into persistent abdominal distension, ileus, and the eventual diagnosis of appendicitis.

Case Presentation

A six-month-old male presented to the emergency department with a one-day history of low-grade fever, diarrhea, and emesis. In the emergency department, he was febrile at 38.2 degrees Celsius, tachycardic at 198 beats/minute, and irritable on physical exam with coarse breath sounds at the right apex. Lab values revealed an elevated procalcitonin of 5.00 ng/mL (<0.50 ng/mL) and C-reactive protein of 67.6 mg/L (<8.0 mg/L). A chest radiography showed a right upper lobe opacity (Figure 1).

How to cite this article

Deskins S J, Abbey C, Vozar A, et al. (May 24, 2023) Appendicitis in a Six-Month-Old Child With Coincidental Pneumonia. Cureus 15(5): e39429. DOI 10.7759/cureus.39429

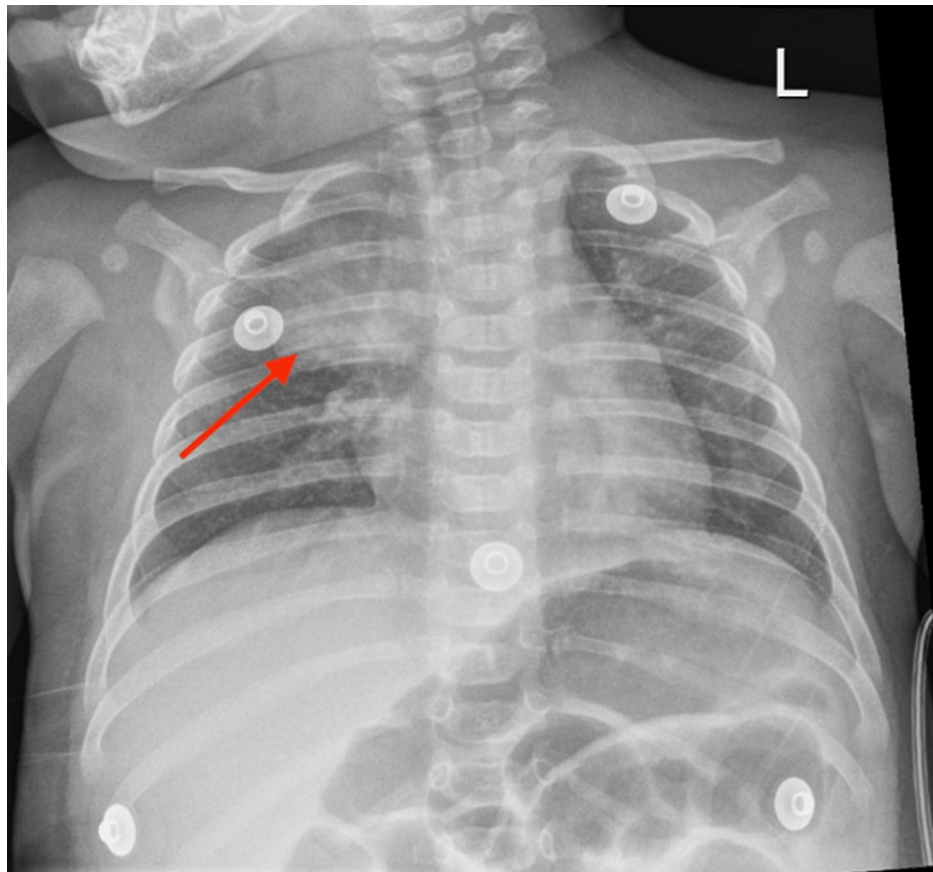


FIGURE 1: Chest radiograph showing focal right upper lobe pneumonia (arrow)

Blood cultures were obtained and showed no growth for 72 hours. He received a 20 mL/kilogram normal saline fluid bolus, which improved his tachycardia, and was started on ampicillin-sulbactam parenterally.

The patient's inflammatory markers improved while on antibiotics, but he continued to have decreased bowel movements and persistent emesis with oral feeds. Feeds were discontinued, and he was started on maintenance intravenous fluids. His physical exam evolved over the next few days to a firm non-distended abdomen with bowel sounds present. An abdominal radiograph was obtained and showed air-filled small and large bowel loops in the left abdomen, consistent with an ileus-type pattern (Figure 2).

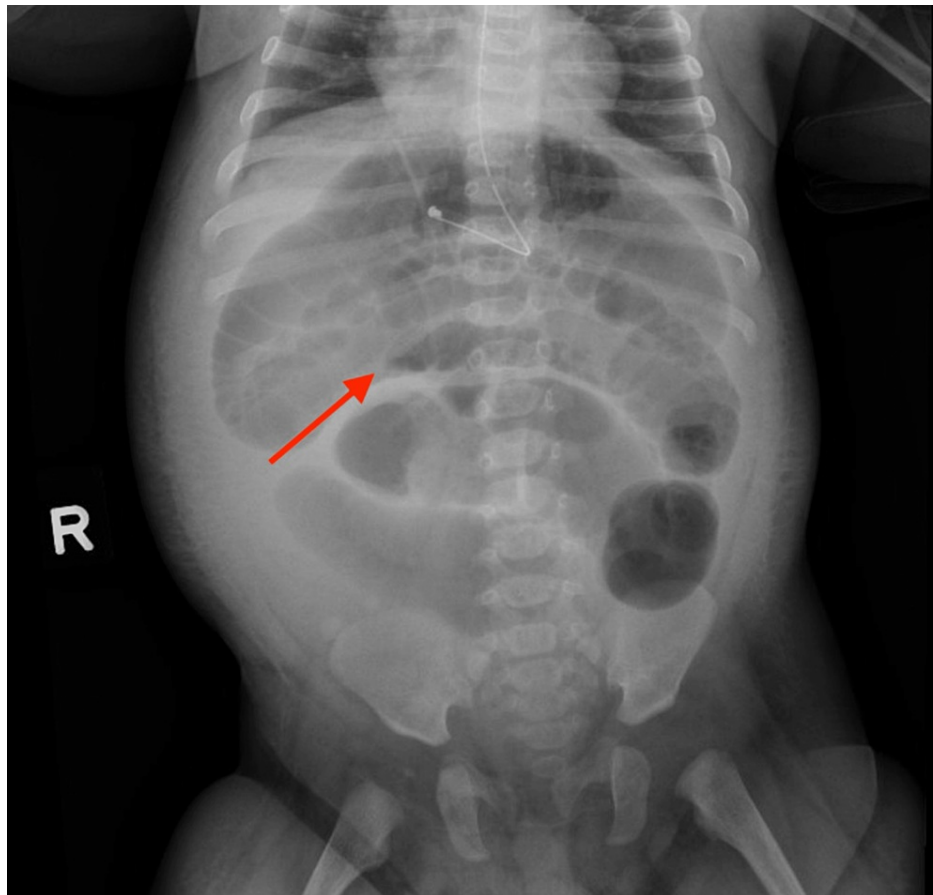


FIGURE 2: Abdominal radiograph showing marked dilated bowel loops (arrow)

After approximately one day of bowel rest, re-feeding was attempted with an oral rehydration solution. He initially tolerated but over the span of approximately 12 hours, he had gradually worsening physical exam findings and abdominal radiographs.

Pediatric Surgery was consulted and was concerned for a small bowel obstruction and recommended bowel decompression through a nasogastric tube. Even with this intervention, a repeat abdominal radiograph showed worsening dilated and tubular bowel loops. Further imaging with an abdominal ultrasound was then performed and was negative for appendicitis and did not show free fluid. Given a few days with unresolved ileus pattern, Pediatric Surgery recommended an exploratory endoscopic laparotomy. The procedure revealed a perforated appendix with a fecalith and a surrounding abscess with peritonitis that was causing a partial small bowel obstruction. The contents expressed from the abscess were sent for culture and yielded multiple Gram-positive rods, lactose-fermenting Gram-negative rods, and *Proteus* species. Based on these culture results, Pediatric Infectious Disease recommended changing antibiotics to metronidazole and ceftriaxone.

Postoperatively, the patient rapidly improved over the following day. Feeds were resumed on postoperative day 1 and gradually increased, and his bowel function resumed two days postoperatively. Intra-operative cultures ultimately speciated to vancomycin-resistant enterococcus (VRE), which was sensitive to linezolid. Therefore, the patient was discharged on parenteral linezolid and ciprofloxacin per infectious disease recommendations with close outpatient pediatric surgery follow-up.

Discussion

While relatively common in pediatric adolescent populations and adulthood, appendicitis is infrequently diagnosed in younger children, especially in infancy [1]. Appendicitis historically presents with anorexia, nausea, emesis, and right lower quadrant pain concerning a surgical abdomen. However, infants tend to present with fever, irritability, grunting, cough, rhinitis, lethargy, and abdominal distension or rigidity, with fever being the best predictor of appendicitis in this age group [1,2]. Although it is apparent that these symptoms, alone or in combination, could be explained by a myriad of other, even benign, illnesses, the combination of an inability to articulate and localize pain, a multitude of etiologies for abdominal

discomfort and fever, and atypical presentations make appendicitis a challenging diagnosis for those in this age group.

Up to 57% of appendicitis cases are missed or misdiagnosed in children under 12 years of age [1], which leads to increased morbidity and mortality. While a delay of four days or greater in diagnosis for patients under the age of two can lead to catastrophic outcomes, even a 36-hour delay increases the risk of perforation by up to 65% [1,2], as seen in our case report. In one study, children who were misdiagnosed displayed more frequent perforation and peritoneal abscess formation and were the only cases in which mortality occurred [2]. Anatomically, appendicitis is less likely to occur in those under one year of age. At this age, the appendix is funnel-shaped with a wider opening, generally preventing obstruction [3]. However, the omentum at this time is underdeveloped, which often leads to rapid peritonitis due to the inability to handle infection if perforation does occur [3]. When appendicitis does occur in neonates, the thinner appendix wall makes these patients especially susceptible to perforation, with 70% of patients aged less than three years developing perforation within 48 hours of symptom onset [4].

A crucial aspect of our case report is the initial presentation of pneumonia. Although the concurrent presentation of appendicitis and pneumonia was observed, it could be that the aspiration of vomitus secondary to appendicitis may have led to pneumonia given the presence of dilated bowel loops on initial imaging. It is also possible that, in this case, the treatment of pneumonia with ampicillin-sulbactam may have modified the course of this patient's appendicitis and prevented clinical decompensation. In fact, it has been shown that antibiotics alone are an effective treatment for uncomplicated appendicitis in older children [5]. Nevertheless, the presentation of pneumonia marred the clinical picture and led to a delay in diagnosis. Given the significant consequences of delay or misdiagnosis of appendicitis in infants, we advocate that physicians and research-based clinical practice guidelines (e.g., scoring systems to assist with diagnosis such as the Alvarado Scoring System) need to maintain lower thresholds to rule out appendicitis.

Conclusions

This case of a six-month-old male with pneumonia and appendicitis emphasizes the importance of maintaining a high clinical suspicion. Certain things are common in the differential diagnosis but serious intra-abdominal pathology such as infection and appendicitis must be ruled out. We encourage providers to rely on clinical examination as imaging may not yield the true underlying pathology, as in our case. Timely diagnosis is paramount, as complications tend to arise within the first 48 hours of symptom onset. The case presented here, although atypical, emphasizes a need for increased awareness of diagnosis and the management of appendicitis in infancy.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Bundy DG, Byerley JS, Liles EA, Perrin EM, Katznelson J, Rice HE: Does this child have appendicitis?. *JAMA*. 2007, 298:438-51. [10.1001/jama.298.4.438](https://doi.org/10.1001/jama.298.4.438)
2. Rothrock SG, Pagane J: Acute appendicitis in children: emergency department diagnosis and management. *Ann Emerg Med*. 2000, 36:39-51. [10.1067/mem.2000.105658](https://doi.org/10.1067/mem.2000.105658)
3. Umscheid JH, Nguyen KM, Vasudeva R, Agasthya N: Neonatal appendicitis presenting as bilious emesis and septic shock. *Kans J Med*. 2021, 14:130-2. [10.17161/kjm.vol1414990](https://doi.org/10.17161/kjm.vol1414990)
4. Marzuillo P, Germani C, Krauss BS, Barbi E: Appendicitis in children less than five years old: a challenge for the general practitioner. *World J Clin Pediatr*. 2015, 4:19-24. [10.5409/wjcp.v4.i2.19](https://doi.org/10.5409/wjcp.v4.i2.19)
5. Huang L, Yin Y, Yang L, Wang C, Li Y, Zhou Z: Comparison of antibiotic therapy and appendectomy for acute uncomplicated appendicitis in children: a meta-analysis. *JAMA Pediatr*. 2017, 171:426-34. [10.1001/jamapediatrics.2017.0057](https://doi.org/10.1001/jamapediatrics.2017.0057)