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Risk Management Review

Pediatric Patient Is Misdiagnosed Multiple Times, With Tragic Outcome

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Introduction

Despite the enormous strides modern medicine has experienced in both knowledge and technology, correct diagnosis continues to present challenges. The correct treatment of the wrong condition is unlikely to produce a favorable outcome, as the following tragic case illustrates.

Facts

The patient was an 18-month-old male who was generally healthy with no relevant medical history. He was brought to the emergency department (ED) of a large community hospital on the evening of September 7 with symptoms of a dry cough, a runny nose, a fever, and vomiting. Of note, he had begun daycare approximately a month earlier.

Physician assistant (PA) 1, who was supervised in the ED by Dr. T, saw the patient. His vitals were as follows: blood pressure (BP) 115/68 mmHg, pulse 168 bpm, respirations 38, and temperature 100.1°F. The PA did not identify anything concerning; the patient was hemodynamically stable. At that time, the PA believed the patient had bronchiolitis, but he also wanted to rule out pneumonia. He ordered a chest X-ray, which was accomplished at bedside within the hour.

A pediatric radiologist was not available, so Dr. N (a general radiologist) read the X-ray. The PA and Dr. T reviewed the X-ray and discussed it with Dr. N. After that conversation, Dr. N generated a report that stated “Perihilar airspace opacifications bilaterally. RSV bronchiolitis vs. pneumonia. Heart size likely within normal limits with thymus shadowing. . .”

The patient was later discharged with a diagnosis of bronchiolitis and possibly developing pneumonia. He was given a prescription for amoxicillin, and the mother was told that the patient’s symptoms should clear up in the succeeding days. The mother also was told that a

pediatric radiologist would review the X-ray the following day, and someone would contact her if any concerns were identified.

The pediatric radiologist, Dr. A, reviewed the X-ray the following morning. Dr. A's report stated "Impression: Bronchiolitis and/or reactive airway disease. No focal pneumonia. Prominent cardiothymic silhouette, possibly due to thymic tissue but cannot exclude underlying cardiomegaly. Correlate clinically."

While both the American College of Radiology (ACR) and the hospital had guidelines/policies that required "material differences" in a subsequent reviewing radiologist's report to be brought to the direct attention of the treating physicians, Dr. A did not consider his report to be materially different from Dr. N's. For that reason, Dr. A did not contact the ED to advise them of his findings.

On September 10 (3 days later), the patient's mother took him to his regular pediatric practice for follow-up. The pediatrician who saw the patient noted cough, fever, fussiness, congestion (including bilateral end expiratory wheezing), decreased appetite, and vomiting. The patient did not seem any better, but the pediatrician was not concerned.

Based on the history and physical examination, the pediatrician did not consider a cardiac etiology (which would be rare). When he learned that the patient had a chest X-ray during his ED visit, the pediatrician ordered a copy of the patient's records from that visit (which included the two X-ray reports). The pediatric practice received the records the next day (which was verified), but they were somehow misplaced. None of the patient's pediatricians saw the records at the patient's three subsequent visits to the practice on September 14, 17, and 28.

The patient came to the pediatric practice on September 28 for clearance to return to daycare. He still had a lingering cough and an intermittent fever. This visit appeared somewhat superficial, as no vital signs were recorded and there was no change in treatment.

The mother took the patient back to the ED on October 1, with concerns about the continuing cough and trouble breathing. The patient's vitals were as follows: BP 82/54 mmHg, heart rate 177 bpm, respirations 36, and temperature 100.3°F. PA 2, who was supervised by Dr. J, examined the patient. The PA noted the patient's condition as "Nontoxic appearance. He appears ill. No distress." The PA advised the mother that the patient seemed to be suffering from just "childhood stuff," which was probably

viral and acquired at daycare. The mother requested a repeat X-ray, which was denied. The care team explained that they did not want to expose the patient to further X-rays, but the mother felt that they were dismissing her concerns. The patient was discharged with instructions to return to the pediatric practice or ED if he did not improve.

On October 3, the patient returned to the ED with a worsening cough, fever, decreased oral intake, and no urination in 24 hours. He was admitted to the pediatric floor; however, by the following morning, he displayed labored breathing, including grunting and nasal flaring. A repeat X-ray resulted in findings of "Enlargement of the cardiothymic silhouette. Considerations include cardiomegaly and/or pericardial effusion. Prominence of interstitial markings and likely associated pulmonary airspace disease in the right lung. Considerations include pulmonary edema vs. infection."

An echocardiogram showed severe myocardial dysfunction with a dilated left ventricle, suspicious for myocarditis. The patient was emergently transported to the nearby children's hospital in critical condition.

Upon arrival at the children's hospital, the patient was immediately admitted to the intensive care unit (ICU), intubated, and put on extracorporeal membrane oxygenation (ECMO) support. The admitting diagnosis was viral myocarditis.

On October 6, the treating cardiologist noted clotting in the ECMO membrane (not uncommon), which necessitated changing the membrane. The standard protocol for this process involved sedating the patient with morphine and midazolam, and a dose of 1.26 mg was ordered (a high, but appropriate dosage).

Unfortunately, on the morning of October 6, the children's hospital installed new intravenous infusion units in the ICU. The ICU nurses had been instructed on their use in early May but had not received "refresher" training since that time. Because of the ICU nurse's unfamiliarity with the infusion unit, she programmed it to administer 12.6 mg — a tenfold overdose. When she received an alarm, she assumed it was due to the original high dosage the cardiologist had ordered, and she cleared the alarm. The hospital's protocol required that a second nurse provide verification, but that nurse made the same assumption and signed off on the infusion. Fortunately, the overdose was identified and corrected early enough to prevent harm.

The patient continued in stable but critical condition until October 11, when he developed a

surgical abdomen. A bedside evaluation, including a fasciotomy and laparotomy, showed free air from an ischemic bowel, progressive multisystem failure, and ischemic brain infarction. Life support was withdrawn the following day, and he died in his parents' arms.

A medical malpractice lawsuit was brought against Drs. N and A (the original radiologists), PA 1 and Dr. T (the original ED providers), the pediatric practice, the individual pediatricians, PA 2 and Dr. J (the second ED providers), and the children's hospital. The case was settled on behalf of all defendants with a global payment in the high range. The defense costs for Drs. N and A (the two MedPro-insured parties) were in the high range.

Discussion

A review of this case indicates several opportunities for improvement, which — had they occurred — likely would have allowed the patient to survive and fully recover.

Chronologically, the first issue was Dr. A's failure to directly contact the ED physicians once he completed his overread of the chest X-ray. It is difficult to say whether he deviated from the standard of care; the plaintiff's radiology experts felt that his interpretation was "materially different" from Dr. N's, but the defense experts felt it was not (that it was simply different nomenclature for the same thing).

Yet, if Dr. A had communicated with the ED physicians, they could have either contacted the patient's parents and put them on notice, or — preferably — had the patient brought back in for a cardiology consult. A simple echocardiogram would have provided a definitive and correct diagnosis.

The second error was the loss of the patient's hospital records within the pediatric practice. If any of the pediatricians had reviewed those records, they could have read Dr. A's recommendation for clinical correlation and ordered a cardiology consult.

The defense experts were not strong in their support of PA 2 and Dr. J's actions during the second hospital visit. These providers *did* have access to the previous hospital record, including Dr. A's recommendation. Further, they were now seeing this patient approximately 3 weeks after his previous ED visit, and he was obviously not responding to treatment.

The patient's mother testified at her deposition that she felt "brushed off," including the denial of her request for a repeat X-ray (which presumably would have shown increasing cardiomegaly). PA 2 was correct in one respect: at

autopsy, the patient's myocardium showed infection with parvovirus, which is commonly acquired in settings such as daycare.

The final issue in this case was the medication overdose that occurred in the children's hospital ICU. The actions of the two nurses directly led to the error, but one can argue that the hospital "set them up to fail" by placing the new infusion apparatus without advance notice and without providing any retraining after almost 6 months since the original training.

From a legal/strategic standpoint, this case was viewed as one that should not go to trial. Given the obvious errors at the pediatric practice and the second ED visit, it would be very difficult to defend that care. As mentioned, the patient's mother testified that she felt "brushed off" by PA 2 during the second ED visit. The defense would have been unable to refute this allegation because, unfortunately, PA 2 passed away prior to the litigation and her deposition.

Although the medication overdose at the children's hospital ended up being clinically irrelevant, based on appearances alone, the defense could not allow this information to go before a jury.

Finally, the defense had to consider a subtle, but potentially significant factor. The experts in this case (both plaintiff and defense) were extremely well-credentialed and credible. Given the complexities of this case and the very persuasive, but conflicting, testimony of the experts, the jury of laypersons possibly would choose to ignore the technical medicine and decide the case on the fact that a young child died a preventable death in his parents' arms.

Summary Suggestions

The following suggestions may be helpful when patients are receiving care across various settings and with multiple providers:

- Evaluate your organization's processes for test tracking (ordering, receiving, reviewing, and documenting), patient follow-up, and referrals/consults. The identification of any gaps in these processes should prompt proactive measures to implement safeguards.
- Use technology (e.g., tracking and reminder features in electronic health records) to help remember planned future actions, such as receiving and reviewing patient records from another health facility. In this case, a reminder may have alerted the physicians at the pediatric practice of the misplaced records.

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- When patients return for further treatment of a previously treated condition, thoroughly review previous treatment documentation to ensure a clear clinical picture and to prevent oversight of potentially important information.
- When formulating a differential diagnosis, make sure to not only consider the most likely condition, but also any other condition that, while unlikely, could be critical if it goes undiagnosed.
- Engage in diligent follow-up when treating patients who have persistent symptoms or conditions that are difficult to resolve. Reconsider differential diagnoses of returning patients and patients who show no signs of improvement.
- When new equipment or technology is introduced into practice, provide advance notification of the change and appropriate training or retraining. Consider using simulation testing with new technologies to identify potential problems, unintended consequences, and workarounds that might lead to errors.

Conclusion

When well-established safety best practices and protocols are not followed, the stage is set for an unfortunate outcome. Strict adherence to risk management principles can significantly diminish the likelihood of an iatrogenic injury and the resulting professional liability exposure.