Published in final edited form as:

Pediatr Pulmonol. 2017 September ; 52(9): E52–E54. doi:10.1002/ppul.23708.

Uremic pleuritis: A case report and review of recurrent exudative pleural effusions in children

M.D. McGraw¹, C. Galambos², and P.C. Stillwell¹

¹University of Colorado School of Medicine Anschutz Medical Campus - Aurora, CO/US, and Pediatric Pulmonology and the Breathing Institute

²Department of Pathology and Laboratory Medicine

Abstract

Despite similar mechanisms driving pleural fluid accumulation, the causes of pleural effusions in children differ significantly from that of adults. When a pleural effusion re-occurs in an adult, literature recommends early thoracentesis and consideration for pleuroscopy with biopsy to guide the diagnostic evaluation. In children, there is a paucity of literature for guiding management of recurrent exudative pleural effusion. We present an unusual pediatric case of uremic pleuritis with recurrent pericardial and exudative pleural effusions.

Keywords

Uremic pleuritis; recurrent exudative pleural effusions; thoracentesis; pleural biopsy

Introduction

Despite similar mechanisms driving pleural fluid accumulation, the causes of pleural effusions in children differ significantly from that of adults¹. Pleural effusions are diagnosed with a chest radiograph, but further management is a multiple step process with additional imaging, thoracentesis and, in certain circumstances, chest tube placement². When a pleural effusion re-occurs, adult literature recommends early thoracentesis and consideration for pleuroscopy with biopsy for further evaluation. We present an unusual pediatric case of uremic pleuritis with recurrent exudative pleural effusions.

Case Report

A 20-year-old male post-cadaveric renal transplant for bilateral vesiculo-ureteric reflux presented with acute onset of chest pain. When falling asleep, he felt “an elephant” was

Correspondence: Matthew D. McGraw, MD. The Breathing Institute at Children’s Hospital Colorado, 13123 E 16th Ave, Aurora, CO 80045; (p): 720-777-4993; (f): 720-777-4903; matthew.mcgraw@childrenscolorado.org.

Author Contributions

MDM analyzed the figures and drafted the manuscript. CG provided histological slides and sections as well as interpretation and critical revision of the manuscript. PCS contributed to interpretation and critically revised the manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

sitting on his chest. He also became short of breath while supine and, after a sleepless night, he presented to the emergency room.

His past medical history was significant for a cadaveric renal transplant 3 years prior to his acute presentation. He had a pericardial effusion requiring pericardiocentesis 1.5 years prior and a left-sided pleural effusion requiring chest tube placement 1 year prior. His immunosuppressive medications included tacrolimus, mycophenolate, and prednisone.

On presentation to the emergency department his vital signs were: temperature 36.2 °C; heart rate 82 bpm; blood pressure 120/85 mm Hg; respiratory rate 17 rpm; and oxygen saturation 98% on room air by pulse oximetry. His physical exam was significant for diminished intensity of breath sounds over his lower lung bases, left greater than right. His heart sounds were distant and he had 2+ pitting edema in his lower extremities. He was obese.

His laboratory evaluation demonstrated worsening renal function with a blood urea nitrogen (BUN) of 64 mg/dL and creatinine of 2.9 mg/dL. His hemoglobin was 7.6 mg/dl. He had a metabolic acidosis with a bicarbonate of 19 mg/dl and a compensatory respiratory alkalosis with a pH 7.38 and pCO₂ of 31 torr. The remainder of his complete blood count with differential as well as total protein and albumin were normal. Imaging studies included: a CXR showing a small L pleural effusion; a heart echocardiogram demonstrating a moderate pericardial effusion; and a V/Q scan showing a low probability for a pulmonary embolism.

His initial treatment included intravenous furosemide and hemodialysis for his acidosis and worsening renal function. After 10 days of hospitalization, his chest pain persisted and his BUN and Cr peaked at 78 mg/dL and 7.5 mg/dL, respectively. A repeat CXR (Figure 1A) demonstrated a larger L-sided pleural effusion followed by a CT chest scan showing a persistent pericardial effusion, bilateral pleural effusions and patchy bibasilar opacities (Figure 1B).

The patient proceeded to have a chest tube placed with analysis of the pleural fluid. The glucose was 104 mg/dL. The protein was 46 mg/dL and serum protein 65 mg/dL making the pleural : serum protein ratio high at 0.71. The pleural fluid LDH was 372 U/L and serum LDH 558 U/L (serum LDH normal: 333 U/L), making the pleural fluid : serum LDH ratio 0.51. Using Light's criteria, the pleural fluid was consistent with an exudate. Additionally, the pleural fluid cell differential showed a lymphocytosis (63%) but without malignant cells. Because the effusions were recurrent, thorascopic lung and pleural biopsies were obtained, demonstrating pleuritis with prominent subpleural fibrosis and type 2 cell hyperplasia (Figure 2), further supporting the diagnosis of uremic pleuritis.

After chest tube placement and 5 additional days of hemodialysis, the effusions improved. The chest tube was removed without reoccurrence, and he was discharged home with improving renal function and a decrease in his immunosuppressive therapy.

Discussion

Uremic pleuritis in children is rare, but not uncommon in adults with chronic kidney disease³. Bakirci, Sasak, Ozturk, Akcay, Sezer, Haberal³ reported on 260 cases of pleural effusions in patients requiring hemodialysis. In a subset of patients who underwent thoracentesis, uremic pleuritis accounted for forty percent of the exudative cases. Thus, in adults, uremia is one of the most common causes of exudative pleural effusions in patients requiring hemodialysis.

Uremic pleuritis is a diagnosis of exclusion⁴. Pleural fluid analysis results that support a uremic effusion include sterile cultures and a fibrinous exudate. Pleural fluid cell differentials often demonstrate a lymphocytic predominance with a lower total number of polymorphonuclear neutrophils than seen in parapneumonic effusions³. Pleural-to-serum LDH ratios are also lower than that of parapneumonic effusions⁴.

The primary treatment of uremic pleuritis is improvement in kidney function^{3,4}. The majority of uremic effusions resolve with supportive care and more aggressive hemodialysis regimens. When uremic pleural effusions reoccur, restrictive lung disease can develop from persistent and unresolved pleural fibrin deposition⁵.

Recurrent exudative pleural effusions are rare in children. When an exudative pleural effusion reoccurs, adult literature recommends early thoracentesis and consideration for pleuroscopy to guide the diagnostic evaluation². Early thoracentesis allows assessment of bacterial, fungal, and acid fast bacilli cultures as well as viral PCR. Cytological examination is used to exclude malignancy. When thoracentesis does not provide a definitive diagnosis, further investigation with pleuroscopy and biopsy is recommended². Most pediatric pulmonologist are not trained in pleuroscopy, so video-assisted thorascopic surgery (VATS) with pleural and lung biopsy is the procedure of choice in children.

Conclusion

This case report highlights an unusual pediatric case of uremic pleuritis presenting with recurrent, exudative pleural effusions and recurrent pericardial effusions. Recurrent exudative pleural effusions are rare in pediatrics, but are not an uncommon finding in patients requiring chronic hemodialysis. In children with recurrent, exudative effusions without a clear underlying etiology, a thorough work-up, including thoracentesis and pleural biopsy, is recommended.

Acknowledgments

Financial Support

MDM's contribution to this work was partially funding by the National Institute of Health Grant T32-HL-007670-27. All other author(s) received no financial support for the research, authorship, and/or publication of this article.

We thank Dr. J.W. Goebel for his significant contribution to the care of this patient and support in writing this manuscript.

Funding

MDM's contribution to this work was partially funding by the National Institute of Health Grant T32-HL-007670-27. All other author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Givan DC, Eigen H. Common pleural effusions in children. *Clin Chest Med*. 1998; 19(2):363–371. [PubMed: 9646987]
2. Hooper C, Lee YC, Maskell N. Group BTSPG. Investigation of a unilateral pleural effusion in adults: British Thoracic Society Pleural Disease Guideline 2010. *Thorax*. 2010; 65(Suppl 2):ii4–17. [PubMed: 20696692]
3. Bakirci T, Sasak G, Ozturk S, Akcay S, Sezer S, Haberal M. Pleural effusion in long-term hemodialysis patients. *Transplant Proc*. 2007; 39(4):889–891. [PubMed: 17524841]
4. Maher JF. Uremic pleuritis. *Am J Kidney Dis*. 1987; 10(1):19–22. [PubMed: 3300285]
5. Rodelas R, Rakowski TA, Argy WP, Schreiner GE. Fibrosing uremic pleuritis during hemodialysis. *JAMA*. 1980; 243(23):2424–2425. [PubMed: 7373822]

Figure 1.

Figure (1A). Anteroposterior chest x-ray of 20-year-old male with large left-sided pleural effusion and small pericardial effusion; (1B): Patient's computed tomography (CT) chest without contrast. Findings are significant for: moderate bilateral pleural effusions, left greater than right, with loculated fluid above the major fissure on the left; a loculated pericardial effusion; and patchy bilateral pulmonary opacities most consistent with atelectasis. There are no significant mediastinal or hilar adenopathy nor pulmonary nodules.

Figure 2. Hematoxylin and eosin stained sections of left upper lobe lung biopsy (4× magnification) showing pleural inflammation and fibrin (asterisks) with subpleural type 2 cell hyperplasia (arrows). Inset: Trichrome stain demonstrating prominent pleural and interstitial collagen deposition/fibrosis (blue staining; 20× magnification).