IMAGES IN THORAX

Pleural empyema secondary to xanthogranulomatous pyelonephritis

Adam Maxwell,[1] Alison Kent,[1] Marianne Tinkler,[1] Sunil Mathur,[2] Andy Beale[3]

[1]Respiratory Department, Great Western Hospitals NHS Foundation Trust, Swindon, UK
[2]Urology Department, Great Western Hospitals NHS Foundation Trust, Swindon, UK
[3]Radiology Department, Great Western Hospitals NHS Foundation Trust, Swindon, UK

Correspondence to
Dr Adam Maxwell, Great Western Hospitals NHS Foundation Trust, Swindon SN3 6BB, UK;
adam.maxwell@nhs.net

Received 13 July 2020
Revised 29 September 2020
Accepted 29 September 2020

To cite: Maxwell A, Kent A, Tinkler M, *et al*. *Thorax* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/thoraxjnl-2020-215786

A 79-year-old woman presented to acute services with a 2-week history of shortness of breath, fever and a cough productive of purulent sputum. She had a medical history of polymyalgia rheumatica, chronic obstructive pulmonary disease and hypertension. She had been admitted with a right-sided pleural empyema 9 months earlier, which had been treated with chest tube drainage and intravenous antibiotics. On that occasion, pH of pleural fluid was 6.7, white cell count (WCC) ++, lactate dehydrogenase (LDH) 7554 U/L and total protein 39 g/L (serum total protein 73). Neither pleural fluid nor contemporaneous blood cultures had shown any significant growth.

In the past year, she had been found to have right-sided hydronephrosis with contrast-enhanced abdominal CT demonstrating a mass arising from the upper pole of the right kidney. Subsequent percutaneous-guided biopsy performed under the urology team identified prominent collections of foamy histiocytes, with immunohistochemical analysis demonstrating strongly positive staining for CD68 and vimentin. These findings were consistent with a diagnosis of xanthogranulomatous pyelonephritis, thought likely to be secondary to chronic obstruction from pelviureteric junction obstruction. (This sample was not sent for microbiological analysis). A further contrast-enhanced CT thorax and abdomen performed as an outpatient under the urology team 2 months prior to this admission showed stable appearances of the right kidney but new changes in the right lung base and pleural space that communicated with the right hydronephrotic kidney (figures 1 and 2).

On this admission, physical examination identified a soft fluctuant mass adjacent to the medial border of the right scapula. Blood tests showed a leucocytosis with predominant neutrophils and an elevated C reactive protein (CRP), with preserved renal function (WCC 24.9×10^9/L, neutrophils 20.69×10^9/L, CRP 345 mg/L, creatinine 55 µmol/L, estimated glomerular filtration rate (eGFR) >90 mL/min). CT Thorax was performed (figure 3). Thoracic ultrasound revealed a thick walled, highly echogenic, loculated effusion with associated empyema necessitans (chest wall extension of pleural infection).

The patient was managed under joint care between urology and respiratory medicine. A radiologically guided chest drain was inserted which drained frank, purulent fluid and intravenous Piperacillin–tazobactam was commenced. This led to improvement of the pleural collection and resolution of the associated empyema necessitans. Culture of pleural fluid grew a fully sensitive *Escherichia coli* consistent with urological origin. Under the urology team, a radiologically guided nephrostomy was inserted. Following clinical and biochemical improvement, she was discharged on

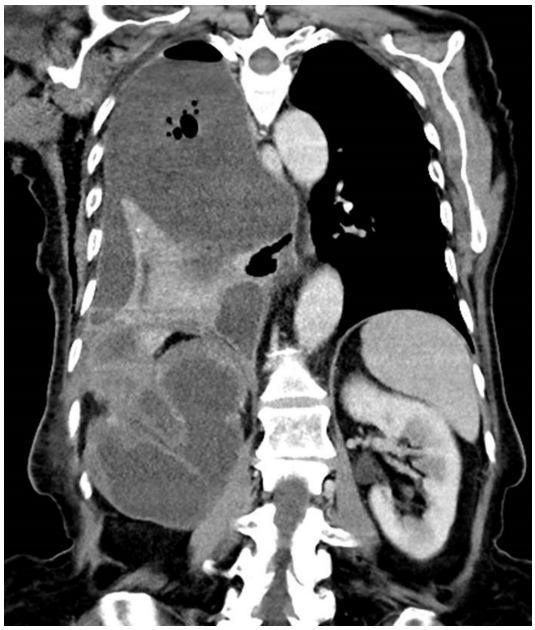

Figure 1 Contrast-enhanced CT thorax and abdomen demonstrating a thick-walled hydronephrotic right kidney, loculated pleural fluid and consolidation at the right lung base with direct communication through the diaphragm between the kidney and the pleural space.

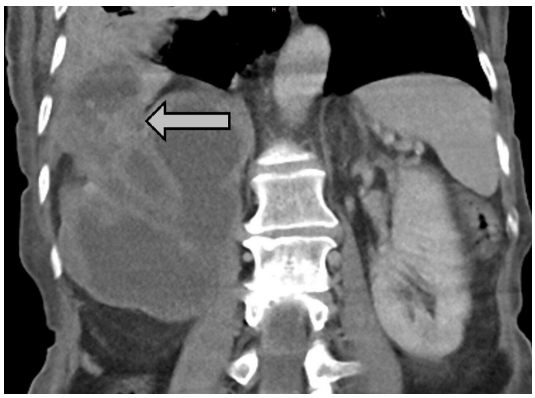

Figure 2 A magnified image of the communication between the hydronephrotic kidney and pleural space, demarcated by the arrow.

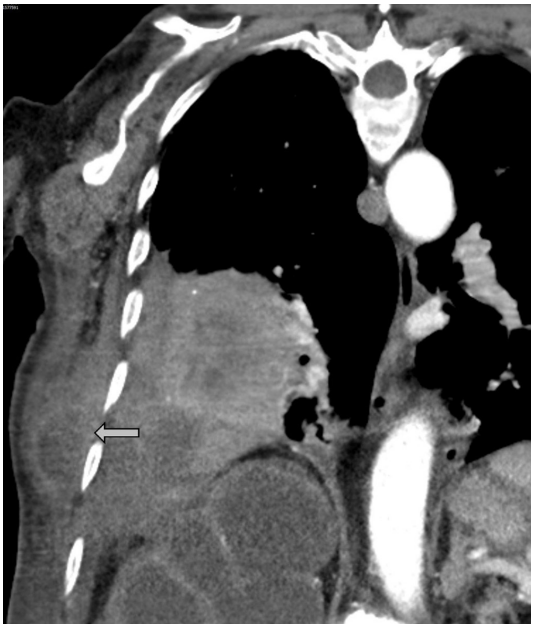

Figure 3 CT thorax on admission demonstrating complex pleural collection associated with empyema necessitans and parenchymal affection. An arrow demarcates extension of the pleural infection into the adjacent chest wall and soft tissues.

oral ciprofloxacin with nephrostomy in situ, with a plan for elective right nephrectomy following a period of recovery.

DISCUSSION

Xanthogranulomatous pyelonephritis is a rare complication of urinary tract infection, usually developing following infection in an obstructed kidney. It can lead to destruction of the kidney due to granulomatous tissue, resulting in complete loss of function. Symptoms can include dull flank or abdominal pain, lower urinary tract symptoms and systemic symptoms such as, fever, weight loss and malaise. It can be difficult to distinguish from renal cell carcinoma on radiology alone. Conservative management is rarely effective, and nephrectomy is ultimately required in the majority of cases. An important cause of empyema necessitans to consider is tuberculosis. In this case, samples were not sent for mycobacterial analysis as an alternative diagnosis was confirmed, but tuberculosis should be considered as part of the differential diagnosis in the workup of similar cases.

Review of the literature identified two previous cases of xanthogranulomatous pyelonephritis which presented with respiratory symptoms including fevers, cough, weight loss and evidence of a unilateral pleural effusion on CXR but not confirmed empyema.[1 2] Diagnosis was made on typical radiological appearance and confirmed with percutaneous biopsy for histopathology. Ultimately all patients required a nephrectomy. There is one case report of postoperative empyema in the context of xanthogranulomatous pyelonephritis and splenic abscess.[3] However, the presentation with frank empyema due to transdiaphragmatic communication with xanthogranulomatous pyelonephritis appears to be extremely uncommon.

This patient had previously presented with a right-sided empyema which, although not identified at the time, is likely also to have been due to the underlying renal pathology. Management of these rare cases requires effective multidisciplinary input with close working between the respiratory and urological teams, with support from interventional radiology, microbiology and renal physicians.

Contributors AM and AK equally wrote the manuscript. MT and SM revised and approved the manuscript. AB provided the radiology images with interpretation and revised and approved the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1 Huang M, Sum R, Deshpande S, *et al*. Xanthogranulomatous pyelonephritis presenting as a left-sided pleural effusion. *Respirol Case Rep* 2018;6:e00377.
2 Chow J, Kabani R, Lithgow K, *et al*. Xanthogranulomatous pyelonephritis presenting as acute pleuritic chest pain: a case report. *J Med Case Rep* 2017;11:1–5.
3 Kashid YS, Tawte ND, Rathod KR, *et al*. Xanthogranulomatous pyelonephritis with splenic abscess and empyema [Internet]. *Bombay Hosp J* 2001.