

Nephroquiz
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Tuberculosis, acute kidney injury and pancreatitis—what is the underlying cause?

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Case

A 42-year-old male presented with malaise, cough, myalgia and a reduced urine output in November 2011. He was a known previous intravenous drug user who was currently on a methadone programme. He had also been diagnosed with pulmonary tuberculosis in early October 2011 and was being treated with directly observed therapy of isoniazid (750 mg), pyridoxine, pyrazinamide (2.5 mg) and rifampicin (750 mg) three times per week.

On admission, the patient looked cachectic. Clinical examination was largely unremarkable except for some mid-abdominal tenderness. Laboratory results revealed acute kidney injury (AKI) with urea 36.3 mmol/L and serum creatinine 579 μ mol/L. Creatinine had been normal 3 weeks earlier. Serum amylase was 900 U/L. A renal ultrasound scan was unremarkable. Serum albumin was 33 g/L and the urine protein creatinine ratio was 144 mg/mmol. Autoimmune screen was negative. Renal function deteriorated and haemodialysis was begun. A renal biopsy was performed.

Question

What did the renal biopsy show and what is the most likely cause of acute pancreatitis?

Answer

Renal biopsy showed acute interstitial nephritis (Figure 1), most likely secondary to rifampicin. The drug is also known to cause acute pancreatitis. Rifampicin was stopped prior to the renal biopsy and renal function recovered. The patient was well when last seen in April 2012 (serum creatinine 145 μ mol/L, normal serum amylase).

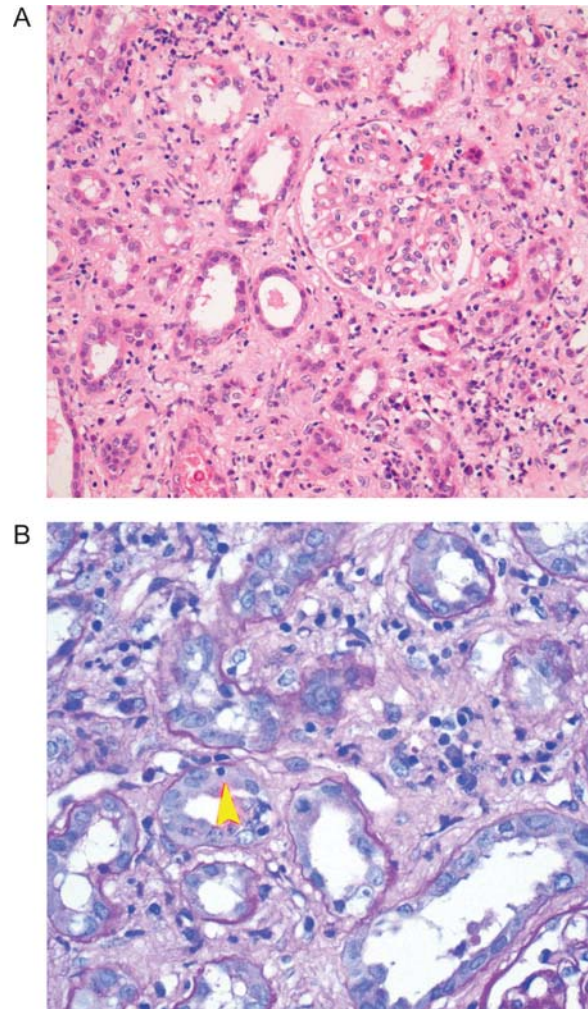


Fig. 1. Renal biopsy. (A) haematoxylin/eosin stain, showing interstitial inflammatory infiltrate. (B) periodic acid schiff (PAS stain), showing tubulitis (arrow).

Table 1. Drug-induced acute interstitial nephritis (modified from [2])

β -Lactam antibiotics (amoxicillin, ampicillin, carbenicillin, cloxacillin, piperacillin, cefaclor, cefotaxime, cefotetan, cephalixin, cephalothin, cephradine, methicillin, nafcillin, oxacillin and penicillin G)
Other anti-infectives (acyclovir, α -interferon, ciprofloxacin, erythromycin, ethambutol, indinavir, polymyxin, rifampicin, sulfonamides, tetracycline and vancomycin)
Non-steroidal anti-inflammatory agents (fenoprofen, indomethacin, naproxen, ibuprofen, piroxicam, ketoprofen and diclofenac)
Diuretics (thiazides, furosemide, chlorthalidone and triamterene)
Other drugs (diphenhydantoin, cimetidine, sulfapyrazone, allopurinol, aspirin, carbamazepine, clofibrate, phenobarbital, azathioprine, diazepam and captopril)

Discussion

Acute interstitial nephritis is a well-recognised cause of AKI accounting for 8 to 14% of patients biopsied because of unexplained AKI [1]. There may be under-reporting when renal function recovers after withdrawal of an offending drug and biopsy is withheld. The diagnosis is often not suspected prior to the biopsy result although there are often clues in the history, such as exposure to a new drug. Numerous causative agents have been identified and the drugs are often implicated (Table 1) [1, 2]. Those most commonly implicated are β -lactam antibiotics and the non-steroidal anti-inflammatory agents.

Rifampicin is a bactericidal antibiotic that has long been recognised as a potential cause of interstitial nephritis and AKI [3]. The drug is also capable of causing acute tubular necrosis [3]. Glomerular damage associated with rifampicin is rare, although mesangial hypercellularity [4] and diffusely proliferative crescentic glomerulonephritis [4] have been reported. In our case, the fact that renal function recovered promptly after rifampicin was stopped, and in the absence of any other therapeutic intervention, gives us confidence in our diagnosis. The mechanism by which rifampicin causes acute interstitial nephritis is not clear but both type II and type III reactions have been implicated [3, 4]. Acute interstitial nephritis can occur on re-exposure to rifampicin after varying time lapses since the initial exposure, suggesting that preformed antibodies may play a role [4]. The prog-

nosis of rifampicin-associated acute interstitial nephritis is generally favourable [3].

Medications are an infrequent but important cause of acute pancreatitis. Cases similar to ours, featuring both acute interstitial nephritis and pancreatitis, have been described previously [5]. In conclusion, our case taught us about rifampicin as a cause of acute interstitial nephritis, an association we had not encountered previously.

Conflict of interest statement. None declared.

References

1. Linton AL, Clark WF, Driedger AA *et al.* Acute interstitial nephritis due to drugs: review of the literature with a report of nine cases. *Ann Intern Med* 1980; 93: 735–741
2. Michel DM, Kelly CJ. Acute interstitial nephritis. *J Am Soc Nephrol* 1998; 9: 506–515
3. Covic A, Goldsmith DJ, Segall L *et al.* Rifampicin-induced acute renal failure: a series of 60 patients. *Nephrol Dial Transplant* 1998; 13: 924–929
4. Muthukumar T, Jayakumar M, Fernando EM *et al.* Acute renal failure due to rifampicin: a study of 25 patients. *Am J Kidney Dis* 2002; 40: 690–696
5. Paydas S, Balal M, Karayalali I *et al.* Severe acute renal failure due to tubulointerstitial nephritis, pancreatitis, and hyperthyroidism in a patient during rifampicin therapy. *Adv Ther* 2005; 22: 241–243

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