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## Macroscopic amoxicillin crystalluria



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A 62-year-old woman was referred to our hospital in September, 2013, with fever, arthralgia, and dyspnoea lasting for 6 days. Her medical history was uneventful apart from hypertension and active tobacco use. Her glomerular filtration rate at admission was 82 mL/min per 1.73 m<sup>2</sup> (normal range  $\geq 90$  mL/min per 1.73 m<sup>2</sup>). Blood cultures on admission grew *Streptococcus agalactiae* and acute aortic infective endocarditis was rapidly diagnosed with transoesophageal echocardiography. She was immediately started on high-dose intravenous amoxicillin (200 mg/kg per day) with intravenous gentamicin (240 mg once-daily). After 4 days, we noticed cloudy urine, with a thin granular appearance (figure). Her urine pH was 5.5. Direct examination of the urine showed amoxicillin crystalluria with large, typically aggregated needle-shaped crystals (figure) that were birefringent under polarised light microscopy. Her clinical condition worsened with oliguria, acute renal failure, and pulmonary oedema within 24 h. An aortic ring abscess was evident on a second echocardiography. After emergency valve replacement surgery and renal replacement therapy, she recovered well and was discharged home in October, 2013, without further renal replacement therapy, and with improving renal function. Her last glomerular filtration rate was 45 mL/min per 1.73 m<sup>2</sup> in March, 2014. At last follow-up,

in September, 2014, the patient was asymptomatic.

Amoxicillin is known to cause urine crystallisation, although its incidence is unknown. Amoxicillin crystalluria usually occurs with high-dose amoxicillin therapy, in urines that have a low pH and are high-density (mainly due to insufficient fluid intakes). Amoxicillin crystalluria can be microscopic or macroscopic. The typical microscopic appearance described here is usually sufficient for diagnosis in a compatible context but the amoxicillin composition of these crystals can be confirmed by infrared spectroscopy if needed. Amoxicillin crystalluria can be asymptomatic or can be responsible for haematuria or acute renal failure attributable to intratubular precipitation or urinary tract obstruction. In our patient, acute renal failure was multifactorial, but we speculate that amoxicillin crystalluria could have played a part.

Physicians should be aware of such a complication of amoxicillin because high intravenous doses are frequently prescribed worldwide and because urine alkalinisation and increased fluid intake might prevent crystalluria.

All authors cared for the patient and contributed to writing of the report. Written consent to publication was obtained.

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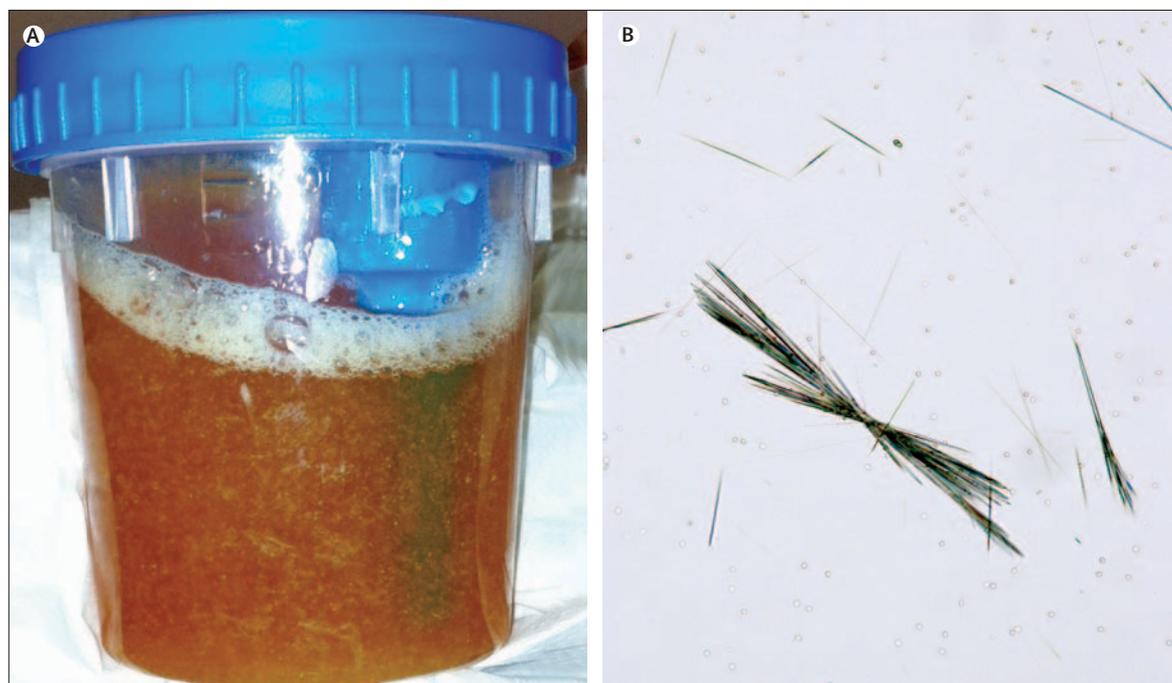


Figure: Cloudy urine with a granular appearance (A) containing large typically aggregated needle-shaped crystals of amoxicillin (B)