Noninvasive screening of vancomycin-associated cast nephropathy

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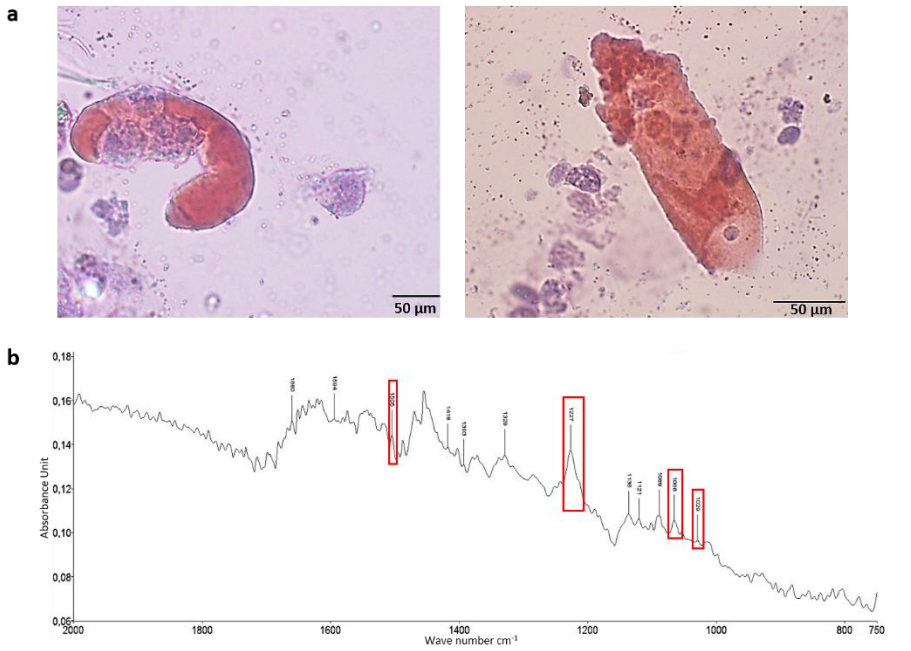
A 62 year-old male patient was initially admitted for severe SARS-Cov-2 related pneumonia. His course was complicated by acute respiratory distress syndrome warranting mechanical ventilation. His initial kidney function was normal (plasma creatinine: 70 µmol/L; eGFR: 94 ml/min). Upon weening from mechanical ventilation, *Enterococcus faecium* together with *Pseudomonas aeruginosa* pneumonia prompted treatment with piperacillin-tazobactam therapy and vancomycin (2500 mg two daily intravenous administrations). Thirty six hours following antibiotic therapy initiation, the patient developed abrupt oliguric stage 3 AKI with a peak plasma creatinine level of 570 µmol/L. On admission the patient was mildly hypertensive with an otherwise unremarkable clinical assessment. Kidney ultrasound examination was normal. Urine investigations were consistent with tubular injury by disclosing mild proteinuria (urine protein to creatinine ratio: 0.1 g/mmol) composed of albuminuria at low levels (urine albumin to creatinine ratio: 34 mg/mmol) and elevated RBP levels: 3.29 mg/l (normal range < 0.01 mg/L). The vancomycin through level was found to be greatly elevated (41 mg/L). The day following his admission urinalysis was ordered to detect vancomycin casts. Microscopic examination revealed vitreous casts on light microscopy, devoid of refringence after polarization. A pellet of urine was spread on a slide and immunostaining performed with a specific anto-vancomycin antibody (Abbot 6E-4421, 1/1000), confirmed the presence of vancomycin casts, a finding further substantiated by infrared spectrum imaging (Figure 1). Immunostaining was negative in control urine samples containing proteins or crystals. Vancomycin therapy was discontinued and the patient fully recovered his baseline kidney function within a 10 days follow-up. Recent studies have evidenced vancomycin cast intra-tubular formation on kidney pathology examination in the setting of high trough levels. Yet, as vancomycin-associated tubular injury is typically remitting with supportive care, urinalysis combined with specific immunostaining may offer a welcome non-invasive alternative diagnostic tool to kidney biopsy.

Figure 1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