

CONTINUING MEDICAL EDUCATION

CASE REPORT

The utility of urine sulphosalicylic acid testing in the detection of non-albumin proteinuria

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We report two cases of immunoglobulin light chain proteinuria (Bence Jones proteinuria) detected by simple side-room investigations: urine dipstick negative/1+, but with strong positive precipitation on addition of an equal volume of sulphosalicylic acid (SSA) 3%. We highlight a significant limitation of urine dipstick testing, namely specificity for albumin, and the utility of SSA testing for the detection of urinary free light chain immunoglobulins.

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Case 1

A 51-year-old woman with hypertension and type 2 diabetes mellitus was referred for evaluation of her chronic kidney disease. Her creatinine was 124 $\mu\text{mol/L}$, urea 5.6 mmol/L and estimated glomerular filtration rate 40 mL/min . She had a severe normocytic anaemia, with a haemoglobin of 6.5 g/dL . On further enquiry she gave a history of unintentional weight loss of 9 kg. She was pale, with no lymphadenopathy or oedema. Urine dipstick was negative for proteinuria, but the urine protein:creatinine ratio was 0.8 g/mmol (normal range $<0.02 \text{ g/mmol}$), indicating nephrotic range proteinuria. The addition of sulphosalicylic acid (SSA) to her urine caused immediate turbidity (Fig. 1). A diagnosis of multiple myeloma was

therefore suspected and serum and urine electrophoresis confirmed a monoclonal lambda peak. Serum free kappa light chains were 12.9 mg/L (3.3 - 19.4), and free lambda light chains 5 688 mg/L (5.7 - 26.3).

Case 2

A 54-year-old man presented with a 2-day history of headache and epistaxis. He was pale, with no lymphadenopathy and an otherwise normal physical examination. Initial testing revealed a severe bicytopenia: haemoglobin 6.2 g/dL , mean corpuscular volume 85.8 fL , and platelets $10 \times 10^9/\text{L}$. A peripheral smear showed occasional tear-drop cells with a leuco-erythroblastic reaction and no fragments or platelet clumping. His urea was 14.9 mmol/L and creatinine 460 $\mu\text{mol/L}$. Urinary dipstick testing showed only 1+ proteinuria, while the urine protein:creatinine ratio was markedly elevated at 1.3 g/mmol . On addition of SSA, dense turbidity was immediately noted. A diagnosis of multiple myeloma was subsequently confirmed on bone marrow biopsy. Serum free kappa light chains were 8.2 mg/L (3.3 - 19.4) and lambda light chains 27 098.0 mg/L (5.5 - 26.3).

Discussion

The urine dipstick is specific for albumin and will miss positively charged proteins in the urine, such as immunoglobulin light chains.^[1] The bedside detection of non-albumin proteinuria is aided by the use of a simple, inexpensive and often-overlooked investigation: addition of SSA 3% to urine. The degree of turbidity provides a semiquantitative method for proteinuria detection.^[2] Discordance between SSA and dipstick testing (where SSA is strongly positive and dipstick negative or low positive) mainly suggests the presence of non-albumin proteinuria, usually immunoglobulin light chain excretion.^[3] This reminder may be of particular interest to clinicians in the South African public sector, where serum and urine electrophoresis results can take 3 - 4 weeks to become available. However, SSA should not substitute urine electrophoresis, as small quantities of monoclonal free light chains may be missed.^[4]

References

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Fig. 1. Case 1. Turbidity with the urine sulphosalicylic acid 3% precipitation test. Negative dipstick test for proteinuria (white arrow-head).