Renal failure associated with colonoscopy—what is the link?

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In January 2006, a 75-year-old woman presented to her primary care physician with severe arterial hypertension and acute renal failure (ARF). She had been hypertensive for 25 years associated with stage 3 chronic kidney disease (serum creatinine 75 µmol/l and estimated GFR 45 ml/min/1.73 m² in October 2005). Her medical history was remarkable for a colic cancer treated by partial colectomy in 2002. A control colonoscopy was done in November 2005; the preparation was done with a sodium phosphate bowel purgative. Her medications included enalapril, hydrochlorothiazide, amlodipine, atenolol and aspirin. The serum creatinine was 340 µmol/l. All immunological exams were negative, and hormonal assays failed to reveal any hormonal cause for hypertension. A bilateral renal arterial stenosis was excluded by a renal angiography. In April 2006, the renal function was still impaired (serum creatinine 410 µmol/l) and the patient was referred to the nephrology unit. Clinical examination was normal, there was no proteinuria and urine sediment analysis was negative.

A kidney biopsy was performed (Figure 1).

What is the cause of her renal failure?

The diagnosis: Acute phosphate nephropathy complicated of chronic renal failure.

The kidney biopsy showed, besides mild vascular lesions related to hypertension (Figure 1A), numerous intratubular crystal deposits in the kidney parenchyma (Figure 1A–C). They were stained by Von Kossa (Figure 2), confirming the calcium phosphate nature of the deposits. So ARF was related to nephrocalcinosis, which was related to the ingestion of sodium phosphate purgative. In December 2007, the renal function was still severely impaired with an estimated GFR of 11 ml/min/1.73 m².

Discussion

Colonoscopy is a common procedure in modern health care, and it requires adequate bowel preparation. Sodium phosphate bowel preparations can lead to acute severe complications, hyperphosphataemia associated with severe hypocalcaemia leading to seizures and sometimes death, in patients with mild or severe renal impairment [1]. Besides these acute complications, nephrocalcinosis [2] (also called acute phosphate nephropathy [3]) can lead to chronic renal failure. The renal failure is secondary to intra-tubular precipitation of calcium phosphate crystals. This complication is associated with age [4] and previous renal impairment or the use of medications that may impair renal haemodynamics (diuretics, ACE, sartans and NSAID) [5]. Before using this kind of purgative, GFR must be evaluated. Physicians must be aware of acute and chronic renal insufficiency as a serious side effect of a 'not at risk' medication. Previous use of phosphate sodium enema, weeks or months before the discovery of an unexplained acute renal insufficiency, should be systematically searched.

Conflict of interest statement. None declared.

References


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Fig. 1. Kidney biopsy (Masson’s staining). (A) Multifocal calcium deposit (arrowhead) in tubular lumens with diffuse chronic tubulointerstitial injuries (Masson’s staining, original magnification ×100). (B) The tubular calcium deposit was associated with obliteration of tubular lumen and virtual loss of tubular epithelial cells. The deposits seemed to cast the tubule (Masson’s staining, original magnification ×400). (C) Extensive deposits in all the tubules with destruction of normal tubular architecture.

Fig. 2. Kidney biopsy (Von Kossa’s staining). (A) The nature and the extent of the tubular calcifications (black deposits) were well illustrated by Von Kossa staining (Von Kossa staining; original magnification ×100). (B) The radial distribution of the crystal deposits suggested a propagation of the calcium phosphate deposit around a central nidus (Von Kossa staining; original magnification ×400).