Fatal renal haemorrhage following haemodialysis in a patient with obstructive uropathy

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Summary

A 22-year-old male with obstructive uropathy and renal failure was given pre-operative haemodialysis. He collapsed five hours later. Autopsy revealed massive intrarenal haemorrhage and rupture of a dilated superior calyx intraperitoneally. Anticoagulation employed during haemodialysis was probably responsible for this spontaneous renal haemorrhage and subsequent calyceal rupture.

KEY WORDS: renal failure, uropathy, haemodialysis, calyx, haemorrhage.

Introduction

Spontaneous haemorrhage into various anatomical regions in chronically haemodialysed patients is well documented (Leonard and Shapiro, 1976; Bhasin and Dana, 1978; Vanichayakornkul *et al.*, 1974; Stewart *et al.*, 1966; Alfrey *et al.*, 1968). Such an incident resulting in fatal subdural haematoma (Leonard and Shapiro, 1976) or ovarian haemorrhage (Glass, Imrie and Gabriel, 1976) has been reported. This report represents perhaps the first case of intrarenal bleeding resulting in rupture of the superior calyx and haemoperitoneum following haemodialysis.

Case report

A 22-year-old male was admitted to the emergency urology service with oliguria of seven days duration. He had spontaneously passed many calculi per urethra since childhood but he did not seek urologi-

cal advice for this problem. Two months before admission he suffered from severe right flank pain which he ignored. On physical examination, the right kidney was palpable, smooth and mildly tender. Respiratory, cardiovascular and neurological systems were unremarkable. Laboratory investigations showed haemoglobin 12.8 g/dl, a neutrophil polymorph leucocytosis, platelet count 310×10^9 /litre, blood urea 20 mmol/litre, serum creatinine 822 μ mol/litre. The bleeding time, clotting time and prothrombin time with kaolin were normal. Abdominal X-ray showed a large soft tissue shadow in the right upper abdomen with multiple radiopaque shadows in both renal areas (Fig. 1). Infusion pyelogram (Rao *et al.*, 1978) revealed a hugely dilated right renal pelvis containing calculi. The left kidney was not visualized. He was given haemodialysis for 5 hr with systemic heparinization, as pre-operative preparation. Heparin (4,000 units) was administered intravenously at the onset of dialysis and 2,000 units after three hours. Intradialysis clotting time was maintained between 20 to 30 min. At termination of dialysis the clotting time was 14 min. Five hours after the dialysis he collapsed suddenly and resuscitative measures were unsuccessful.

Autopsy revealed two litres of blood in the peritoneal cavity. The right kidney (including calculi) weighed 750 g and showed rupture of the anterior wall of dilated superior calyx into the peritoneal cavity. The pelvicalyceal system was filled with clots and fluid blood in addition to the calculi (Fig. 2). The left kidney weighed 200 g and contained multiple calculi; it also showed scarring of the parenchyma. There was no evidence of bleeding into any other

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FIG. 1. X-ray of kidney, ureter and bladder shows a huge soft tissue shadow in the right upper abdomen. Multiple radiopaque shadows are seen in both renal areas.

major body cavity or tissue plane. Histology of the right kidney revealed features of chronic interstitial nephritis.

Discussion

As a large number of patients with chronic renal failure are enrolled in regular haemodialysis programmes, reports of bleeding into various parts of the body have been reported increasingly (Leonard and Shapiro, 1976; Bhasin and Dana, 1978; Vanichayakornkul *et al.*, 1974; Stewart *et al.*, 1966; Alfrey *et al.*, 1968; Glass *et al.*, 1976). Subdural haematoma, retroperitoneal haematoma, haematoma of the rectus abdominis, hyphaema, haemorrhagic pleural effusion, gastrointestinal bleeding, ovarian haemorrhage and haemopericardium are examples of such bleeds. Generalized clotting abnormality associated with systemic heparinization (Maher *et al.*, 1963), oral anticoagulant therapy for maintenance of the vascular device patency and platelet dysfunction including thrombocytopenia have been implicated (Bhasin and Dana, 1978).

Impacted calculi themselves can cause gross bleeding at times and this, enhanced by the anticoagulation, would have led to rupture of the obstructed

FIG. 2. Photograph of ruptured anterior surface of the superior calyx of right kidney. Arrows indicate the margins of the calyceal rupture. (The calculi and blood clots have been removed for clarity).

pelvic calyceal system in the present case. Haemostatic dysfunction associated with non-dialysable proteins such as the Von Willebrand factor could have contributed to the bleed in our patient. Maher and associates (1963) discussed the importance of regional heparinization for haemodialysis in patients who have potential for bleeding to reduce the chance of spontaneous haemorrhage. Rebound anticoagulation in cases where regional heparinization was employed has been reported by Vanichayakornkul *et al.* (1974).

Spontaneous rupture of the renal pelvis has been reported following infusion pyelography (Rao *et al.*, 1979). The contributing factors are sudden increase in intrapelvic pressure due to the diuresis induced by the urographic contrast in a partially obstructed pelvic calyceal system and diseased status of the renal pelvis. In such a situation, extravasation of contrast will be noticeable in the urogram. But at surgical exploration or autopsy, a perinephric urinoma will be found, and not massive intrarenal haemorrhage into the haemoperitoneum as in this case.

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