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Renal Allograft Rupture

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Introduction

Renal Allograft Rupture (RAR) is an unusual and serious complication of renal transplantation. Early reports gave incidences of 2.5–9.6% [1-4], while papers published since 2000 reported incidences of 0.35–2.7% [5-8]. Introduction of Cyclosporine as background immunosuppressant and use of anti-lymphocyte agents for prophylaxis and treatment of acute rejection have reduced the occurrence of RAR [3,9] presumably due to reduction in the incidence and severity of rejection.

Aetiology

RAR occurs because of trauma or any cause of swelling of the transplanted kidney. Trauma to the transplant may result from direct blunt injury [2]; insertion of a nephrostomy tube [10]; and operative [11], open [12,13] or percutaneous [9,14,15] renal biopsy. The author treated a patient whose longstanding kidney transplant ruptured following hyperextension and stretching of the abdomen while bungee jumping.

'Spontaneous' RAR is due to swelling of the allograft because of acute cellular rejection [4,5], antibody-mediated rejection [16], acute tubular necrosis [5,8,9], allograft ischaemia and focal necrosis [2,15], abscess formation [14], obstructed efferent lymphatic vessels [4,14,17], ureteric obstruction causing hydronephrosis [4,15,18] and renal vein thrombosis with or without ileo-femoral vein thrombosis [2,3,5]. Intrarenal pressure has been shown to almost double in kidneys with acute rejection [19].

Factors that may contribute to RAR include the method of kidney preservation [2,20,21], capsulotomy at the time of transplantation [11,15], a prothrombotic effect associated with cyclosporine [4] and postoperative anticoagulation [2,22] for haemodialysis, plasma exchange and prevention of thrombosis.

Presentation

Most cases of spontaneous RAR occur within the first two to three weeks after transplantation [3,9]. Patients experience sudden onset of severe pain over the transplanted kidney, simultaneous tenderness and swelling of the graft, signs of hypovolaemia and blood loss, increased drain output and oliguria if the graft is functioning [9]. Investigations to visualise the transplanted kidney are unnecessary as they may delay urgent operative intervention. Renal angiography, ultrasound, renal isotope scanning and computerised tomography [7,10,11] can confirm the clinical diagnosis by demonstrating increased transplant size, disruption of cortical integrity, parenchymal rupture and perinephric haematoma.

Management

Patients require urgent exploration of the transplant together with active resuscitation. The aim of the intervention is to control bleeding and repair the kidney, evacuate the perinephric haematoma and treat the underlying cause of the rupture. Ruptures of the renal parenchyma are usually multiple and frequently along the convex border of the kidney [9,11,16]. Every attempt should be made to salvage the transplant [7,8,9,22]. Several different methods of repair have been reported. Haemostatic material (Oxycel [9], fibrin sealant [23], fascia and muscle [21], tissue glue [24], collagen foam [17]) is placed into the split which is then over sewn [9]. The renal parenchyma is fragile but can be sutured by passing sutures through Oxycel or teflon pads [9], placed on the renal surface where the suture needle enters and exits the parenchyma. External compression can be provided by wrapping the allograft instrips of fascia [23], peritoneum [22], polyglycolide (dexon) mesh [17], polyglactin 910 (vicryl) absorbable mesh [24] or strips of lyophilized human Dura [13], if the parenchyma is deemed unsuitable for suture. Kidneys should be biopsied at the time of repair so that the underlying cause of the rupture can be identified [9]. Transplant nephrectomy is performed only if haemorrhage cannot be otherwise controlled.

Prognosis

Most reports indicate that satisfactory medium and long-term graft survival can be obtained in the absence of renal vein thrombosis [3,5,8,9,13,16,17]. Haemorrhage must

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be controlled, re-rupture and infection prevented, acute rejection (if present) [25] successfully treated and chronic allograft nephropathy avoided.

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