

Reference

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UROGENITAL TRAUMA

Long-term functional and morphological effects of transcatheter arterial embolization of traumatic renal vascular injury

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BJU Int. 2008; 101: 473-7

Objective: To assess the long-term morphological and functional outcome of superselective transarterial embolization (TAE) for treating traumatic renal vascular injury.

Patients and Methods: The surgical records of 124 patients with traumatic renal vascular injury managed by TAE between 1990 and 2004 were reviewed, of whom 81 completed a long-term follow-up and were included in the final analysis. Patients were followed using serum creatinine levels, grey-scale ultrasonography, intravenous urography (IVU) and radioisotopic renography using (99m)Tc-mercapto-acetyl triglycine (MAG3) and (99m)Tc-dimercaptosuccinic acid (DMSA).

Results: Embolization resulted in the cessation of haematuria in all patients but two (97.5%). At 3 months, serum creatinine levels increased in four of nine patients with a solitary kidney, but only one of them required haemodialysis. After a mean follow-up of 4.6 years, IVU showed a normal calyceal configuration in 70% of renal units, pyelonephritic changes in 26% and no dye excretion in 4%. DMSA scans showed no evidence of photopenic areas in 17 renal units (21%). The mean (sd) percentage of DMSA uptake by the corresponding kidney improved from 24 (9)% at the 3-month scans to 32 (10)% at the last follow-up scan ($P < 0.001$). Using MAG3, the mean (sd) glomerular filtration rate improved significantly from 26 (11) mL/min at the 3-month scan to 32 (9) mL/min at the last follow-up ($P < 0.05$).

Conclusions: Superselective TAE is safe and effective for traumatic renal vascular injury. The short-term deleterious effects were more pronounced in patients with a solitary kidney. The long-term follow-up showed functional and morphological improvements in the embolized renal units.

Minimally invasive endovascular techniques to treat acute renal hemorrhage

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J Urol. 2008; 179: 2248-52; discussion 2253

Purpose: We evaluated the effectiveness of endovascular therapy for severe renal hemorrhage.

Materials and Methods: We retrospectively reviewed cases compiled from the trauma database, billing records and interventional radiology logs at our institution from 1990 to 2007. Technical success was defined as the cessation of bleeding after angiographic embolization. Clinical success was defined as the absence of recurrent hematuria without the need for additional embolization.

Results: A total of 26 patients underwent angiography and endovascular treatment for renal hemorrhage. Mean patient age was 42 years (median 37, range 7 to 70). There were 20 males and 6 females. Mean clinical followup was 11.7 months. The mechanisms of injury were iatrogenic in 6 cases (renal biopsy in 5 and post-percutaneous nephrostomy placement in 1), trauma in 16 (blunt in 10 and penetrating in 6) and spontaneous rupture of a renal mass in 4. At presentation 16 patients (62%) were hemodynamically stable, while 10 (38%) were in shock. A total of 11 patients (42%) presented with gross hematuria, 7 (27%) had microscopic hematuria and 8 (31%) had no evidence of hematuria. A total of 16 patients (62%) had kidney injuries alone, while 10 (38%) also had significant concurrent injuries. Treatment failed in all 5 grade 5 acute renal injuries (100%) caused by external trauma. Technical and clinical success was achieved in 22 (85%) and 17 patients (65%), respectively.

Conclusions: Superselective embolization therapy for renal trauma provides an effective and minimally invasive means to stop bleeding. Overall our complication rate was minimal. Most renal traumas, including most grade 4 injuries, were effectively managed by conservative therapy. Embolization proved effective for grade 4 renal trauma for which conservative therapy failed. In our series embolization failed when applied to grade 5 injuries.

Editorial Comment

There has been a growing body of literature lately in support of managing the injured kidney with early angiography and embolization. Embolization therapy for the blunt splenic injury has been highly effective and successful. Once the decision has been made to manage the kidney injury nonoperatively, it appears that relative inclusion criteria for the use of selective embolization is symptomatic gross hematuria after penetrating renal trauma, contrast blush on CT scan (intravascular contrast extravasation), need for > 3 u RBC transfusion in a 24 hour period, or a symptomatic delayed renal bleed. Delayed renal bleeding typically occurs in 1-2 weeks after injury, when the clot lysis and there is hematoma liquefaction. In general, significant delayed bleed with observed AAST G3 or G4 renal injuries is very rare with blunt trauma 1%, but can occur in up to 24% with isolated penetrating injuries. As to effectiveness, kidney embolization is about 85% technically successful (the vessel can be embolized and subsequent show no flow on angiography) and about 65% clinically successful (35% will re bleed despite a technically and well performed embolization). Complications of post segmental infarction are rare, with pyrexia and fevers in about 10%, and persistent hypertension in less than 1%.

Renal bleeding from the kidney is usually due to a pseudoaneurysm or AV fistula. Embolizations of such vascular injuries are typically performed with permanent coils made from platinum. In our institution, we prefer the Tornado coils by Cook Urological. The Tornado coils come in 0.018", 0.035" and 0.038" wire size and once deployed are conical in shape 2 – 3 mm diameter. Platinum coils are highly radio-opaque and are of a softer metal so that they can achieve a tighter pack and have less vessel wall injury. To promote thrombogenicity attached to the coil walls are multiple Dacron side fibers.

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