

PELVIC FRACTURE COMPLICATED BY BILATERAL URETERAL OBSTRUCTION: CASE REPORT

Patti Flint, MD, and Charles F. Allen, MD, FACS

A case of pelvic fracture with pelvic hematoma resulting in bilateral ureteral obstruction and acute renal failure is discussed. Treatment was with bilateral tube nephrostomies, resulting in prompt resolution of renal failure. Urinary tract obstruction is a rare problem associated with pelvic fracture that can be recognized and treated early to minimize morbidity related to obstructive uropathy.

THE INCIDENCE of genitourinary tract injuries associated with pelvic fracture is 12% to 16%.¹ Most commonly, bladder rupture, urethral injuries, or both are incurred.² These injuries generally are caused by compressive or shearing forces. Obstructive uropathy, a rarely described mechanism of urinary tract injury associated with pelvic fracture not often mentioned in the literature, is the subject of this case report.

CASE REPORT

A 27-year-old female unhelmeted motorcycle passenger was thrown to the ground and then dragged 30 yards during a motorcycle crash. She suffered a brief loss of consciousness but was awake and alert during transport to the trauma center. Her systolic blood pressure was 105 mm Hg at the scene and 120 mm Hg in the trauma room. Pertinent findings on physical examination included a 12-cm right temporal scalp laceration, benign abdomen, and a tender right hip. Her pelvis was stable and nontender and there was no perineal bruising or blood at the urethral meatus. A Foley catheter was placed and her urine tested positive by dipstick for blood. Roentgenograms revealed a right parietal skull fracture, bilateral inferior pubic rami fractures, right superior pubic ramus fracture, and a left sacral compression fracture. The sacroiliac joints appeared normal (Fig. 1). An intravenous pyelogram (IVP) demonstrated only medial displacement of the right ureter and bladder (Fig. 2). Hemoglobin and hematocrit were 11.9 and 33.8, respectively.

Computed tomographic (CT) scans of the head, abdomen, and pelvis revealed a minimally depressed right temporoparietal skull fracture, a right zygoma fracture, and pelvic fracture as described above, with associated pelvic hematoma (Fig. 3). The patient was intubated because of combativeness and then transported to the intensive care unit. Repeat hemoglobin and hematocrit were 8.7 and 24.5, respectively, and two Units of packed red blood cells were transfused. Post-transfusion hemoglobin and hematocrit were 6.8 and 19.4, respectively. The patient became hypotensive and was noted to have developed a lower abdominal mass. To rule out intra-abdominal hemorrhage a repeat abdominal and pelvic CT scan was obtained and



Figure 1. Plain AP film revealing multiple pelvic rami fractures.

revealed a 10 × 16 × 18 cm pelvic hematoma with posterior displacement of the bladder (Fig. 4). Angiographic studies revealed extravasation from the right obturator and inferior pudendal arteries and these were embolized with Gelfoam pledgets (Fig. 5). Blood pressure stabilized at 130 mm Hg systolic.

The patient developed a mild coagulopathy and was transfused with multiple units of packed red blood cells, fresh frozen plasma, and platelets. Twelve hours after the angiogram the patient became anuric and her creatinine level had risen to 2.4 mg/dL. A Swan-Ganz catheter was placed and revealed adequate CVP and wedge pressures. A flat-plate film of the abdomen was obtained. Retained dye in the urinary tract revealed bilateral hydronephrosis, left hydroureter, nonopacification of the right ureter, and a collapsed bladder (Fig. 6). A right nephrostomy tube was placed with immediate production of 100 to 300 mL/hour of urine. The patient's serum creatinine level normalized within 36 hours. Forty-eight hours after the right nephrostomy tube was placed a renal ultrasound study revealed persistent left hydronephrosis and hydroureter; therefore a left nephrostomy tube was placed.

From the Trauma Service, Good Samaritan Regional Medical Center, Phoenix, Arizona.

Address for reprints: Patti A. Flint, MD, Trauma Service, Good Samaritan Regional Medical Center, 1130 E. McDowell Rd., Suite B-10, Phoenix, AZ 85006.

The patient developed *Enterobacter* pneumonia but was extubated on hospital day 10. Antegrade ureterograms on hospital day 11 revealed a patent right ureter. The right nephrostomy tube was removed. The left nephrostomy tube was removed several weeks later while the patient was in rehabilitation. She was discharged from rehabilitation ambulating.

DISCUSSION

Pelvic fracture is a severe injury that carries with it a mortality rate of 5% to 20%.³ Associated abdominopelvic injuries are common, with bladder rupture and urethral tears occurring in 12% to 16% of pelvic fractures.¹ Extraperitoneal bladder rupture is more common than intraperitoneal rupture, occurring 85% and 15% of the time, respectively.³ Diagnosis of these injuries requires retrograde urethrograms, cystograms, and intravenous pyelography (IVP). Many different recommendations exist for use of these studies in patients with pelvic fractures. It is now known that microscopic hematuria alone is a poor predictor of genitourinary tract injuries, and more judicious use of these studies can be implemented without fear of missing serious injuries. In a retrospective analysis of 156 patients undergoing IVP for hematuria following blunt trauma Guice et al. found that if IVPs were reserved for patients with only 4+ or gross hematuria, no patients with genitourinary tract injuries would



Figure 2. Intravenous pyelogram revealing medial displacement of the right ureter and bladder.



Figure 3. CT scan of abdomen and pelvis revealing hematoma.



Figure 4. Repeat CT scan of abdomen and pelvis revealing increasing size of hematoma and dilation of ureters.

have been missed and 75% of their cohort would not have had the study.⁴ Any recommendation regarding use of diagnostic studies has to be tempered by the clinical situation at hand. Patients with pelvic fracture and hemodynamic instability, lower rib fractures, flank hematomas, or high-riding prostate obviously warrant IVP examination regardless of findings on urinalysis.

Hemorrhage associated with pelvic fracture is not uncommon. In a study by Rothenberger of 604 patients with pelvic fractures, 72 patients died; 30% as a result of uncontrollable hemorrhage.⁵ Attempts to control hemorrhage with angiographic embolization and or stabili-

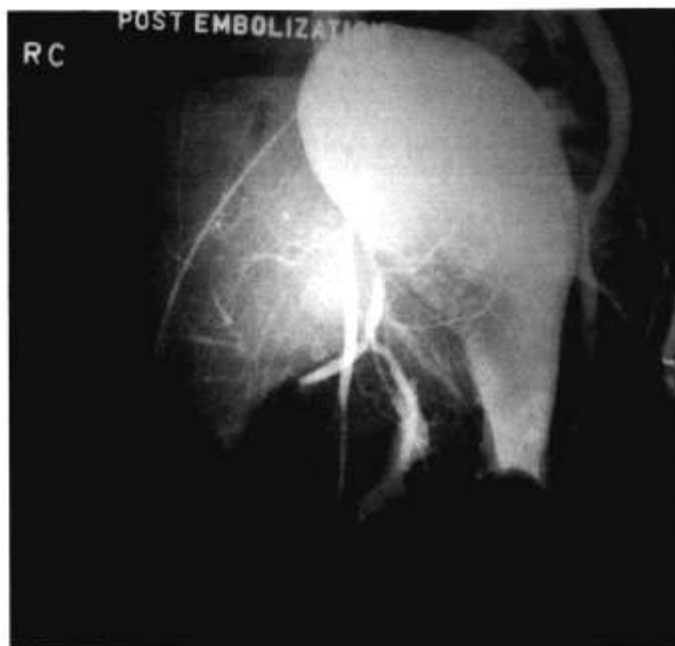


Figure 5. Angiogram obtained during embolization of the right obturator and inferior pudendal arteries.



Figure 6. Flat plate of the abdomen showed retained dye in the urinary tract, bilateral hydronephrosis, left hydroureter, and non-opacification of right ureter.

zation are moderately successful but these must be employed early to attempt to decrease the 75% mortality rate associated with major vessel injuries and pelvic fracture. Sepsis associated with an infected pelvic hematoma can be lethal alone but also increases the risk of pulmonary emboli, ARDS, and renal failure.

We found only three reports of obstructive uropathy associated with pelvic fracture and hematoma as a cause of renal failure in the recent literature. Two of these patients had bladder outlet obstruction and were treated successfully with suprapubic cystostomy.⁶ One had ureteral obstruction and was treated by attempted drainage of a large retroperitoneal hematoma. This patient subsequently died of sepsis.⁵ The patient in our report suffered from bilateral ureteral obstruction and consequent renal failure. The cause of renal failure was initially felt to be hypotension and contrast nephropathy. However, bilateral hydroureter and prompt brisk urine output on placement of nephrostomy tubes confirmed the diagnosis of obstructive uropathy. If an obstructive cause had not been considered, further damage to the kidneys could have occurred.

Preventing sepsis in patients with pelvic hematoma and obstructive uropathy is paramount; therefore a treatment modality must be chosen carefully. This patient could not have her legs abducted to allow placement of ureteral stents through the bladder, so nephrostomy tubes were used. Surgical exploration to remove hematoma should be avoided because of the increased risk of sepsis and further hemorrhage.

In summary, genitourinary injuries associated with pelvic fracture are not uncommon. Diagnosis of these injuries requires appropriate studies including urethrography, cystography, and IVP. Uncontrollable pelvic hemorrhage is a major cause of death associated with pelvic fracture. Angiography, embolization, and pelvic stabilization should be instituted early to attempt to decrease the morbidity and mortality associated with pelvic hemorrhage. Urinary outflow tract obstruction must be considered in patients who have pelvic hematoma and renal failure. Effective treatment can be instituted without increasing the risk of sepsis by using nephrostomy tubes.

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