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experience with nonoperative management of blunt renal injuries in order to evaluate the utility of routine follow-up imaging.

METHODS: We reviewed the records of patients with blunt renal injury managed nonoperatively at our institution between 1/2002 and 1/2006. All injuries were diagnosed by CT imaging and graded according to the American Association for the Surgery of Trauma (AAST) renal-injury severity scale. Follow-up CT imaging was obtained routinely on all patients managed by the urology service. Data was compiled from chart review, and clinical outcomes were correlated with imaging results. Student's t test was used to compare outcomes between patients with low grade (I-III) and high grade (IV-V) injuries.

RESULTS: 207 patients were identified. 120 (58%) patients were male and 87 (42%) were female. Average age was 35 (range: 15-80). Average Glasgow Coma Score (GCS) was 13.6 (range: 3-15). AAST grades I, II, III, IV, and V were assigned to 34 (16%), 65 (31%), 80 (39%), 26 (13%), and 2 (1%) renal units, respectively. Average BMI among patients with low grade injury was 26.6, compared to 27.0 among patients with high grade injury ($p=0.81$). 176 (85%) patients underwent routine follow-up imaging 24-48 hours after admission. After follow-up imaging, renal injuries were downgraded in 4 (22%), 5 (9%), 9 (12%), 1 (4%), and 0 cases of grade I, II, III, IV, and V injury, respectively. Renal injuries were upgraded in 0, 2 (4%), 2 (4%), 0, and 0 cases of grade I, II, III, IV, and V injury, respectively. Overall, the rate of injury downgrading was 12% for low grade injury and 4% for high grade injury ($p=0.18$). The rate of injury upgrading was 3% for low grade injury and 0% for high grade injury ($p=0.32$). In 2 cases of grade IV renal injury, a ureteral stent was placed after serial imaging demonstrated persistent extravasation. In no other cases did follow-up imaging affect clinical management. There were no complications among cases for which follow-up imaging was not obtained.

CONCLUSIONS: Routine follow-up imaging is unnecessary for blunt renal injuries of grades I-III. Grade IV injuries can be followed clinically without routine follow-up imaging, but urine extravasation may necessitate serial imaging to guide management decisions. The volume of grade V renal injuries in this study is not sufficient to support or contest the need for routine follow-up imaging.

Source of Funding: None

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ANGIOGRAPHY AND EMBOLIZATION IN THE MANAGEMENT OF RENAL HEMORRHAGE

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INTRODUCTION AND OBJECTIVE: To evaluate the effectiveness of endovascular therapy in the treatment of severe traumatic renal hemorrhage.

METHODS: A retrospective review was performed on cases compiled from the SFGH trauma database, billing records and interventional radiology logs from 1990-2005. Technical success was defined as cessation of bleeding after embolization. Clinical success was defined as the absence of recurrent hematuria without need for additional embolization.

RESULTS: 18 patients underwent angiography and endovascular treatment of renal injury. Mean patient age was 38 (range 7-61, median 37). There were 14 males and 4 females. Mean clinical follow-up was 11.7 months. The mechanism of injury were 6 iatrogenic (5 renal biopsies and 1 post-percutaneous nephrostomy placement), 9 traumatic cases (6 blunt and 3 penetrating) and 3 cases of spontaneous rupture of renal mass. At the time of presentation, 10 patients (55%) were hemodynamically stable, while 8 (45%) were in shock. Seven patients (39%) presented with gross hematuria, 6 (33%) had microscopic hematuria and 5 (28%) had no evidence of hematuria. Thirteen patients (72%) had kidney injuries alone, while 5 (28%) also had significant concurrent injuries. Ten patients (55%) underwent a single endovascular intervention requiring no further therapy. Four patients (22%) were treated with embolization after renal surgery. Five patients (28%) underwent renal surgery after endovascular therapy. Three patients (16%) who developed spontaneous hemorrhage of a renal mass all underwent nephrectomy after embolization. Technical and clinical success was achieved in 16 patients (89%) and 11 patients (61%), respectively.

CONCLUSIONS: Super-selective embolization therapy for renal hemorrhage provides an effective and minimally invasive means to stop bleeding and to preserve renal parenchyma. Its future use in the

treatment of trauma is likely to grow. Randomized trials are needed to demonstrate superiority over conventional surgical therapy.

Source of Funding: None

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TREATMENTS OF POSTERIOR URETHRAL INJURIES ASSOCIATED WITH PELVIC FRACTURES: A META-ANALYSIS

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INTRODUCTION AND OBJECTIVE: Treatment of the patient with severe mechanical trauma and urethral disruption remains controversial. Debate continues regarding the advisability of early realignment versus delayed open urethroplasty. We review the effects of these two therapies (by the rate of subsequent urethral stricture, impotence, incontinence and the percentage of strictures needing urethroplasty) to determine which is the most appropriate therapy for posterior urethral injuries associated with pelvic fractures.

METHODS: A systematic review of all the relevant clinical trials was performed. Trials were identified from specialized trials register of Cochrane UGDP Group, the Cochrane library, additional electronic search (mainly MEDLINE, EMBASE, CBM) and handsearching. Clinical trials comparing early realignment and delayed open urethroplasty of posterior urethral disruption associated with pelvic fractures were included. No language and blinding limitations were applied. Statistics analysis was managed with Review Manager 4.2.

RESULTS: Ten clinical trials including 470 patients were included. Meta-analysis indicated that odds ratio (OR) of the rate of urethral stricture was 0.27 (95% confidence interval (95% CI) [0.08, 0.86], $P=0.03$). The OR of the percentage of strictures was 0.22, 95% CI [0.07, 0.75], $P=0.01$. There's no significant difference of impotence and incontinence between the two therapies, OR=0.98, 95% CI [0.60, 1.60], $P=0.93$ and OR=0.74, 95% CI [0.37, 1.45], $P=0.37$, respectively.

CONCLUSIONS: Early realignment may provide better outcomes than delayed open urethroplasty after posterior urethral disruption. It can decrease urethral stricture formation and the percentage of strictures needing urethroplasty and not increase the rate of impotence and incontinence. But we can't exclude the results were influenced by the bias of grouping, especially the severity of injuries.

Source of Funding: None

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TISSUE BIOREACTOR SYSTEM FOR THE CREATION AND MATURATION OF ORGANIZED FUNCTIONAL TISSUES FOR SURGICAL RECONSTRUCTION

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INTRODUCTION AND OBJECTIVE: One of the major challenges in engineering clinically applicable functional tissues for reconstructive procedures is the lack of a bioreactor system that would accelerate cellular organization and tissue formation. We developed a computerized bioreactor system that could allow for enhanced bladder tissue formation. In this study we investigated whether organized functional muscle tissue could be engineered using the 3-D bioreactor system for surgical reconstruction.

METHODS: The computerized bioreactor system consisted of an actuator mounted on a tissue container that permits a controlled cyclic strain to the muscle scaffolds. Primary human muscle cells were seeded onto scaffolds and were placed in the bioreactor system to exert $\pm 10\%$ stretch of the scaffolds (3 times/min for the first 5 min/hour) for up to 3 weeks. The cell constructs were assessed for structural and functional parameters using histo- and immunohistochemistry, scanning electron microscopy and organ bath studies in vitro and in vivo.

RESULTS: The bioreactor engineered muscle produced viable tissue with cellular organization. SEM showed uniform cell attachment on the scaffold. The engineered muscle showed unidirectional orientation by 5 days and continued to mature with time. Presence of organized myofibrils was evident with the expression of muscle markers. The scaffolds without stimulation showed disorganized muscle cells without any orientation. The engineered muscle showed a reproducible contractile response to KCl ($p<0.05$).

CONCLUSIONS: This study shows that organized functional muscle can be engineered using a computerized bioreactor system.