INTRODUCTION
Since the paintball game was introduced to the United States more than two decades ago, the popularity of this recreational sport has grown significantly. It is estimated that, as of 2002, more than 12 million people in over 6000 paintball sites have participated in this simulated combat sport (1). With the rising popularity of this recreational sport supported in part by a rapid industry growth, there has been a steady rise in the incidence of paintball-related injuries (1). Because a paintball firearm is capable of firing paint-filled gelatin pellets at a high velocity, this recreational weaponry can cause significant blunt injury to bodily organs upon impact. Although the majority of reported injuries are related to ocular damage, recent reports have underscored the potential for paintball-related injuries (1). Because a paintball firearm is capable of firing paint-filled gelatin pellets at a high velocity, this recreational weaponry can cause significant blunt injury to bodily organs upon impact. Although the majority of reported injuries are related to ocular damage, recent reports have underscored the potential for severe bodily injury caused by paintball weaponry (2–4). In this report, we describe a case of subcapsular renal hematoma caused by a paintball pellet strike.

CASE REPORT
A 56-year-old man presented to the hospital with hematuria 3 h after being shot in the right flank by paintball pellets during a simulated war game. He was shot from a distance of approximately 10 feet. At the time of his injury, he was wearing a T-shirt without protective body gear. He denied falling or sustaining any blunt trauma after the paintball pellet strike. He complained of right flank pain that was dull, constant, and non-radiating. Physical examination revealed moderate tenderness in the right flank region with focal skin ecchymosis. He was not on any medications. Laboratory studies showed normal complete blood count, platelet count, serum electrolytes, and coagulation profile.

Due to the hematuria and flank pain, an abdominal computed tomography (CT) scan was obtained, which revealed a subcapsular hematoma of the right kidney (Figure 1). No other associated pathology or injury was noted. The patient was treated with analgesics and complete bed rest for the first 3 days of hospitalization. He remained hemodynamically stable as his clinical course gradually improved. There was no change in the hemoglobin or hematocrit. The hematuria resolved on hospital day 3, and the patient was discharged home on hospital day 4. He was followed-up with serial abdominal CT scans every 3 months. The renal subcapsular hematoma was completely resolved on the CT scan at a 9-month follow-up visit.

DISCUSSION
Paintball game is a simulated combat sport in which players attempt to shoot one another with compressed-
gas guns. These weapons fire small paint-filled gelatin spheres at 300 feet per second, turning them into small projectile missiles (1). These pellets are filled with non-toxic, water-soluble paint with an average diameter of 10 mm and a weight of 0.8 gram. With adequate protection they do not penetrate the skin, but at this velocity, the spheres have sufficient kinetic energy to cause significant blunt trauma. Recent data show that the incidence of Emergency Department-treated paintball injuries rose from 926 in 1997 to 2780 in 2000 (1). Approximately two-thirds of these injuries are caused by ocular damage, with >40% of these involving the pediatric age group (5). Similar paintball weaponry also has been adapted by law enforcement agencies to fire dry powder pepper ammunition for riot control or self-defense against animals.

The vast majority of injuries resulting from paintball trauma involve the eyes (6). Only two other non-ophthalmological severe traumas caused by paintball pellets have been reported in the literature (2,3). A case of traumatic aneurysm of the superficial temporal artery was reported (3). A second case was a young man who suffered acute myocardial infarction during a simulated war game when he was struck by paintball pellets in the thorax (2). Due in part to the abdominal musculature and fascial protection, blunt injury to the abdominal organs caused by paintball projectile is rare.

Isolated blunt injury to the kidney is itself rare, seen in <4% of patients who sustain blunt abdominal trauma (7). These injuries may include contusions, subcapsular and perinephric hematomas, and superficial lacerations. Wilson and Ziegler evaluated 112 patients with renal trauma, and differentiate the various causes of renal injury (7). Among a total of 112 patients who sustained renal injuries, 74% were due to penetrating missile injuries, 16% were due to stab wounds, and 10% resulted from blunt trauma (7). Although trauma is the most frequent cause of renal injury, physicians have reported other causative mechanisms (8). Maziak and colleagues report that extracorporeal shock-wave lithotripsy can lead to symptomatic perinephric hematoma, with incidences ranging from 0.2% to 0.66% (8). Lastly, spontaneous perinephric hemorrhage has been documented in patients with certain medical comorbidities, including chronic anticoagulation, chronic hemodialysis, renal tumor, and human immunodeficiency viral infection (9).

If blunt renal trauma is suspected, an abdominal CT scan is the preferred imaging modality. Intravenous urography is used for gross assessment of renal function in hemodynamically unstable patients (9). The presence of urinary extravasation and large devitalized areas on a CT scan necessitates surgical intervention. If the diagnosis of perinephric or subcapsular hematoma is made in stable patients, non-operative conservative treatment should be utilized. Our patient was managed with bed rest with supportive care, and he was discharged home after an uneventful hospital course. He was followed serially with CT scans that demonstrated complete resolution of the renal injury.

In conclusion, our case represents a case of paintball-pellet-related subcapsular hematoma of the kidney. The clinical symptoms of hematuria and flank pain in our patient improved with expectant management. Participants of this combat sport should wear appropriate protective gear to minimize the bodily impact of paintball pellets. Physicians should be cognizant of the potential injury to abdominal organs that are susceptible to paintball-related blunt trauma.

REFERENCES