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# Abdominal Injuries in the “Found Down”: Is Imaging Indicated?



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**BACKGROUND:** We sought to investigate the incidence of abdominal injuries in “found down” trauma patients to better understand the value of emergency department (ED) imaging. Found down patients are at high risk for injuries to the head or neck and low risk to the abdomen or pelvis, so imaging with CT of the abdomen/pelvis (AP) or Focused Assessment with Sonography for Trauma (FAST) is of questionable value.

**STUDY DESIGN:** The trauma registry was queried over a 10-year period ending December 2013 for found down patients. Demographics, CT AP, FAST scans, and injuries were abstracted from the trauma registry and then through a confirmatory chart review. The primary outcome was significant abdominal or pelvis injury, defined as abdomen/pelvis Abbreviated Injury Scale (AIS)  $\geq 3$  or an abdominal injury that required operative intervention. The secondary outcome was mortality due to abdominal injury.

**RESULTS:** Of the 342 patients who met inclusion criteria, mean Glasgow Coma Scale (GCS) was 11.0, and 189 (60%) of those tested for alcohol were intoxicated. Abdominal imaging included: CT AP only, 88 (57%); FAST only, 37 (24%); and CT AP and FAST, 29 (19%). Neither CT AP nor FAST scan led to a change in treatment and no patient had abdomen/pelvis AIS  $\geq 3$ . Overall mortality was 33 (10%). The 24 trauma deaths were attributed to serious head trauma ( $n = 16$ ) or traumatic arrest in the ED ( $n = 8$ ); the 9 medical deaths were due to cerebral vascular accident ( $n = 5$ ) or sepsis ( $n = 4$ ).

**CONCLUSIONS:** Although patients found down have a high mortality, abdominal injuries identified by imaging are highly unlikely. Efforts should focus on rapidly identifying and treating other causes of mortality, especially trauma to the head and neck, or medical diagnoses such as cerebral vascular accident or sepsis. (J Am Coll Surg 2015;221:17–24. © 2015 by the American College of Surgeons)

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A patient found unconscious in the field challenges diagnostic and treatment skills in the trauma bay. Without the patient’s history, management could be either surgical or medical.<sup>1</sup> Causes of altered mental status can be toxicologic, metabolic, infectious, psychological, or neurologic

in nature,<sup>2–4</sup> or multifactorial, such as an intoxicated patient who falls.<sup>5</sup> Elderly patients are especially likely to present with more severe injuries when the mechanism is unknown.<sup>6–8</sup> Often a description of the inciting event, mechanism, and findings provided by prehospital personnel guides the initial evaluation and resuscitation.<sup>9,10</sup> Because this contextual information is lacking in patients with no clear mechanism of injury,<sup>1</sup> these patients are designated at emergency department (ED) admission as “found down.” Found down patients require significant resources to appropriately triage, diagnose, resuscitate, and definitively treat<sup>1</sup> due to the high acuity care necessary to avoid delays and misdiagnosis.<sup>11,12</sup>

To evaluate the found down patient for abdominal or pelvis trauma, CT abdomen/pelvis (AP) is highly sensitive at detecting most injuries, evaluating solid organs, and identifying intraperitoneal air or fluid,<sup>13–20</sup> while

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**Abbreviations and Acronyms**

AIS	= Abbreviated Injury Scale
AP	= abdomen/pelvis
ED	= emergency department
FAST	= Focused Assessment with Sonography for Trauma
GCS	= Glasgow Coma Scale
ISS	= Injury Severity Score
LOS	= length of stay

abdominal ultrasound is rapid, portable, and noninvasive.<sup>21,22</sup> Abdominal ultrasound was incorporated into the acute resuscitative environment in the 1990s<sup>23,24</sup> and the Focused Assessment with Sonography for Trauma (FAST) improved the management of abdominal trauma, resulting in a significant increase in its use.<sup>21,22,25,26</sup> Both CT AP and FAST are invaluable adjuncts in the management of abdominal trauma when used selectively based on a combination of hemodynamic status and clinical findings.<sup>22</sup> Because there is a lack of guidelines regarding the appropriate use of imaging in the found down patient, we sought to investigate the value of these studies in this population.<sup>11</sup> The objective of this study was to characterize the utility of CT AP and FAST when evaluating abdominal injuries in patients who present with the diagnosis of found down. We hypothesized that found down patients are at high risk for injuries to the head or neck and low risk to the abdomen or pelvis, so imaging with CT AP or FAST is of little value.

**METHODS**

A retrospective trauma registry review was performed for all patients presenting to Cedars-Sinai Medical Center, a single-institution level I trauma center, with the "found down" diagnosis between January 1, 2004 and December 31, 2013. Trauma patients with the following mechanisms of injury were included: unconscious, "found down," or altered mental status. After trauma registry patients were identified, electronic charts for all patients were reviewed to confirm demographic and clinical data. The data extracted included age, sex, Injury Severity Score (ISS), admission Glasgow Coma Scale (GCS) score, regional Abbreviated Injury Scale (AIS), abdominal imaging, blood alcohol concentration, and drug abuse panel, which tests for opiate, cocaine, amphetamine, phencyclidine, methadone, benzodiazepine, propoxyphene, and cannabinoid, and mortality.

Initial analysis included all 342 found down patients who were thought to have traumatic injuries. Of these patients, 188 did not have any abdominal imaging on admission, but may have had other studies such as chest or pelvis

x-rays, CT head, CT c-spine, CT chest, or extremity x-rays. Of those who had abdominal imaging on admission ( $n = 154$ ), patients were stratified into 3 groups according to the type of abdominal imaging: CT AP only, FAST only, or both CT AP and FAST. The CT AP was considered positive for any free fluid, solid organ injury, hollow viscus injury, vascular injury, or pelvic fracture. Results of FAST scan were obtained from history and physical documentation, or as recorded in a procedure encounter note. The FAST was considered positive for any free fluid, evidence of solid organ injury, pericardial fluid, or lack of cardiac motion.

Admission physical exam, imaging findings, and discharge diagnoses were reviewed to categorize patients as either trauma or medical. Our retrospective categorization of trauma or medical diagnosis did not necessarily reflect how patients were initially triaged in the ED. Of note, the trauma surgery team evaluated all 342 patients, so all patients had a trauma work-up.

The primary outcome was significant abdominal injury, defined as abdomen/pelvis (AP) AIS  $\geq 3$ , or injury requiring operative intervention. The secondary outcome was mortality due to abdominal injury. Data were analyzed to determine if abdominal imaging altered the primary or secondary outcome. Descriptive statistics were summarized using raw percentages, means, and standard deviations (SD). The Pearson's chi-square test and Fisher's exact test were used to compare differences in proportions for categorical variables. Numerical variables were summarized by means, with  $p$  value of  $< 0.05$  considered significant. This study was approved by the Institutional Review Board of Cedars-Sinai Medical Center.

**RESULTS**

During the 10-year analysis, 342 patients were identified as found down at ED admission (Table 1). Mean age was  $46.5 \pm 18.6$  years, 83% were male, and mean admission GCS was  $11.0 \pm 4.0$ . Of 342 patients, 313 (92%) were tested for blood alcohol and 189 (60%) had alcohol present. Of those who tested positive, 181 (96%) patients had a blood alcohol level greater than 0.08 g/dL and the mean alcohol level was  $0.209 \pm 0.2$  g/dL. The mean ISS was  $6.8 \pm 9.1$ , 62 (18%) patients had an ISS score  $\geq 16$ , and 80 (23%) had a head AIS  $\geq 3$ . Mean AP AIS was  $0.03 \pm 0.24$ , and no patient had AP AIS  $\geq 3$ . Mean ICU and hospital length of stay were  $2.4 \pm 4.4$  days and  $6.7 \pm 15.9$  days, respectively. Overall mortality was 33 (10%).

Of 342 patients, 188 (55%) did not have any abdominal imaging, but may have had other studies performed such as CT head, CT c-spine, CT chest, and/or x-rays

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