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Anterior abdominal stab injury: a comparison of self-inflicted and intentional third-party stabbings

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Abstract

BACKGROUND: There is minimal literature comparing self-inflicted (SI) with non-self-inflicted (NSI) anterior abdominal stab wounds (AASW).

METHODS: Adult patients treated at a level 1 trauma center from 2006 through 2011 with an AASW were reviewed.

RESULTS: There were 215 patients with an AASW; 20% were SI. NSI patients had more nonabdominal injuries (47% vs 16%, $P < .01$) and disposition directly to the operating room (45% vs 26%, $P = .02$). Intra-abdominal injury rates were similar. One hundred twenty-eight patients had isolated AASWs; 28% were SI. SI patients had higher admission rates (86% vs 63%, $P = .01$). One hundred three patients had isolated stable/asymptomatic AASWs; 31% were SI. SI patients had more admissions (84% vs 52%, $P < .01$), had higher intensive care unit admission rates (23% vs 5%, $P = .01$), longer LOS (3.2 vs 1.4, $P < .01$), and higher hospital charges (\$18,000 vs \$11,000, $P < .01$). The rates of intra-abdominal injury were again similar.

CONCLUSIONS: Controlling for extra-abdominal injuries, SI AASW patients have similar rates of intra-abdominal injury but use more resources.

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It is estimated that there were an average of 420,000 visits to US emergency departments per year for attempted suicide or intentional self-harm from the years 1993 through 2008 or 1.5 visits per 1,000 US population.¹ Suicide remains a significant cause of death in the United States. In 2008, it was the 3rd leading cause of death among those 15 to 24 years of age, the 2nd for ages 25 to 34, and the 4th for those aged 35 to 54 years.² Suicide by stabbing

is rare, representing 1.6% to 3% of all suicides.^{3,4} Previous reports derived from psychiatric and forensic sources provide limited clinical information on patients with self-inflicted stab wounds to aid the trauma provider.⁵⁻⁷

Data on clinical characteristics and outcomes of self-inflicted abdominal stab wounds suggest that self-inflicted abdominal stab wounds can result in significant yet often nonlethal abdominal and retroperitoneal injuries.⁸ Many of these studies rely on hospital admission data and may therefore understate the true burden of these injuries. In addition, we were unable to find any studies that directly compared the demographics, pattern of injury, diagnostic workup, and outcomes of patients with self-inflicted abdominal stab injuries compared with non-self-inflicted injuries. In

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the absence of hard signs of intra-abdominal injury, trauma and emergency medicine providers may have a lower index of suspicion for self-inflicted abdominal stab wound patients, which may lead to a delay in diagnosis or missed injury.

Therefore, we sought to review the characteristics, clinical features, and outcomes of patients who presented to the emergency department (ED) with self-inflicted anterior abdominal stab wounds and to compare them with patients having non-self-inflicted anterior abdominal stab wounds. We hypothesized that patients with self-inflicted wounds would be less severely injured overall and have lower rates of intra-abdominal injury than patients with non-self-inflicted anterior abdominal stab wounds.

Methods

After institutional review board approval, a retrospective review of all adult trauma patients who presented to the ED at a regional level 1 designated trauma center with an anterior abdominal stab wound over a 6-year period between January 1, 2006, and December 31, 2011, was conducted. Patients were identified using the following *International Classification of Diseases, Ninth Revision* E codes: E920.3 (accidents caused by knives, swords, and daggers), E920.9 (accidents caused by an unspecified cutting and piercing instrument or object), E956 (suicide and self-inflicted injury by a cutting and piercing instrument), E966 (assault by a cutting and piercing instrument), E979.4 (terrorism involving firearms), and E986 (injury by cutting and piercing instruments, undetermined whether accidentally or purposely inflicted).

Data were collected from patients' electronic medical records (Epic Systems Corporation, Madison, WI) and the trauma registry (TraumaBase; Clinical Data Management Inc, Genesee, CO). Data collected included age, sex, location and number of stab wounds, other injuries, heart rate, blood pressure, the presence of hemodynamic instability/symptomatic wounds, Injury Severity Score (ISS), diagnostic testing in the ED, results of diagnostic testing, disposition from the ED, operative procedures, operative findings, ED length of stay (LOS), intensive care unit LOS, total hospital LOS, complications (eg, rates of bacteremia, surgical site infection, urinary tract infection, catheter-associated infections, deep venous thrombosis, pulmonary embolism, and wound dehiscence), mortality, and hospital charges.

Patients were grouped into self-inflicted and non-self-inflicted groups based on documentation in the history and physical examination. The anterior abdomen was defined as the area located within the boundaries of the costal margins, anterior axillary lines, and inguinal ligaments. Unstable/symptomatic patients were defined as patients having a heart rate >120 beats/min; a systolic blood pressure <90 mm Hg; or symptoms requiring immediate operative management such as evisceration, traumatic hernia, peritonitis, or significant bleeding. Stable/asymptomatic patients

were defined as patients who did not exhibit the aforementioned signs and symptoms.

Data were analyzed using SPSS for Windows version 20 (SPSS Inc, Chicago, IL). Numeric data were compared using the Student *t* test or a nonparametric test as appropriate. Categorical data were compared using either the chi-square or Fisher exact test. A *P* value $\leq .05$ was considered statistically significant.

Results

Analysis of all anterior abdominal stab wounds

During the study period, there were 570,070 ED visits. Three thousand five hundred fifty-nine patients were identified using our screening criteria; of these, 215 patients were identified as having an anterior abdominal stab wound. Patient characteristics and demographics are shown in [Table 1](#). The mean age was 35 years; men comprised 86% of the treated patients. The mean ISS was 2.7; 26% of patients had multiple abdominal stab wounds, 41% had extra-abdominal injuries, and 26% exhibited unstable/symptomatic injuries. Of these patients, 172 (80%) had non-self-inflicted stab wounds, and 43 (20%) had self-inflicted wounds. Patient characteristics and demographics were well matched between the groups. Patients in the self-inflicted group were older (mean 39 vs 34 years, *P* = .03). There was no statistical difference in sex between self-inflicted and non-self-inflicted groups. Injury severity, as assessed by the ISS, was similar between self-inflicted and non-self-inflicted patients. Patients with self-inflicted stab wounds had similar rates of multiple abdominal stab wounds compared with those having non-self-inflicted stab wounds. Self-inflicted patients were less likely to have secondary injuries in addition to the penetrating wound to their anterior abdomen compared with non-self-inflicted patients (16% vs 47%, *P* < .01). Non-self-inflicted patients were twice as likely to be unstable/symptomatic.

Hospital course and outcomes are summarized in [Table 2](#). The ED diagnostic workup was evaluated. Non-self-inflicted patients had higher utilization rates of focused assessment of sonography for trauma (FAST) compared with self-inflicted patients (40% vs 21%, *P* = .03). Utilization rates of computed tomography (CT) scans (30% vs 38%,

Table 1 Population demographic information

n	215
Age	34.7 ± 12.5
% male	86
ISS	2.7 ± 0.4
Multiple stab wounds (%)	26
Extra-abdominal injury (%)	41
Hemodynamically unstable/symptomatic injury (%)	26

Mean (± standard error of mean).

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