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Outpatient follow-up does not prevent emergency department utilization by trauma patients

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ABSTRACT

Background: Although most trauma centers have a regularly scheduled trauma clinic, research demonstrates that trauma patients do not consistently attend follow-up appointments and often use the emergency department (ED) for outpatient care.

Methods: A retrospective review of outpatient follow-up of adult patients admitted to the trauma service (January 2014-December 2014) at an urban level I trauma center was conducted ($n = 2134$).

Results: A total of 219 patients (10%) were evaluated in trauma clinic after discharge from the hospital. Twenty-one percent of patients seen in trauma clinic visited the ED within 30 d compared with 12% of those not seen in clinic ($P < 0.001$). A total of 104 patients were readmitted within 30 d of discharge; no difference existed in the rate of hospital readmission between patients seen in clinic and those not seen in clinic ($P = 0.25$). Stepwise logistic regression showed that clinic follow-up was not a significant predictor of decreased ED utilization (adjusted odds ratio [OR] 1.16 [95% confidence interval 0.78-1.72], $P = 0.461$) and also showed that while ED use was a significant predictor of readmission (adjusted OR 216 [93-500], $P < 0.001$), clinic visits were not (adjusted OR 0.74 [0.33-1.69], $P = 0.48$).

Conclusions: Outpatient follow-up in the trauma clinic does not decrease ED utilization or hospital readmissions indicating that interventions aimed at improving access to a conventional outpatient clinic will not impact ED utilization rates. Further study is necessary to determine the best system for providing clinically appropriate and cost-effective outpatient follow-up for trauma patients.

Introduction

Many trauma patients have injuries or other significant health issues that require ongoing care after hospital discharge.[1] Most trauma centers operate a scheduled outpatient clinic where they follow trauma patients after discharge; however, the rate of compliance with outpatient follow-up is historically low. Stone *et al.* found that lack of insurance, penetrating mechanism of injury (MOI), short hospital stay, discharge to home, and weekend discharge were predictive of clinic follow-up compliance; whereas operative intervention, patients aged >35 y, White race, Medicaid/Medicare insurance, blunt

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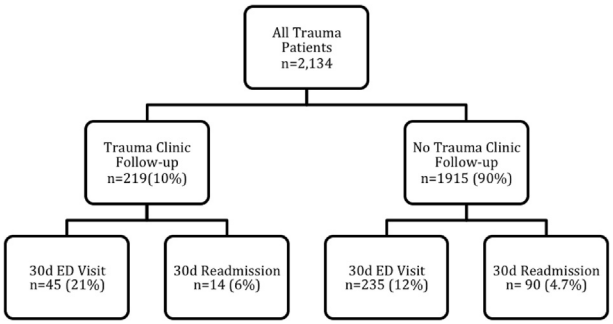

Fig. 1 – Subject flow diagram.

MOI, extended hospital length of stay, and discharge to rehabilitation facilities were associated with noncompliance.[2] A study by Aaland *et al.* conducted telephone interviews of patients who failed to follow-up in trauma clinic and found that the most cited reasons for not following-up included distance, financial difficulties, and being unaware of the appointment.[3]

Trauma patients also have high rates of seeking care in the emergency department (ED), including routine follow-up and treatment for conditions that could potentially be appropriately managed in a nonacute outpatient setting.[1,4] Ladha *et al.* found that uninsured and publicly insured trauma patients were more likely to present to the ED after discharge than those with commercial insurance.[4] They also found that residing in a neighborhood with a low median household income was associated with higher rates of post-discharge ED use. Englum *et al.* showed that disadvantaged populations, including racial and ethnic minorities, have more limited use of posthospitalization care.[5]

In addition, readmission after discharge among trauma patients has also been examined. There has been significant variability in the readmission rates of trauma patients reported in the literature.[6-8] Moore *et al.* showed that trauma patients have increased rates of readmission compared with expected population levels for nearly 12 mo postdischarge.[9]

Prior efforts to improve outpatient care of trauma patients have largely focused on interventions aimed at improving the number of patients returning for follow-up. Haider *et al.* attempted to improve follow-up rates by scheduling trauma clinic appointments for patients before discharge but found no difference in the likelihood of patients returning for follow-up.[10] In addition, as many as 22% of patients lost to clinic follow-up received follow-up care at their institution's ED. Similar interventions have been attempted in ED patient populations. Some of these studies have shown initial improvement in outpatient follow-up compliance; however, results indicate that these interventions may have little impact on long-term care utilization.[11,12]

However, there is a paucity of literature that examines specific benefits to either patients or healthcare systems conferred by outpatient follow-up in the trauma population. We sought to determine whether clinic follow-up would confer the benefit of decreasing the use of care in the ED or inpatient setting. We hypothesized that outpatient follow-up would have a protective effect against ED utilization and readmissions. To test our hypothesis, we performed a retrospective cohort study. Our primary study endpoint was ED visits within 30 d of discharge from the trauma service. The secondary study endpoint was readmission within 30 d of discharge.

Methods

This study was approved by the Cooper Health System Institutional Review Board (IRB). A waiver of informed consent was granted by the Institutional Review Board. Cooper University Hospital is a tertiary care hospital located in Camden, New Jersey, and the regional level one trauma center for southern New Jersey. We hold a regularly scheduled trauma clinic on Wednesday afternoons each week. This clinic is held in our outpatient facility located across the street from the hospital where our ED is located. At discharge, select patients are instructed to follow-up in trauma clinic at specific intervals. This decision is made by the trauma team based on clinical judgment. All other patients are instructed to follow-up on an as needed basis and are given information on how to schedule a clinic appointment before discharge.

A list of all patients admitted to the trauma service between January 1, 2014, and December 31, 2014 was generated from the local trauma registry. Inclusion criteria consisted of patients aged >18 y, who were admitted to the trauma service and were alive at discharge. Patients were excluded if they were discharged to jail or prison, hospice, or to a long-term care facility. We reviewed each patient's electronic medical record to obtain demographic information, clinical characteristics, and resource utilization data. The distance and estimated driving time between the patient's address and our clinic location was calculated using Google Maps (Google Inc, Mountain View, CA).

Statistical methods

Demographic and clinical characteristics

The groups with and without clinic follow-up were compared in a univariable fashion with respect to sociodemographics and clinical characteristics. Similar analysis was done comparing those visiting and not visiting the ED, as well as those who were and were not readmitted. Categorical variables are reported as number and percent while continuous variables are presented as mean and standard deviation for normally distributed variables while nonnormally distributed variables are categorized by median and interquartile ranges.

Univariable analysis was carried out with Chi-square and Fisher's exact test for dichotomous variables. Continuous, normally distributed variables were compared with the *t*-test. Forward stepwise multivariable logistic regression was performed to assess the effects of the potential covariates on outcome always including clinic follow-up. Statistical analyses were performed using SPSS version 23 (IBM Corp, Armonk, NY).

Results

Patient demographics and presenting characteristics

A total of 2134 patients were admitted to the trauma service during the study period and met inclusion criteria. Of these