

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Use of emergency department imaging in patients with minor trauma

Gregory E. Tong, BS,^a Kristan Staudenmayer, MD,^b Feng Lin, MS,^c and Renee Y. Hsia, MD, MSc^{d,*}

^a Department of Emergency Medicine, University of California, San Francisco, California

^b Department of Surgery, Stanford University School of Medicine, Stanford, California

^c Department of Epidemiology and Biostatistics, University of California, San Francisco, California

^d Department of Emergency Medicine and Philip R. Lee Institute for Health Policy Studies, University of California, San Francisco, California

ARTICLE INFO

Article history:

Received 14 October 2015

Received in revised form

12 November 2015

Accepted 24 November 2015

Available online 1 December 2015

Keywords:

Computed tomography

Emergency department

Minor trauma

ABSTRACT

Background: Advanced radiographic studies have detrimental risks, yet the prevalence of CT utilization in patients with minor trauma presenting to the emergency department (ED) has never been fully evaluated. Our objective was to evaluate the frequency of CT imaging in patients presenting to the ED for minor trauma.

Materials and methods: A retrospective analysis of the California Office of Statewide Health Planning and Development Emergency Department and Ambulatory Surgery Data from 2005 to 2013 was performed. A total of 8,535,831 patients were identified using the following inclusion criteria: adult patients (age ≥ 18 y); with a traumatic ECODE diagnosis and injury severity score < 9 ; and discharge to home. The primary study outcome measurement was the prevalence of CT imaging for each year in the study period. We performed univariate and multivariate analysis to evaluate clinical and hospital-level factors related to CT use in this population. We also performed a trend analysis using Poisson logistic regression to assess the trend of imaging scans over the study period.

Results: Of the study population, 5.9% received at least one CT study during their ED visit. The proportion of patients with at least one CT scan increased from 3.51% in 2005 to 7.17% in 2013 ($P < 0.005$). Adjusted predictors for CT included age 18–24 y or > 45 y ($P < 0.005$), Medicare and self-pay patients ($P < 0.005$), fall injuries ($P < 0.005$), motor vehicle collision injuries ($P < 0.005$), and patients seen at level I/II trauma centers ($P = 0.005$).

Conclusions: Even after clinical and demographic predictors were adjusted for, there was a 1.97-fold increase in CT among minor trauma patients from 2005–2013.

© 2015 Elsevier Inc. All rights reserved.

Introduction

Over the past decade, there has been a dramatic rise in the use of imaging, specifically computed tomography (CT) in emergency departments in the United States [1,2]. Imaging plays an

important role in the diagnosis and treatment of injured patients. Current evidence suggests that early use of whole-body CT scanning may decrease mortality, reduce time spent in the emergency department, lead to more accurate diagnoses, and result in faster diagnosis in patients presenting with major

* Corresponding author. Department of Emergency Medicine, UCSF; 1001 Potrero Ave, 1E21; San Francisco General Hospital; San Francisco, CA 94110. Tel.: +1 415 206-4612; fax: +1 415 206-5818.

E-mail address: renee.hsia@ucsf.edu (R.Y. Hsia).

0022-4804/\$ – see front matter © 2015 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jss.2015.11.046>

trauma [3–7]. However, few publications have assessed the benefits of imaging for patients with minor trauma, especially for advanced imaging such as CT. This is important given the increased radiation exposure and associated cancer susceptibility, as well as high costs [8–13].

Recent awareness of these issues has resulted in campaigns directed at reducing potential overuse of imaging studies [14–16]. And although numerous clinical decision making tools have been created to guide judicious ordering of CT imaging, studies indicate a lack of adherence to these prediction rules. [17–20].

Identifying the prevalence and trend in utilization in patients with minor or no injuries is important, and no prior studies have fully evaluated these patients except studies focusing on minor head injuries [21]. The purpose of our study was to evaluate the frequency of CT imaging for adults with minor trauma presenting to the ED who ultimately did not require admission. We hypothesized that the utilization of imaging has increased even for patients with minor trauma.

Materials and methods

Data sources

This retrospective review used nonpublic data from the California Office of Statewide Health Planning and Development (OSHPD) Emergency Department and Ambulatory Surgery Data (EDD) from 2005–2013. The OSHPD EDD contains all outpatient discharges from emergency department (ED) patient encounters in California and includes demographic, clinical, payer, and facility information [22]. More detailed information regarding data reporting and requirements is available at the California Emergency Department and Ambulatory Surgery Data Reporting Manual [23]. We also identified trauma centers using the California Emergency Medical Services Authority and other hospital characteristics with the OSHPD Utilization file [24,25]. Our study was reviewed and approved by the University of California San Francisco Committee on Human Research.

Patient population

We included all adults (age ≥ 18 y) seen in all California Emergency Departments from January 1, 2005–December 31, 2013. Our inclusion criteria included visits for a traumatic event as defined by the presence of a traumatic ECODE diagnosis, injury severity score (ISS) < 9 , and disposition to home or self care. Injury visits were defined based on external cause-of-injury codes and adapted using the framework presented by the Centers for Disease Control and Prevention [26]. Those patients with a traumatic ECODE diagnosis but without an Injury Severity Score (ISS) were excluded. E-codes relating to accidental poisoning, adverse effects of surgical and medical procedures, accidents due to natural and environmental factors, accidents caused by submersion, suffocation and foreign bodies, late effects of accidental injury, and adverse effects of therapeutic use of drugs were excluded (E850–E879, E900–E915, E929–949). ISS < 9 was selected as the lowest cutoff that would ensure exclusion of all high injury severity [27]. We further

excluded patients who died in the ED or had no disposition documented. We identified patients who received CT scans identified by American Medical Association Current Procedural Terminology (CPT) codes (see [Table A.1 in the Supplement](#)) [28]. Mechanism of injury was determined by applying criteria adapted from the CDC injury framework (Falls: E880–E886.9, E888, E957.0–0.9, E968.1, E987.0–0.9; motor vehicle collision: E810–E819.9, E958.5, E988.5) [26].

Outcomes

We categorized CT imaging into body region: head, face, neck, chest, spine, abdomen/pelvis, and other, using similar subdivisions of body section in accordance to categorizations in prior literature [20].

Data analysis

We first used descriptive statistics to describe the demographics of the population, including age, gender, race, and insurance status. To understand hospital factors involved in CT use, we also included trauma center status, teaching status, and rural and/or urban classification.

We calculated ISS using the validated ICD Programs for Injury Categorization to translate *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) diagnostic codes into injury severity scores [29]. We derived ISS using a Stata module, the ICD Programs for Injury Categorization (ICDPIC, version 3) [30].

Univariate analysis was performed to assess independent variables and their association with scan; we then performed a multivariate analysis with the descriptive variables found significant in the univariate analysis ($P < 0.01$) to assess for the independence of the predictors. Trend analysis using Poisson logistic regression was performed to assess CT scan prevalence over the study period. All analyses were performed with SAS, version 9.4 (Cary, NC).

Results

We identified a total of 8,535,831 patients with both ECODE diagnosis of trauma and ISS < 9 who were seen in California emergency rooms and were subsequently discharged. Of these, 502,418 (5.9%) received at least one CT study during their ED visit ([Table 1](#)).

Patients who received a CT scan were different from those who did not. Patients aged > 45 y and those aged 18–24 y were more likely to receive a CT as compared to those 25–34 y and 35–44 y ([Table 1](#)). On average, patients who received a CT scan were more likely to be non-Hispanic white and have Medicare or self-pay and/or uninsured.

The proportion of patients receiving at least one CT scan increased from 3.51% in 2005 to 7.17% in 2013 ([Fig. 1](#); $P < 0.005$ for trend). The use of CT scans initially peaked in 2009, decreased through 2011 but resumed growth to a new peak in 2013 ([Fig. 1](#)). [Figure 2](#) shows the specific types of CT obtained in this cohort of patients. The most common CT obtained throughout the entire study period was a head CT, rising from 2.67% in 2005 to 5.67% in 2013 among all minor trauma patients

Download English Version:

<https://daneshyari.com/en/article/4299209>

Download Persian Version:

<https://daneshyari.com/article/4299209>

[Daneshyari.com](https://daneshyari.com)