American Journal of Emergency Medicine 36 (2018) 1451–1454

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Brief Report

Is hallway care dangerous? An observational study

Jeffrey A. Rixe, MD [a], James H. Liu, MS [a], Hudson A. Breaud, MPH [a], Kerrie P. Nelson, PhD [a,b], Patricia M. Mitchell, RN [a], James A. Feldman, MD MPH [a,*]

[a] Department of Emergency Medicine, Boston University School of Medicine, Boston, MA 02118, United States
[b] Department of Biostatistics, Boston University School of Public Health, Boston, MA 02118, United States

ARTICLE INFO

Article history:
Received 5 March 2018
Accepted 2 April 2018

ABSTRACT

Objectives: In response to crowding the use of hallway beds has become an increasingly prevalent practice in Emergency Departments (EDs). There is limited research on whether caring for patients in hallways (HP) is associated with adverse outcomes. The goal of this study was to examine the effects of HP triage on 30 day outcomes for ED return, readmission, and mortality.
Methods: We performed a retrospective cohort study at an urban, academic ED comparing HPs (defined as HP for ≥30 min) to matched controls triaged to standard ED beds from 9/30/14 to 10/1/15. We analyzed data from the hospital's clinical data warehouse. Matched controls were selected by gender, age, ethnicity, and language. We used McNemar's test to assess the association between triage location and 30 day study outcomes. We also examined adverse outcomes by triage severity using McNemar's test.
Results: A total of 10,608 HPs were matched to control patients. Compared to controls, HPs had 2.0 times the odds of returning to the ED in 30 days (95% CI: 1.8–2.1), 1.6 times the odds of inpatient readmission (95% CI: 1.4–1.9), and 1.7 times the odds of readmission to observation (95% CI: 1.4–2.0). The odds ratio for mortality in HPs versus controls was 0.80, (95% CI: 0.50–1.3).
Conclusions: Patients initially triaged to the hallway have an increased odds of 30 day return to the ED, observation and inpatient admission. After adjusting for ESI, the increased odds for return remained similar. The small sample size precluded testing effects of HP status on mortality.

1. Introduction

1.1. Background

As problems with boarding and crowding rise in emergency departments (EDs), patients are being pushed out of traditional care areas, and an increasing number are cared for in hallway beds [1]. Overcrowding has been recognized as an international problem in emergency medicine [2]. Despite the growing number of hallway patients (HPs), there is limited research into the effects of hallway care location on patient outcomes.

The existing data about HPs creates concern regarding this specific population. Compared to patients in standard treatment rooms, HPs report lower overall satisfaction scores and lower satisfaction based specifically on their treatment area [3]. In an era of satisfaction scores impacting physician and hospital reimbursement, this is an important issue. Patients have also repeatedly demonstrated a preference for boarding in inpatient hallway beds as compared to boarding in ED hallways [4,5]. Despite the increased use of hallway beds to provide care in EDs, there is limited research about whether this affects patient care or is associated with adverse outcomes.

1.2. Importance

Survey studies and observational research studies have suggested that hallway care could be a threat to patient safety. In a survey of 60 Norwegian hospitals, the head physicians and head nurses agree with statements that caring for patients in corridors reduces the quality of care, increases the risk of mistakes and accidents, increases the risk of infections, and decreases the amount of time spent by providers with patients [6]. Healthcare provider hand hygiene use decreases at peak times of overcrowding and the decrease in hand hygiene is magnified for patients cared for in hallways [7]. Patients cared for in hallway beds report feeling avoided and unseen by health care professionals [8]. The mean time to initial patient evaluation by a provider is longer for someone triaged to a hallway bed [9]. Finally, case reports have indicated that there is an increased risk of malpractice for patients treated in hallways [10].

* Corresponding author at: Department of Emergency Medicine, Boston Medical Center, 818 Harrison Ave, Boston, MA 02118, United States.
E-mail address: James.Feldman@bmc.org (J.A. Feldman).

https://doi.org/10.1016/j.ajem.2018.04.003
0735-6757/

1.3. Goals of this investigation

This preliminary investigation aimed to examine whether there was any association between hallway care and 30 day adverse outcomes for ED return visit, inpatient readmission, observation readmission, and mortality.

2. Methods

2.1. Study design and setting

We performed a retrospective, cohort study at an urban, academic ED that sees approximately 130,000 patient visits each year, comparing HPs (defined as HP for ≥30 min) to matched controls triaged to standard ED beds from 9/30/14 to 10/1/15. This study was approved by the Boston University Medical Campus Institutional Review Board. We followed the STROBE checklist for observational research studies.

2.2. Selection of participants

We queried the hospital's clinical data warehouse to select patients age ≥ 18 years of age who had been initially triaged to a hallway location in the ED, and were in the hallway ≥30 min. We used 30 min to define HP in order to assure that a patient was treated in the hallway and not moved to the hallway only temporarily or as a placeholder in the electronic medical record while moved to a traditional treatment area. We also queried the clinical data warehouse for controls during the same one year time frame, initially triaged to an ED bed. Controls were matched on gender, race, ethnicity, language, and age within a five-year range. We included only the first ED visit for those patients who had multiple visits.

2.3. Methods and measurements

We compared HP to their matched controls on 30-day return to ED, 30-day return to observation, 30-day return to inpatient, and 30 day inpatient mortality.

2.4. Analysis

We examined differences in outcomes between HP and their controls via proportions and corresponding 95% confidence intervals using McNemar's chi-square tests. We used SAS 9.3 (Cary, NC) and R 3.2.3 to perform all data analyses. Additionally, we tested for potential confounding of triage severity by analyzing a subgroup of triage ESI level 1, 2 and 3 patient pairs using McNemar's chi-square tests.

3. Results

3.1. Characteristics of study subjects

There was nearly even distribution of HPs by gender, with male (50.3%) and a mean age of 46.3 years. The majority of HPs had public insurance (51.3%) and were ESI score 3 (70.2%). See Table 1 for study demographics and race, ethnicity data.

3.2. Main results

The total number of hallway visits over the course of the study year was 14,782. There were 11,218 unique HPs identified. We then matched a total of 10,608 HPs to control patients triaged to standard treatment rooms.

HPs had increased odds of return to all hospital settings. Compared to controls, HPs had 2.0 times the odds of returning to the ED in 30 days (95% CI: 1.8–2.1), 1.6 times the odds of inpatient readmission (95% CI: 1.4–1.9), and 1.7 times the odds of readmission to observation (95% CI: 1.4–2.0). HPs had a lower odds of inpatient death as compared to controls (OR of 0.80), although this was not significant (95% CI: 0.5–1.3) (Table 2).

When stratified for triage severity, ESI 1/2/3 HPs ($n = 7132$) had similar high odds of adverse outcomes when compared to control patients with 1.9 times of the odds of returning to the ED in 30 days (95% CI 1.7–2.1), 1.7 times the odds of inpatient readmission (95% CI 1.4–1.9), 1.6 times the odds of readmission to observation (1.3–2.0).

Table 1
Matched patient characteristics $n = 10608$*.

Characteristic	Hallway	Control
Age		
Mean (SD)	46.3 (16.3)	46.5 (16.8)
≥90 years (%)	93 (0.9)	93 (0.9)
Male (%)	5333 (50.3)	5333 (50.3)
Primary language (%)		
English	8189 (77.2)	8189 (77.2)
Spanish	1400 (13.2)	1400 (13.2)
Haitian Creole	466 (4.4)	466 (4.4)
Cape Verdean	247 (2.3)	247 (2.3)
Vietnamese	64 (0.6)	64 (0.6)
Other	242 (2.3)	242 (2.3)
Race (%)		
Black	5395 (50.9)	5395 (50.9)
White	2967 (28.0)	2967 (28.0)
Declined/NA	2026 (19.1)	2026 (19.1)
Asian	184 (1.7)	184 (1.7)
Other	36 (0.3)	36 (0.3)
Ethnicity (%)		
Hispanic/Latino/Spanish	2311 (21.8)	2311 (21.8)
Insurance status (%)		
Medicaid	5418 (51.3)	4781 (45.1)
Medicare	1922 (18.2)	1975 (18.62)
Commercial/private	1706 (16.2)	2218 (20.9)
Self-pay/uninsured	412 (3.9)	375 (3.5)
Other	1102 (10.4)	1259 (11.9)
ESI score (%)		
1	0 (0.0)	6 (0.1)
2	1253 (11.9)	1432 (13.5)
3	7406 (70.2)	7250 (68.4)
4	1672 (15.9)	1730 (16.3
5	216 (2.1)	186 (1.8)

*48 hallway patients missing insurance statuses and 61 missing ESI scores. 4 control patients missing ESI scores.

4. Limitations

This study has several important limitations. As is the case with observational studies reliant on databases, confounding and factors other than hallway status could explain the increased morbidity we observed. For example, such characteristics as chief complaints, discharge diagnosis, time of day or hallway care burden could have contributed to the outcomes as well.

Table 2
Comparison of triage location and 30 day outcomes for patients (matched on gender, age, ethnicity, and language).

Adverse outcome	Hallway (%)	Control (%)	Odds ratio* (95%CI)
All patients	n = 10,608	n = 10,608	
30 day return to ED	1606 (15.1)	816 (7.7)	2.0 (1.8–2.1)
30 day return to inpatient	527 (5.0)	326 (3.1)	1.6 (1.4–1.9)
30 day return to observation	279 (2.6)	168 (1.6)	1.7 (1.4–2.0)
Mortality	32 (0.3)	40 (0.4)	0.8 (0.5–1.3)
ESI 1/2/3 patients	n = 7132	n = 7132	
30 day return to ED	1035 (14.5)	557 (7.8)	1.9 (1.7–2.1)
30 day return to inpatient	419 (5.9)	253 (3.5)	1.7 (1.4–1.9)
30 day return to observation	217 (3.0)	133 (1.9)	1.6 (1.3–2.0)
Mortality	27 (0.4)	35 (0.5)	0.8 (0.5–1.3)

*McNemar's Chi-Square Test for paired data.