Analysis of Emergency Department Visits for Palpitations (from the National Hospital Ambulatory Medical Care Survey)

Marc A. Probst, MD[a,*], William R. Mower, MD, PhD[a], Hemal K. Kanzaria, MD, MS[b], Jerome R. Hoffman, MA, MD[a], Eric F. Buch, MD[c], and Benjamin C. Sun, MD, MPP[d]

Palpitations is a common complaint in patients who visit the emergency department (ED), with causes ranging from benign to life threatening. We analyzed the ED component of the National Hospital Ambulatory Medical Care Survey for 2001 through 2010 for visits with a chief complaint of palpitations and calculated nationally representative weighted estimates for prevalence, demographic characteristics, and admission rates. ED and hospital discharge diagnoses were tabulated and categorized, and recursive partitioning was used to identify factors associated with admission. An estimated 684,000 visits had a primary reason for visit of "palpitations" representing a national prevalence of 5.8 per 1,000 ED visits (0.58%, 95% confidence interval 0.52 to 0.64). Women and non-Hispanic whites were responsible for most visits. A cardiac diagnosis made up 34% of all ED diagnoses. The overall admission rate was 24.6% (95% confidence interval 21.2 to 28.1), with higher rates seen in the Midwest and Northeast compared with the West. Survey-weighted recursive partitioning revealed several factors associated with admission including age >50 years, male gender, cardiac ED diagnosis, tachycardia, hypertension, and Medicare insurance. In conclusion, palpitations are responsible for a significant minority of ED visits and are associated with a cardiac diagnosis roughly 1/3 of the time. This was associated with a relatively high admission rate, although significant regional variation in these rates exists. **(Am J Cardiol 2014;113:1685−1690)**

Palpitations, defined as a sensation of irregular, rapid, or forceful pulsation in the chest, is a common presenting complaint in medical outpatients.[1−4] The cause of palpitations ranges from benign causes to life-threatening cardiac conditions.[5,6] The relative frequency of diagnoses associated with palpitations has been described in outpatient and inpatient populations,[3,4,7−9] but only 1 single-center study has focused specifically on patients who visit the emergency department (ED)—who, because of self-selection, may be different from either of these other groups.[4] The primary goal of this study is to describe the epidemiology of ED visits and hospitalizations for palpitations using nationally representative United States (US) data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) over a 10-year period. In addition, we sought to (1) determine diagnosis frequencies, (2) evaluate demographic and clinical factors associated with admission, and (3) investigate regional variation in admission rates.

Methods

We performed an analysis of the ED component of the 2001 to 2010 NHAMCS. The NHAMCS data set is a nationally representative sample of US ED visits obtained by the National Center for Health Statistics (NCHS) branch of the Centers for Disease Control and Prevention.[10] NHAMCS uses a 4-stage sampling strategy, covering geographic primary sampling units, hospitals within primary sampling units, EDs within hospitals, and patient visits within EDs. The ED visit is the basic sampling unit and represents a larger number of samples based on the inflation factor called the ED patient weight. This weighting is based on 4 factors: the reciprocal of the probability of selection, nonresponses adjustment, population ratio adjustment, and weight smoothing.

All visit sampling and data collection were performed by hospital staff, and review of data collection was performed by a US Census Bureau field supervisor. The data abstraction forms include information pertaining to the sampled visit including demographic information, 3 patient "reason-for-visit" fields, triage acuity, initial vital signs, ED tests and procedures performed, 3 International Classification of Diseases, ninth revision (ICD-9) ED discharge diagnoses, and, starting in 2005, 1 hospital discharge diagnosis. Further data collection methods and sampling design are described in detail on the NCHS Web site (*http://www.cdc.gov/nchs*).

[a]UCLA Emergency Medicine Center, [b]Robert Wood Johnson Foundation Clinical Scholars Program, UCLA Emergency Medicine Center, and [c]UCLA Cardiac Arrhythmia Center, Department of Medicine, Ronald Reagan UCLA Medical Center, School of Medicine, University of California, Los Angeles, Los Angeles, California; and [d]Department of Emergency Medicine, Oregon Health and Science University, Portland, Oregon. Manuscript received December 11, 2013; revised manuscript received and accepted February 12, 2014.

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*Corresponding author: Tel: (310) 666-3834; fax: (310) 794-0599.

E-mail address: mprobst@gmail.com (M.A. Probst).

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Table 1
Demographic characteristics of emergency department (ED) visits for palpitations in the United States, 2001 to 2010

Characteristic	All Visits			Admitted or Transferred	
	Absolute No. of Cases	Estimated No. of US Cases	Percent Total of ED Palpitations (%)	Estimated No. of Cases	Weighted Percentage (%)
Overall	1,998	684,177	100	168,400	24.6
Age (yrs)					
0–9	30	9,900	1.5	NR	NR
10–19	106	37,300	5.5	970	2.6
20–29	218	66,300	9.7	4,700	7.1
30–39	242	84,200	12.3	11,500	13.7
40–49	325	120,000	17.6	26,300	21.9
50–59	312	100,300	14.7	25,300	25.2
60–69	272	100,100	14.6	31,300	31.3
70–79	274	93,200	13.6	37,600	40.3
80+	219	72,800	10.6	29,500	40.5
Gender					
Male	795	268,000	39.2	71,400	26.6
Female	1,203	416,000	60.8	97,000	23.3
Race/ethnicity					
Non-Hispanic white	1,396	486,500	71.1	122,400	25.2
Non-Hispanic black	273	90,800	13.3	17,600	19.4
Hispanic	190	67,000	9.8	14,500	21.6
Other	139	39,800	5.8	14,000	35.1
Insurance status					
Private insurance	901	303,400	44.3	57,100	18.8
Medicare	558	199,600	29.2	77,700	38.9
Medicaid/SCHIP	227	66,300	9.7	1,500	22.5
Uninsured	173	64,700	9.5	8,400	13.0
Other	139	50,300	7.4	10,200	20.4
Region					
Northeast	530	147,400	21.5	44,000	29.9
Midwest	434	161,800	23.6	51,000	31.5
South	590	229,000	33.5	53,000	23.1
West	444	146,000	21.4	20,500	14.0
Metropolitan statistical area					
Urban area	1,710	576,100	84.2	144,600	25.1
Nonurban	288	108,100	15.8	23,800	22.0

NR = not reportable (because of unweighted sample size <30); SCHIP = State Children's Health Insurance Program.

This study was exempted from review by our institutional review board.

From the 2001 to 2010 NHAMCS database, we selected all ED visits that had a primary reason for visit (RFV) of "1260.0 Abnormal pulsations and palpitations; includes rapid heartbeat, slow heartbeat, irregular heartbeat, fluttering, jumping, racing, skipped beat" coded using Reason for Visit Classification for Ambulatory Care, a standardized sourcebook used in NCHS studies.[11] ED visits with this RFV as secondary or tertiary complaints were not included.

We collected the demographic characteristics of the patients including age, gender, race, ethnicity, insurance status, metropolitan statistical area, and geographic region. We recorded clinical data such as vital signs, triage acuity, and mode of arrival, diagnostic testing data (i.e., laboratory tests, electrocardiograms, cardiac monitoring, and x-ray imaging), and ED therapy and procedures. Additionally, ED consultations, dispositions (i.e., admit to hospital, admit to observation unit, transferred to outside hospital, and discharged), and short-term mortality in ED or in hospital were examined. We also recorded the 3 ED discharge diagnoses provided for every ED visit and the single hospital discharge diagnosis for admitted patients.

The NHAMCS data form varies in content from year to year. For example, cardiac enzyme ordering and hospital discharge diagnosis were recorded starting in 2005, respiratory rate and pulse oximetry starting in 2007. We included in our analyses only data that were available without using imputation other than what was already done by the NCHS. For simplicity, all ED visits were categorized into 2 classes: high acuity, comprising patients needing to be seen in $\leq$1 hour, and low acuity, comprising patients needing to be seen in 1 to 24 hours, as has been done in previous NHAMCS analyses.[12] We created new variables to examine the frequency of abnormal initial vital signs. We defined tachycardia, bradycardia, fever, hypoxia, tachypnea, hypotension, and hypertension using standard age-adjusted clinical cutoffs used in previous NHAMCS vital sign analyses (see Appendix 1).[13]

We also recorded whether the ED visits contained a cardiac ICD-9 discharge diagnoses including dysrhythmias (e.g., cardiac dysrhythmias, atrial flutter or fibrillation, and ventricular fibrillation or flutter), structural heart disease