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Original Contributions

IMPACT OF AGE ON PAIN PERCEPTION FOR TYPICAL PAINFUL DIAGNOSES IN THE EMERGENCY DEPARTMENT

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☐ **Abstract—Background: Age-related differences in pain perception have been demonstrated in experimental settings but have been investigated scarcely and without valid scale in the clinical framework. Objectives: To examine the effect of age on pain perception for recognized painful diagnoses encountered in the emergency department (ED). Methods: A post-hoc analysis of real-time archived data was performed in a tertiary urban and a secondary regional ED. We included all consecutive adult patients (≥18 years) with the following diagnosis at discharge: renal colic, pancreatitis, appendicitis, headache/migraine, dislocation and extremities fractures, and a pain evaluation of ≥1 (0–10, verbal numerical scale) at triage. The primary outcome was to compare for each of these diagnoses the level of pain intensity between four age groups (18–44; 45–64; 65–74; 75+ years). Results: A total of 15,670 patients (48% women) were triaged with a mean pain intensity of 7.7 (SD=2.0). Women exhibited greater pain scores than men for pancreatitis, headache/migraine, and extremity fracture. Renal colic, pancreatitis, appendicitis, and headache/migraine showed a linear decrease in pain scores with age whereas dislocation and extremity fractures did not present age differences. Mean differences in pain intensity scores between young adults (18–44 years) and patients aged ≥75 years were 0.79 (95% confidence interval [95% CI] 0.5–1.1) for renal colic, 1.1 (95% CI 0.7–1.4) for pancreatitis, 0.70 (95% CI 0.2–1.2) for appendicitis, and 0.86 (95% CI 0.6–1.1) for headache/migraine. Conclusion: Older patients perceive similar pain for dislocation and extremity fractures and less for visceral and headache/migraine pain; however, these age differences may not be clinically important.** © 2016 Elsevier Inc.

☐ **Keywords—pain perception; age difference; emergency medicine**

INTRODUCTION

Pain is one of the most common reasons for emergency department (ED) visits (1). Therefore, how patients perceive their pain is important for triage, for adequate diagnosis, and management. Aging is one of the multifactorial components, such as sociocultural factors, including sex and ethnicity, that could affect the subjective experience of pain perception (2). Experimental research on pain threshold and pain tolerance generally supports the evidence of an age-related decline in pain sensitivity, despite variability in results from thermal, mechanical or electric stimulus modalities (3).

Clinical studies on age differences in pain sensitivity are scarce but tend to present similar decreases in pain perception with age (4). Older patients seem to report less pain than younger patients with metastatic cancer, peptic or duodenal ulcer, myocardial infarction, acute

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pneumothorax, appendicitis, and pancreatitis (5–13). In a study of pain appreciation, Scapa et al. determined that only 16% of elderly patients (≥65 years) with ulcer had moderate to excruciating pain compared with 75% of younger patients (14). Similarly, 36% of elderly patients with myocardial infarction had moderate to excruciating pain compared with 72% of younger patients. However, these clinical investigations did not quantify pain intensity with a valid pain intensity scale.

Diminished visceral pain sensitivity in older subjects also has been demonstrated in an experimental study of intraesophageal balloon distension (15). In a small ED investigation, 32 elderly patients reported less pain, produced by the insertion of an intravenous catheter, than nonelderly patients (16). To the best of our knowledge, no large study evaluating age differences in pain perception has been carried out in EDs.

The objective of the present work was to examine the effect of age on acute pain intensity perception measured on a 0−10 numerical rating scale (NRS) for typical painful diagnoses encountered in the ED. We hypothesized that acute pain perception will decrease as age increases.

MATERIALS AND METHODS

Study Design and Setting

We undertook post-hoc analysis of real-time, archived data from a computerized medical prescription and nursing records system in the EDs of 2 health care institutions: a tertiary academic urban hospital (TUH) with an annual census of approximately 60,000 ED visits, and a secondary regional community hospital (SRH) with approximately 46,000 ED visits per year. The computerized system was the same in both institutions and included all demographic data, all triage information, including pain intensity assessment, all medical procedures performed by nurses, and final diagnosis. All information was collected in real time and time-stamped. The study was approved by the ethics review boards of both institutions.

Participant Characteristics

An experienced research professional familiar with data mining, blinded to our research hypothesis, extracted the data. From March 2008 to November 2013 for the TUH and from November 2005 to January 2013 for the SRH, we included all consecutive patients older than 18 years of age with a recognized painful diagnosis (renal colic, pancreatitis, appendicitis, headache/migraine, dislocation or extremity fracture) recorded by ED physicians at discharge (selected from a drop-down list) and a pain intensity evaluation ≥1 (0−10, NRS) at triage. Extremity fractures were defined as follows: from elbow to hand and from knee to foot. These diagnoses were identified in a focus group of ED physicians and authors from the TUH. This group was instructed to find ED diagnoses that physicians would unanimously agree on, ones that produce significant pain and physiopathology and should not vary greatly with age. To exclude possible pain-related disease interactions, patients who had a combination of two or more of the six painful diagnoses were excluded from analysis.

Measurement

Nurses administered the11-point NRS ranging from 0 to 10 to evaluate pain intensity at triage. Patients were instructed to rate 0 as “no pain,” and 10 as “the worst possible pain.” Triage nurses have detailed training in administering the pain intensity scale, and they use an electronic form that prompts them to adopt specific wording and an 11-point NRS for evaluating pain intensity. From the database, we extracted the following data: sex, age, Canadian Triage and Acuity Scale priority level (high = 1, 2 vs. low = 3, 4, 5), triage pain intensity level, analgesic prescription before ED arrival, arrival mode (ambulance or walk-in), ED duration of stay, disposition after ED (admission or release), and final diagnosis.

The primary outcome was pain intensity assessment at triage examined in relation to four defined a priori age groups for the six selected painful diagnoses. These age categories are well-accepted in occidental age studies (young adults: 18−44 years; middle-aged: 45−64 years; seniors: ≥65 years). However, to be more sensitive to the impact of old age, we divided seniors into early seniors (65−74 years) and late seniors (≥75 years).

Data Analysis

Patient characteristics were compared between hospitals by χ^2, Mann-Whitney U, and t tests, depending on the nature of the variables. Because of our large sample size, Cohen’s effect sizes (ES) are presented instead of significance level. In very large sample, all statistical tests can be significant despite tiny differences. In general, the ES is the difference between groups mean relative to within group variability. It is a standardized expression of the magnitude of an outcome that is not influenced by large samples and can also be compared with other studies. Small, medium, and large effect size for χ^2 and Mann-Whitney U are 0.1, 0.3, and 0.5, respectively, and 0.2, 0.5, and 0.8, respectively, for the t test statistic. Pain level at triage was compared between the different diagnoses by one-way analysis of variance (ANOVA).