

Original Contributions

IS FEVER TREATED MORE PROMPTLY THAN PAIN IN THE PEDIATRIC EMERGENCY DEPARTMENT?

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Abstract—Background: Fever can be treated with a higher priority than pain in the pediatric emergency department (ED) population. **Objective:** The primary objective was to assess whether patients with a fever are treated with acetaminophen or ibuprofen more promptly than they are treated for pain. **Methods:** A retrospective descriptive study was performed on all patients between the ages of 3 and 19 years who received acetaminophen or ibuprofen in the pediatric ED from February 1, 2010 to January 31, 2011. The time interval from arrival to treatment with acetaminophen or ibuprofen was compared for those patients with a fever ($\geq 100.4^{\circ}\text{F}$) and those without a fever and had reported pain. Other measurable points (time of vital signs, bed assignment, and medication order) on the medical record were compared to further describe any differences. **Results:** Pediatric patients with fever ($n = 1097$) received ibuprofen or acetaminophen a median of 54.0 min (interquartile range [IQR], 35.4–89.3 min) after arrival. The corresponding median time for afebrile patients ($n = 1861$) that received the same medications was 83.2 min (IQR, 52.7–136.1). The difference between medians was 24.6 min (95% confidence interval 21.3–27.9 min). **Conclusions:** Fever is treated more promptly than pain in the pediatric ED. This difference is associated with prevailing and largely unfounded concerns about fever and the undertreatment of pain (oligoanalgesia). © 2014 Elsevier Inc.

Keywords—acetaminophen; acuity; database; electronic medical record; emergency department; fever; ibuprofen; pain; pediatric; triage

INTRODUCTION

Pain is often not treated promptly or adequately in the emergency department (ED) (1). Lack of adequate pain management has been referred to as oligoanalgesia. Withholding of analgesics of any type does not obscure evaluation of patient and clinical diagnosis (2). We were specifically interested in the time of delivery of the noncontrolled analgesics, acetaminophen and ibuprofen, to pediatric patients.

There is no evidence to indicate that lowering a child's moderate temperature elevation improves clinical outcome, and there is evidence that prompt treatment of pain may be beneficial (3–6). In a January 2010 pilot study, data obtained from routine chart reviews demonstrated that patients with fever obtained acetaminophen or ibuprofen more promptly than patients with pain. We wished to compare any time differences to the delivery of the same antipyretic and analgesic medications between febrile and afebrile patients.

The primary objective was to compare the time from patient arrival to the administration of acetaminophen or ibuprofen for patients with a temperature $\geq 100.4^{\circ}\text{F}$ with those patients with a temperature $< 100.4^{\circ}\text{F}$. Other measurable points (time of vital signs, bed assignment, and medication order) on the medical record were also examined to further describe any differences. A separate analysis to

determine the individual effects of temperature, pain, age, and acuity on the time to treatment was also performed.

METHODS

Study Design and Setting

A retrospective descriptive study was done in a suburban academic ED with an annual census of 100,000 patients. Approximately 30,000 visits are seen in a dedicated pediatric ED. The hospital's Institutional Review Board approved the protocol.

From the 30,000 pediatric ED visits (February 1, 2010 to January 31, 2011), all patients that received acetaminophen or ibuprofen in the pediatric ED ($n = 5322$) were analyzed. Of these 15 patients were excluded because of missing or incomplete data. There were 3244 patients that were between the ages of 3 and 19 years who received either medication. An additional 286 patients were excluded who were afebrile with a pain score of 0, leaving 2958 patients that were analyzed (Figures 1 and 2).

Data were abstracted from the electronic medical record (Allscripts ED™, formerly Healthmatics A4™) for patients that received acetaminophen or ibuprofen. This computerized patient charting and order-entry system enabled the collection of standardized information for each patient and integrated that information into a relational database. The database was queried by SQL Cognos Impromptu™ (Cognos) IBM (Armonk, NY), which allows the administrator to create reports using criteria filters. This has been described elsewhere (7,8). Using the inclusion criteria listed here, a report was created with Cognos that queried all patients seen in the ED that fit the criteria for study enrollment. This report was further analyzed by Excel 2007 (Microsoft, Redmond, WA), using tools that Cognos does not possess, on patients between the ages of 3 and 19 years that were medicated with acetaminophen or ibuprofen (Figures 1 and 2).

Patients given acetaminophen or ibuprofen were included if all data were available from time of arrival, including time of vital signs; time of bed assignment; time of medication order, and time medication was administered; the patient was seen in the pediatric ED (not in the Fast Track or other treatment areas); the patient did not have a temperature $>106^{\circ}\text{F}$; and if the patient was afebrile had an initial report of pain ≥ 1 . All medications were ordered by physicians or nurse practitioners. The ED had no standing orders for the administration of medications by nurses.

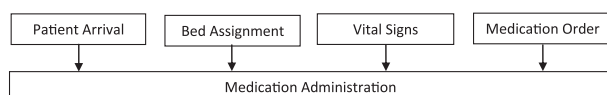


Figure 1. Patient management time intervals ($n = 2958$).

Data extracted included hospital account number; age; sex; acuity; ethnic group; primary diagnosis; arrival date/time; triage date/time; vital signs date/time and pain scale; bed assignment date/time; medication and order date/time; and medication administration date/time.

Outcome Measures

The primary outcome measured was the arrival time to the time of medication. Also measured were the intervals from vital signs to medication administration, medication order to medication administration, and bed assignment to medication administration. Demographics and pain scales utilizing an 11-point scale (0–10) were also assessed.

Data Analysis

Data were analyzed using StatsDirect (Cheshire, UK) for nonparametric data and IBM SPSS Version 21 for parametric analyses.

RESULTS

Patient demographics are listed in Table 1. During the 1-year study period, all patients who received acetaminophen or ibuprofen in the pediatric ED and met study criteria were included. There were 1097 patients who presented with a temperature $\geq 100.4^{\circ}\text{F}$ and 1861 patients who presented with a temperature $<100.4^{\circ}\text{F}$ and were reported to be in pain.

The data demonstrated that it took longer to administer medication to afebrile children. The difference in medians from the time of arrival to medication administration was 24.6 min (95% confidence interval [CI] 21.3–27.9 min). All other components of this time interval were also significantly different ($p < 0.01$) (Table 2 and Figure 3).

Median pain score for afebrile children was significantly higher as compared with the febrile children, with a pain score of 6 (interquartile range [IQR], 5–8) for afebrile children vs. 3 (IQR, 0–6) for febrile children (median difference = 2; 95% CI 2–3; $p < 0.01$).

A five-tiered triage category was used, with the lowest number having the greatest acuity (9). The median tier was 3 for both the febrile and afebrile groups. Patient demographics except for age and race were similar (Table 1). Fewer febrile patients tended to be white, as compared with afebrile patients (44.3% vs. 53.7%). When times to medication administration by age (Table 3) and acuity (Table 4) were stratified, patients with fever were always treated more promptly than those that were afebrile. Young febrile children were treated more quickly than older febrile children.

A separate secondary analysis was used to determine the individual effects of temperature, pain, age, and

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