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Clinical teaching in a busy emergency department: Interruptions during case presentations



The oral case presentation (OCP) plays an essential role in the care of emergency department (ED) patients. Medical students and house officers communicate important information about their patients through the OCP whereby a patient's story is filtered, organized and presented in a concise manner to generate a diagnostic impression and appropriate plan. In a clinical teaching setting, the OCP delivered by learners serves to support patient care and plays an essential role in medical education [1]. However, in a busy ED, faculty are challenged to instruct learners while simultaneously caring for multiple patients, including the critically ill. Attending physicians must balance the need to quickly devise patient assessments and plans with teaching responsibilities [2]. This workload is often uncontrolled and punctuated by frequent interruptions and competing demands. Time-motion studies have demonstrated that emergency physicians frequently multitask and are interrupted an average of 10 times per hour, significantly more often than other ambulatory care specialists [3,4]. The objectives of this study were to determine the incidence and type of interruptions that occur during case presentations in the ED.

This was a 5-month prospective observational study undertaken at a single university-affiliated teaching hospital with an emergency medicine residency training program and an annual ED census of 95,000 patients. A convenience sample of house officers and fourth-year medical students were observed during the initial OCPs of new patients presented to attending EM clinicians. None of these physicians or students were aware of the purpose of the study. They were informed only that a second-year medical student was observing case presentations as part of their elective. As many different attending physicians as possible were sampled while maintaining equal hours of observation for each daily shift. Each shift was observed five times for a total of 200 h of observation. The student completed a simple data sheet after each case presentation and recorded OCP duration, interruption frequencies, and interruption types. An "interruption" was defined as any event that diverted the physician's attention from the task at hand [3]. To minimize the Hawthorne effect, the observer completed the data sheet after each case presentation. Descriptive statistics (frequency tables, confidence intervals) were used to summarize the data. Chi-square and ANOVA tests were used to compare demographic differences. Effects of learner level or time of day on frequency of interruption were evaluated using analysis of variance.

A total of 860 new patient presentations were observed during the study period. The study involved 53 EM faculty members, 77 resident physicians and 24 medical students. The mean duration of presentation was 3.1 ± 2.5 min (range 0.5 to 15 min). There were a total of 2838 interruptions during case presentations; mean $3.3 (\pm 2.8)$ interruptions per presentation or $0.94 (\pm 0.71)$ interruptions per minute. At least one interruption occurred in 94% of OCPs, with a maximum of 32. The interruptions were categorized as follows: interruptions by faculty members who were being presented to (85%), questions by nursing

and/or medical staff (8%), phone calls (5%), ECG interpretation (1%), and orders on other patients (1%). Faculty interruptions were categorized into four types: 1) probing for further data, 2) teaching points, 3) instructions for managing the case, and 4) prompting for expected sequence.

In 39% of OCPs, attending physicians interrupted to give an assessment and/or a plan before the learner had done so. The number of interruptions (per OCP) and duration of OCPs varied by learner level of training ($p < 0.001$), with less experienced learners giving longer, less structured presentations and being interrupted more often. For example, faculty interruptions occurred in 12% of third-year resident OCPs compared to 66% of fourth-year medical student OCPs. Neither frequency nor number (per OCP) of interruptions was statistically different by time of day.

One simple explanation for the number of interruptions during OCPs is that more people work together and interact in EDs, increasing the chance that interruptions could occur [3]. However, we found that the greatest number of interruptions came from the attending physicians. Reasons for faculty physician interruptions include the duration of the OCP, quality and organization of the presentation, patient complexity, and varying faculty expectations of learners [2]. The primary focus of our study was on quantifying and characterizing such interruptions; we did not determine the detrimental effect, if any, of interruptions on the learner's education. There are situations in the ED during which such interruptions provide the attending physician an excellent opportunity to teach, gather more information on the patient, and guide treatment. However, these same interruptions may cause the learner to lose focus and omit relevant details [4,5]. Faculty should be cognizant of how frequently they interrupt and use strategies such as prompting and summarizing to reorient the learner after an interruption.

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Hyperkalemia in the emergency department: Consider the use of nebulized salbutamol



Sir:

We have read with great interest an article “Hypoglycemia as a complication of intravenous insulin to treat hyperkalemia in the emergency department” in which the authors described the frequency of hypoglycemia following the use of insulin to shift potassium intracellularly [1]. They reported that hypoglycemia is a frequent complication of treatment with IV insulin in the ED. They also recommend interventions, such as standardized protocols, to assist with the ED management of hyperkalemia. Hyperkalemia is a potentially life-threatening electrolyte disturbance that can be fatal [2]. Because of the potential cardiac effects of hyperkalemia, its management is an emergency intervention and patients require a rapid drop of serum potassium level [3]. In the emergency department, we can use intravenous insulin or beta₂-agonists. Here, we want to highlight the interest of a nebulized beta₂-agonist, an easy-to-use tool with reduced monitoring for the management of hyperkalemia in the emergency department.

Allon et al. reported, in 10 patients on hemodialysis, a significantly greater reduction in serum potassium with 10 mg and 20 mg nebulized salbutamol compared with placebo, with a peak effect of 10 mg nebulized salbutamol at 120 min and at 60 min for 20 mg nebulized salbutamol [4]. In 17 chronic renal failure patients, Mandelberg et al. reported a significant decrease in serum potassium with 1200 µg of salbutamol in a metered-dose inhaler with a spacer device compared to placebo in a cross-over trial, with a peak effect at 60 min [5]. Importantly, Balanzario et al. reported no significant difference in serum potassium between 0.5 mg IV salbutamol and 10 mg nebulized salbutamol [6]. In a randomized cross-over trial including 12 hemodialysis outpatients, Allon et al. reported that IV insulin-dextrose (regular insulin 10 units with glucose 50 mL) significantly reduced serum potassium compared to nebulized salbutamol (nebulized treatment of albuterol 20 mg) at 15 min but not at 30, 45 or 60 min. The maximal decrease was 0.65 ± 0.09 and 0.66 ± 0.12 mmol/L after insulin with glucose and albuterol, respectively. In this study, insulin-dextrose therapy caused significant hypoglycemia (mean plasma glucose concentration 2.8 ± 0.3 mmol/L) at 60 min, whereas albuterol was associated by a non-significant increased heart rate [7]. Ngugi et al. included 20 patients with acute and chronic renal failure and reported no significant differences in serum potassium reduction between intravenous salbutamol and intravenous insulin-dextrose at 60 and 120 min. In detail, at 2 h the decrease in serum potassium caused by insulin with glucose was 0.90 ± 0.45 mmol/L which was comparable to that caused by salbutamol 0.90 ± 0.56 mmol/L [8].

Therefore, we propose that beta₂-agonists should be used preferentially by the emergency physicians for the management of hyperkalemia in the emergency department. Insulin is associated with increased monitoring with repeated measurement of blood glucose, and hypoglycemia is associated with longer stay in the emergency room. The authors propose that “emergency departments developing standard practices for checking glucose at frequent and regular intervals following the administration of intravenous insulin”. This may be

complicated in an overcrowded emergency department, and beta₂-agonists will not require such intensive monitoring.

We also note that robust evidence for the emergency treatment of hyperkalemia is missing. Thus, a rigorous evaluation of the first-line treatments of hyperkalemia in emergency departments is needed and a large scale randomized clinical trial is warranted.

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