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## **Cardiac Arrest Following Inadvertent Intravenous Administration of an Oral Antiacid: Hydrotalcite**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author SE contributed to data acquisition. Author FY designed the study. Author BMS performed the revision of the article.*

*Author MO wrote the protocol, author MÖ wrote the first draft of the manuscript and author EC managed the literature search. All authors read and approved the final manuscript.*

**Case Study**

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### **ABSTRACT**

Emergency department overcrowding combined with shortage of experienced and knowledgeable healthcare staff may lead to fatal, albeit rare, malpractice cases in developing countries. We report herein a patient with cardiac arrest as a result of inadvertent intravenous injection of hydrotalcite, an orally administered anti-acid medication. Our literature search revealed no previous cases of cardiac arrest as a result of intravenous (IV) administration of hydrotalcite.

**Keywords:** *Cardiac arrest; medical error, hydrotalcite syrup.*

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## 1. INTRODUCTION

Intravenous administration of drugs is a complex and demanding task that involves a drug preparation process prior to injection of the medication. So far, mortality and morbidity following medication errors have been reported, including administering a wrong drug, dose, or diluent, or causing contamination of one medication with another during injection [1,2]. In the present case we report a patient who developed cardiac arrest following inadvertent IV administration of 10mL hydrotalcite solution intended by the patient's nurse to be given via oral route.

## 2. CASE REPORT

A 50-year-old woman presented to emergency department with epigastric pain of burning character for a few days. Her past history was not remarkable for any disease. Her vital signs on admission were as follows: Blood pressure: 140/80mmHg, pulse rate: 98bpm, SaO<sub>2</sub>: 98%, body temperature: 36.5°C. Electrocardiogram showed normal sinus rhythm.

In physical examination her general condition was well and she was conscious with full cooperation and orientation. Abdominal examination revealed epigastric tenderness without rebound or guarding. Her laboratory examinations were all within normal limits. An IV route was established and it was intended to administer ranitidin 50mg and hydrotalcite (talcid) for epigastric pain. A solution containing 10mL hydrotalcite prepared in an injector for oral administration was inadvertently injected through IV line by the patient's daughter who was a nurse. The patient's general condition quickly deteriorated immediately following injection of 3mL drug and thus she was promptly taken to the resuscitation room. She became bradycardic and 0.5mg atropine was IV administered but pulse could not be palpated and cardiopulmonary resuscitation (CPR) was initiated due to pulseless electrical activity (PEA) and she was urgently intubated but we did not observe any upper swollen airway in the course of intubation (Fig. 1).



**Fig. 1. Cardiac arrest following inadvertent IV administration of hydrotalcite**

She was converted to sinus rhythm 5 minutes later. Her blood pressure was 90/50mmHg, pulse rate 110bpm, and SO<sub>2</sub> 90%. She was admitted to intensive care unit. A thoracoabdominal computed tomography (CT) with contrast was performed and revealed no pulmonary embolism. Abdominal CT revealed signs of cholecystitis. Intravenous antibiotics were begun. She was extubated 6 days after admission and taken to regular ward. She was followed at the ward for 10 days and discharged without sequel thereafter.

### **3. DISCUSSION**

A medication error was defined by United States National Coordinating Council for Medication Error as “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer” [3-6]. Medication error is the most common error type affecting patient safety and, additionally, it is the most common type of medical errors [5].

Administration of medications is at times so confusing and complex that errors regarding this task may appear at any stage. Studies have reported that the estimated rate of errors are 39% during prescription process, 12% during transcription process, 11% during dispensing process, and 38% during administration process. Nevertheless, majority of medication errors occur at bedside when a medication is inadvertently and mistakenly administered to a patient [7,8].

It has been considered that many factors play a role in occurrence of medication errors. Some of them include lack of knowledge, miscommunication, and inadequate time. In addition to factors causing medication errors, there are also some other factors that pave the way for medication errors. Some of them are working in night shifts or early in the morning, working in collaboration with inexperienced staff, increase in workload, and exhaustion [5].

A study reported that the most common factors causing medication errors reported by healthcare staff were heavy workload, insufficient number of nurses, assigning of tasks to nurses for which they are not responsible, stress, and exhaustion [6].

In a study from Başkent University Ankara Hospital the most common medication errors the nurses made were IV infusions, IV medications, antibiotics, anticoagulants, tablets, and chemotherapy drugs [9].

In a case reported by Uzkeser et al. [10] 5mL of hydrotalcite was applied intravenously to a 23-year-old woman and was hospitalized due to angioedema. After 12-24 hours follow up she was discharged with no residual complication. But in our patient apparently cardiac arrest occurred without anaphylactic reaction.

In one study Aşti and Kivanç explored the knowledge status of nurses about orally administered drugs and reported that 33.4% of nurses had information about adverse effects of drugs, 13.3% were aware of factors affecting drug doses and 82.7% knew about effects of drugs (systemic, synergistic, and local). In the same study it was reported that 20% of nurses caused medication errors during their entire career [4].

#### **4. CONCLUSION**

In conclusion, to prevent medication errors it is essential to provide the system with qualified nurses, adequate man power to prevent excessive workload and burn-out, ensure proper definitions of roles and responsibilities of nursing staff, pass legal regulations, provide continuous education, use of information technologies, enhance registry systems, eliminate inadequacies about physical infrastructure of hospital, implement teamwork to working environments, develop efficient communication, develop quality assurance and standards of care, develop adequate treatment protocols, and raise personal/public awareness.

#### **CONSENT**

All authors declare that 'written informed consent was obtained from the patient for publication of this case report and accompanying images'.

#### **ETHICAL APPROVAL**

All authors hereby declare that this manuscript have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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