

Errors, Patient Safety, and Risk Management in EM

Case Report: Wrong Drug Delivery

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Abstract

We describe a case of wrong drug delivery in an Israeli ED, which fortunately did not cause any harm. The editors of this section of the Israeli Journal of Emergency Medicine urge emergency physicians to write and share their cases with their colleagues. Names of the authors, institutes and any other identifying signs will be withheld so as to maintain anonymity.

MeSH Words: medical errors, risk management, emergency medicine, emergency department.

Case Report

Two young patients were admitted during the afternoon to the ED, one after the other, both complaining of abdominal pain. Patient A was 28 years old and Patient B was 30 years. Both were examined by the same physician who ordered IV papaverine 160 mg/1L 0/9% saline for both.

The ED was overcrowded at that time. Nurse C prepared papaverine for both patients and showed the syringes and the ampoules to Nurse D before injecting them into the infusion

bag. Nurse D confirmed the drugs and both nurses signed the labels on the infusion bag.

Nurse C started the IVs, marked the date and time and signed her name in the chart. Thirty minutes later, Nurse C checked Patients A and B for their pain scale and both patients declared improvement. One hour later Nurse C, while checking again their pain scale, found Patient A somnolent and agitated and Patient B having bizarre behavior and purposeless movements. She stopped the infusions immediately,

Figure 1: Medicine drawer. Note that the papaverine and promethazine are close and the drugs are not arranged in alphabetical order of their generic names.



measured their vital signs, SaO₂ on room air and blood sugar and reported immediately to the senior physician in the ED. Upon physical examination, Patient A had normal vital signs and normal blood sugar, no fever but neurologically was somnolent and agitated. No focal neurological signs could be detected. Patient B had also normal vital signs but her speech was slow and sluggish. Neurological examination revealed dyskinetic movements of the upper limbs, but, again, no other focal neurological signs could be detected. The infusion bags were checked but nothing unusual was remarked. Few minutes later Patient A had a drop in her SaO₂ to 90% on room air and her blood dropped to 80/60 mmHg. Oxygen was delivered immediately through a 90% face mask with non-rebreathing bag and 500 cc of normal saline were administered rapidly within 15 minutes, leading to a rise in the SaO₂ to 98% and blood pressure to 110/70 mmHg. Patient B remained stable but prophylactic oxygen was delivered.

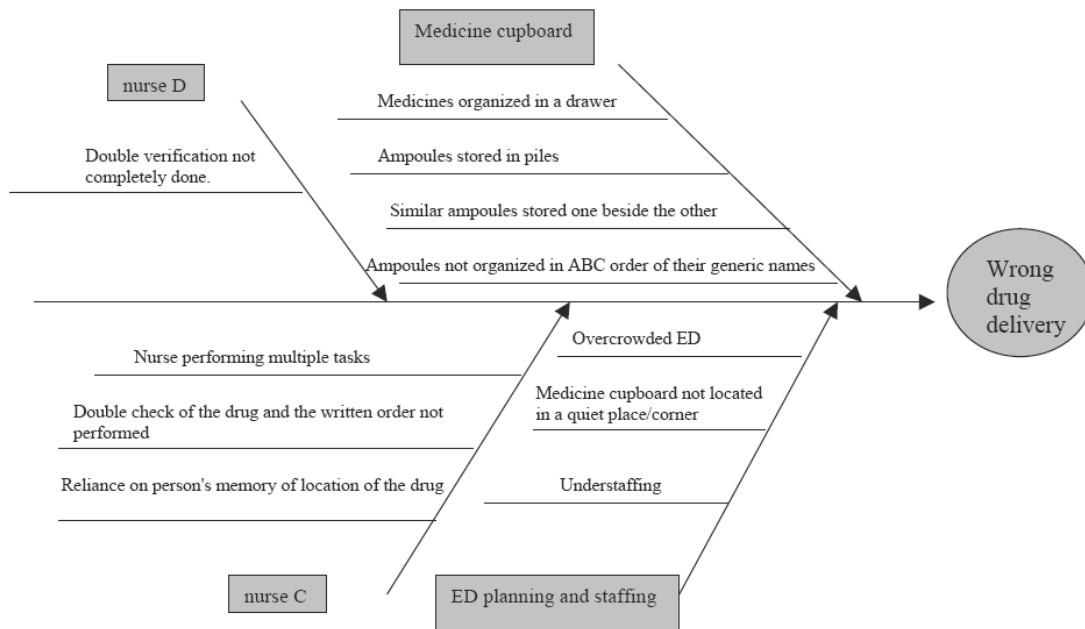
A neurologist consultant examined both patients but could not point out on a specific cause. Drug error was eventually suspected but search for the papaverine ampoules was futile because the

garbage containers were emptied. Nurse D assured that she saw the papaverine ampoules that Nurse C prepared (4 ampoules for each patient, each ampoule contains 40mg/2cc of papaverine chloride). The supervisor nurse who was called checked the medicine drawers and came up with a suggestion that both patients were given promethazine instead of papaverine (Fig 1).

The physicians in the ED and the neurologist consultant agreed with this diagnosis. Blood and urine samples were drawn for drug screening and the infusion bags were stored to be sent the next day for drug screening. Patient A continued to be somnolent and agitated and she was transferred to the intensive care unit for further observation. IV propofol infusion was administered for the following 12 hours to stop the agitation. Patient B improved while still in the ED, the dyskinesia resolved and she was transferred to the medical department for further observation. Both patients were discharged home 2 days later with no residual sequelae.

Drug screening revealed positive results for promethazine in the blood, urine and infusion fluid samples. No trace of papaverine was found.

Figure 2: Fishbone Chart



Discussion

The fishbone chart (Fig 2) summarizes the different causes that led to wrong drug administration.

IV drug administration by nurses has been addressed by the Ministry of Health, and the Nursing Department of the Ministry of Health published strict and clear instructions for this issue (1). This specific hospital had also its standing orders that only qualified nurses deliver IV drugs and the nurse must double check the drug with another qualified nurse (personal communication). In this case, Nurse C stated that she knew where the papaverine was stored, on the first row at the right side of the drawer, and after drawing the drug into the syringes she showed them to Nurse D. Nurse D stated that she looked at the ampoules but she didn't really read the labels because she was in a hurry to treat another patient. According to Reason's classification of human errors, the nurses' mistakes were of the "slip" type (2).

Prima facie, one can conclude that human factor was the only reason for this event and the nurses violated the standing orders of the hospital, but

since risk management does not look for "the guilty" but rather has a wider range of view and looks for system failures, investigation of this event reveals other important contributing factors:

1. Storing drugs in drawers may be space saving but has the disadvantage of poor view of the drug labels.
2. Papaverine and promethazine ampoules were stored in a pile (Fig 1).
3. Papaverine and promethazine ampoules are quite similar but, still, they were stored one beside the other (Fig 3). One can easily pick promethazine instead of papaverine.
4. Drugs in the drawer were not arranged in an ABC order of their generic names.
5. The medicine cupboard was not built in a quiet place/corner that enables the nurse to concentrate on drug preparations.

Figure 3:
Papaverine and Promethazine ampoules.



Figure 4:
Rearrangement of the medicine cupboard



Along with refreshing the regulations and standing orders of IV drug administration, the ED staff rearranged the drugs in the medicine cupboard (Fig 4) and separated the papaverine from promethazine. These measures should

serve to prevent future errors regarding papaverine-promethazine, and hopefully will prevent other drug errors.

Appropriate design of the ED is important to ensure a quiet location for preparing drugs. Hospital managers planning to build or renovate their EDs must consider these issues. In this specific case, the medicine cupboard location was not changed and the nurses will continue to have their attention disturbed while preparing medicines.

Overcrowding in the ED is an international problem. Medical staff will continue to perform multiple tasks if not appropriately staffed. Again, appropriate design of the ED and personnel staffing might help to overcome this problem

Conclusion

Undoubtedly, this drug error was preventable. The nurses' deviation from the hospital standing orders and the regulations of the Ministry of Health is central to the error. Nevertheless, there were other non-human factors that contributed to this event. One must always look at the whole system and never chose the easiest way of finding the "guilty party".

The authors of this section would like to thank our colleagues for sharing this case and hope to receive more cases to be published in this journal.

Reader's Forum:

We invite readers comments regarding the incidence, reporting and prevention of medication errors in other emergency departments. What has been your experience? Is this department still vulnerable to other forms of medication error (such as calculation, infusion, equipment error?). What has been your experience with other protocols and technology (Pyxis machines, computerized order entry) intended to minimize error? Are errors routinely reported?

Send your comments to:
letters@isrjem.org

References:

1. Management of drug treatment. Regulations of the Nursing Administration at the Ministry of Health 53, August 2003.
2. Reason J. Human error. Cambridge University press, Cambridge, England 1990.

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