Accidental oral administration of Monsel's solution during caesarean delivery

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Introduction

- Look-alike sound-alike (LASA) medications contribute to 6.2 - 14% of medication errors.
- Similar packaging, appearance and labelling can lead to physician cognitive errors thus impacting patient safety.
- We report a case of accidental oral administration of Monsel's solution (20% aqueous ferric sub-sulfate, a topical haemostatic agent used in gynaecology and dermatology; **Figure 1**) prior to general anaesthetic (GA) for an elective caesarean delivery (CD).

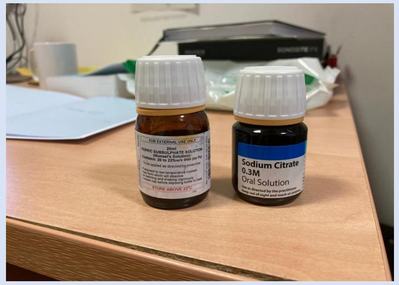


Figure 1. Monsel's solution and Sodium Citrate bottles.

Case Report

- A 32-year-old woman (BMI 28kg.m^{-2}) presented for an elective CD at our tertiary obstetric centre in Manchester.
- Previous medical history included hyperemesis gravidarum, severe reflux, and anxiety requiring omeprazole and sertraline.
- Her surgical history included an uncomplicated CD under GA in 2008 and Harrington rod insertion with posterior fusion and anterior release in 2016 between T8 and L5 for severe scoliosis
- It was decided to perform the CD under a GA due to patient preference, severe patient anxiety, and anticipated difficult neuraxial blockade.
- In theatre, after routine monitoring and securing intravenous (IV) access, the anaesthetist administered the patient what was believed to be 30 ml of 0.3M sodium citrate (usually kept on top of the anaesthetic machine).
- Immediately after ingestion, the patient experienced severe nausea, vomiting, and brownish discolouration of tongue and oral mucosa.
- On scrutinising the bottle, it was noted that 20 ml of Monsel's solution had been accidentally administered.
- Omeprazole and ondansetron was administered and IV hydration with crystalloid was instituted immediately.
- No maternal or foetal haemodynamic instability was observed and it was decided to cancel the CD.
- The National Poisons Information Service was consulted, and the patient's mouth and oral mucosa was rinsed continuously with saline for several hours and desferrioxamine was kept available in pharmacy.
- Blood investigations post incident revealed low serum ferritin and transferrin levels, but were otherwise unremarkable
- The patient was fully debriefed regarding the incident in line with duty of candour and her CD was performed the following day under GA without any complications.
- No oral ulcerative mucosal lesions were noted on video-laryngoscopy during tracheal intubation.
- The patient was discharged on the third post-operative day and reported no swallowing difficulties on 10-week follow-up.

Discussion

- Our team utilised the Human factors analysis and classification system (HFACS) to investigate this incident and found perceptual errors, organisational influences, environmental factors, and inappropriate actions as key factors in this medication error (see **Table 1**).
- Remedial measures included introduction of double-checking medications, liaison with pharmacy to remove Monsel's solution from the anaesthetic storage chain, and high-priority departmental alerts including discussing at the obstetric morbidity meeting.
- We recommend that anaesthetists remain vigilant when dealing with LASA medications, engage in double-checking medication procedures, and participate in reviews with pharmacists in identifying safe storage of LASA medications to enhance and improve patient safety.

	HFACS factor	Identified risks/deficiencies	Actions taken to mitigate the risk
Latent conditions	Organization	- Purchase/availability of look-alike, sound-alike bottles - Lack of robust drug handling policy (e.g., storage, double check) - Lack of technological tool e.g., barcode reader - In theatre: lack of coordination (e.g., usually assistant administers but as he was busy anaesthetist administered) - Proximity of gynaecology and obstetric theatres - Performing obstetric surgeries in routine gynaecology theatre during COVID-19.	- Liaison with pharmacy to highlight and remove Monsel's solution from the anaesthetic supply and storage chain. - Monsel's 20 ml bottle replaced by a 50ml bottle.
	Preconditions for unsafe act	- Inadequate pre-planning for oral medication administration (e.g., it is not clear when and who brought the Monsel's solution in theatre) - Timing of administration e.g., administered immediately prior to GA in theatre when multiple tasks are on going. - Distal storage – both bottles stored nearby in the pharmacy cupboard - Proximal storage (in theatre) suboptimal (e.g., site where visibility may not be clear, near to sodium citrate solution) - Distraction: Patient was very anxious. Assistant was occupied in reassuring the patient.	- Removal of sodium citrate from the top of the anaesthetic machine. - High priority departmental alerts to all staff and discussion at morbidity meeting to raise awareness.
Active failure	Unsafe act	- Incorrect visual perception	- Introduction of double-checking medications with anaesthetic assistants prior to administration.

Table 1. Human Factor Analysis and Classification System (HFACS)

References

1. Bryan, R, Aronson, JK, Williams, A, Jordan S. The problem of look-alike, sound-alike name errors: Drivers and solutions. *Br J Clin Pharmacol.* 2021; 87: 386– 394.
2. https://www.hfacs.com/hfacs-framework.html (Accessed April 12, 2022)