

## REGULAR

## WEBAIRS NEWS



### A CASE REPORT FROM WEBAIRS

WebAIRS is a web-based anaesthetic incident recording system which has been designed by ANZTADC to improve the safety and quality of anaesthesia by providing an enduring capability to capture, analyse and disseminate information about incidents, relative to the safety and quality of anaesthesia in Australia and New Zealand ([www.anztadc.net](http://www.anztadc.net) [anztadc@anzca.edu.au](mailto:anztadc@anzca.edu.au)).

#### Case 2019:1 Look-alike ampoules

WebAIRS has received a recent report concerning look-alike ampoules. The report stated that "A Xylocaine® ampoule was found in one of the block trolleys in the Marcain® section today." And added "Please remember to verify all drugs before administration and take care when stocking the trolleys and returning unused ampoules."

It can be seen that if the Xylocaine® ampoule were inadvertently placed in the Marcain® compartment, as happened in this case, it would be easy to misread the label, especially if working in a busy area where distractions might occur. This report also highlights "the similarity between Marcain®/adrenaline 0.5% and Xylocaine®/adrenaline 0.5% ampoules. The ampoules are nearly identical except for the dark blue band at the top on the Marcain® ampoule. The concentration of 0.5% highlighted in green and adrenaline in a red font which distracts attention from the drug name and contributes to

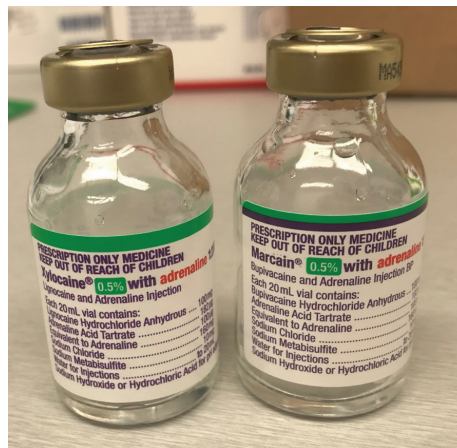


Photo of the ampoules concerned, which was supplied by email

the similarity. The close similarity thus poses a risk for potential drug errors." The report also noted that it was suspected that the error occurred whilst restocking the compartment from unused ampoules that had been left on the trolley, and stated that "Only a final ampoule check, after the medication had been drawn up, prevented the incorrect drug from being administered to the patient".

The analysers assumed that the green highlighting around the 0.5% might have been an initiative by the manufacturer to assist in distinguishing between different concentrations of the same medication. reduce possible errors arising from differing concentrations of the same drug. Also, they assumed that the red font was designed to distinguish between similar preparations with or without adrenaline. In reality, these features appear to increase the similarity of these two different local anaesthetics, thus having the unintended

consequence of creating a latent factor for look-alike errors.

Although on this occasion it was Xylocaine® and Marcain® involved, substitution errors of look-alike medications are common, and a search of the webAIRS database yielded many other comparable reports suggesting a similar failure mechanism, probably involving an unused ampoule left on the trolley and then placed into an incorrect compartment. Placing two things that have different functions close to each other is known as component proximity and is a recognised design fault in human factors literature. There was a previous such instance at the same institution where GTN was re-stocked into an unlabelled section of the anaesthetic trolley that contained tranexamic acid. GTN is normally stored in a separate 'emergency drug' drawer of the trolley.

Look-alike errors arise when similarities in ampoule or packaging colour, size and design (used to emphasise the manufacturer's brand rather than distinguish between two different products) predispose clinicians to mistake one medication for another<sup>1</sup>. There are challenges to implementing systems in anaesthetic practice that mitigate the risk posted by look-alike medications. For example, packaging from manufacturers may change without notice, and brands of drugs that are purchased by a health service often change frequently due to cost and availability considerations. As occurred in the case described above, preconceptions through position coding are introduced by the location of drugs in

the anaesthetic drug trolley<sup>1</sup>, and errors made during the restocking process may further amplify the downstream error risk posed by look-alike packaging and ampoules through such end-user confirmation bias.

Look-alike ampoule errors are explicitly mentioned in the ANZCA document PS 51<sup>2</sup> and have been identified in previous journal publications<sup>3</sup>. There is value in raising awareness of this continuing risk to safe practice, although doing so is a relatively weak intervention that relies on human memory and attentiveness to be effective. Interventions to distinguish ampoules could involve colour coding of the label by class of medication or the writing to an agreed upon national or international standard, to ensure that at least the correct class of drug is given. However, colour coding alone would not have prevented this particular incident which involved medications of the same class. From other reports in the webAIRS database, it is notable that where two syringes of the same class of drug are drawn up and placed in syringes with colour coded labels, there is still a potential for a look-alike syringe error. This has happened on more than one occasion where suxamethonium and a non-depolarising relaxant have been drawn up and placed in close proximity. For instance, where suxamethonium is routinely drawn up as an 'emergency drug' and then accidentally given instead of the intended relaxant. In general, within class substitutions are less likely to have serious consequences than between class substitutions, but the present case is an important exception to this rule (and there are other exceptions, of course). Thus, colour coding of labels might be very useful in reducing errors between midazolam and either atracurium or cisatracurium. In this respect placing one of these classes of medication (midazolam) into clearly labelled and colour-coded pre-filled syringes has been used in many New Zealand hospitals to address this particular

risk, with apparent success.

These are some quotes from case reports to webAIRS where atracurium or cis-atracurium has been given instead of midazolam:

- Atracurium drawn up and labelled as midazolam. Ampoules look similar and are in the same drawer.
- Realised that I had mistakenly labelled the atracurium as midazolam.
- The ampoule opened was found to be cis-atracurium (with no open midazolam ampoule).
- The anaesthetic nurse identified the ampoule I used, was in fact Atracurium 50mg in 5ml. Two such ampoules had been left out due to expiry being on that day.

There are other examples where atracurium has been given instead of other drugs for instance instead of protamine or local anaesthetic.



The risk described in the present report would not have been ameliorated by colour coded labels on the syringes, because the mistaken identity occurred prior to drawing up the drug due to the similarities between the ampoules. More attention is needed to ensure clearer labelling of medication ampoules. Much effort has been made by ANZCA and others over the years to persuade manufacturers and others to address this need. EZ Drug ID is an international campaign to improve the safety of medication packaging and more information about other similarities can be viewed at the website<sup>4</sup>.

Queensland Health Medication Services has recently developed a "look-alike/sound-alike" (LASA) register to raise awareness of potential similarities between drugs based on reports received. At this early stage, the register describes the relevant medication formulations along with a photograph, the context of any associated drug error or near-miss, the site from which the notification was received, and any action taken at a local or central level to discuss the incident and put in place risk mitigation strategies.

Frequent change of the brands of drugs without adequate warning is one of the problems cited in the webAIRS reports. Where a hospital changes a brand there should be a circular that shows the new ampoule and other similar ampoules. This would warn practitioners of the introduction of a potential risk of look-alike error. ANZCA document PS 51 also has recommendations relating to drug purchasing decisions and look-alike ampoules which should be considered by healthcare administrations<sup>2</sup>.

Finally, a new intervention could be the creation of a register or bulletin, similar to the Queensland Hospitals look-alike medications register, but dedicated to anaesthetic drugs and designed to raise awareness of the problem at a bi-nation level.

Dr Gerard Eames, Dr Martin Culwick  
for the webAIRS case report writing group

## References

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