Residual medications: Silent threat, visible solutions

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Case Report

A 27 year old male underwent an appendicectomy after a RSI.
A second cannula was inserted and on returning to the ward, the original cannula containing residual Suxamethonium was flushed and the patient suffered a respiratory arrest with explicit awareness.
He was successfully mask ventilated.

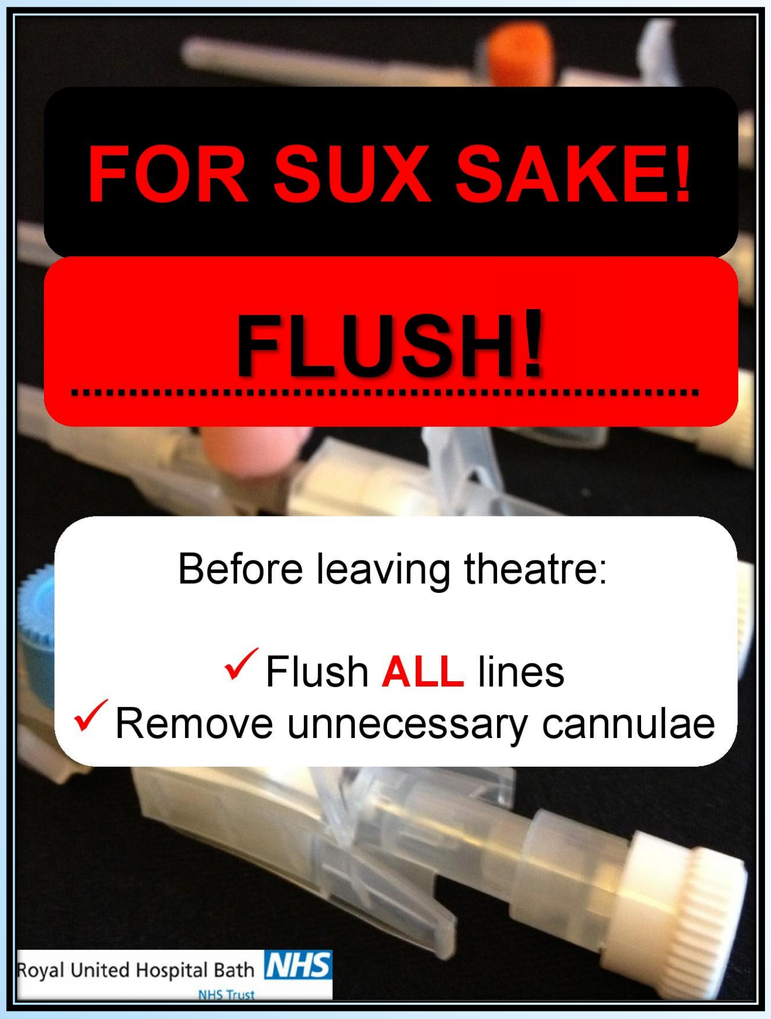
Previous alerts

- NPSA Paediatric Signal Alert in 2009[1]
- SALG safety update in 2012[2]

A 20G cannula with a needle free injector port has enough dead space to cause a respiratory arrest if filled with Suxamethonium or Opioids.
RCN now recommend the use of 'Octopus' extensions as standard, so their use will increase[3].
The risk of not flushing in paediatrics has been highlighted before[3]; however the risks in adult patients are less well documented.

Risks

Paediatric: Respiratory arrest leading to **hypoxic injury**
Adult: Paralysis causing explicit awareness and psychological trauma. 100% of claims for brief paralysis were settled for **£32,680** each[5]

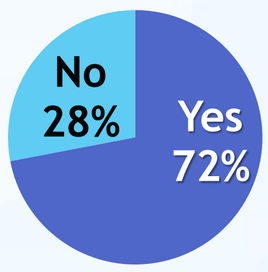


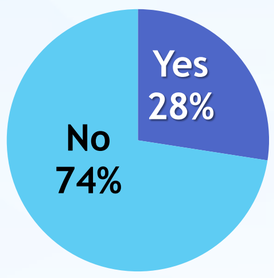
Survey

Distributed to clinicians in the Severn Deanery through the STAR Group:
127 anaesthetists responded:
- 69% consultants
- 17% registrars
- 8% core trainees.

Results

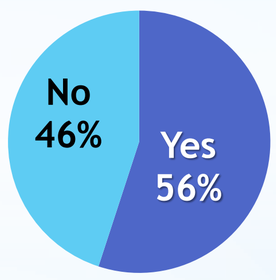
Do you routinely flush cannula before leaving theatre?





Are you aware of any near misses in your hospital in the last 5 years?

In your opinion do you believe there is a potential problem with retained medications?



Responders Comments

- Outside of neonatal anaesthesia, this is a load of rubbish. The dead space in a cannula could be full of sux and it will be unlikely to effect an adult patient
- Pointless in adults, only an issue for children...if at all!
- Only in paediatric practice
- Theoretical risk.
- I think there is the potential for harm in paediatrics but not adults as the volumes retained/kg are not an issue with large people.

A range of posters were created and displayed in the Department of Anaesthesia and theatre complex.
Using Propofol as a surrogate for an unflushed cannula in recovery, we recorded an increase in flushing from
68% to **98.4%**
after our posters were displayed.

Discussion

Only half of respondents considered there to be a potential problem, thinking there was an insignificant risk due to the small residual volume.
The survey highlights a significant issue: over a quarter of clinicians had experience of a critical incident due to delayed cannula flushing.
There is a large discrepancy between perceived and actual risk.
As over a quarter of clinicians do not routinely 'flush their drips', there is a significant patient safety issue.
After correspondence in *Anaesthesia*[4], 22 hospitals throughout Britain, New Zealand and Canada have requested the posters to date.

Recommendations

28% of clinicians in our regional survey are aware of a **critical incident** involving retained anaesthetic drugs.

We believe that a national campaign is needed to highlight simple solutions to an endemic problem.

References
1 National Patient Safety Agency (NPSA). Residual anaesthetic drugs in cannulae. November 2009. Signal Alert. http://www.nrls.npsa.nhs.uk/resources/?EntryId45=65333 [Accessed 11th March 2014]
2 Safe Anaesthesia Liaison Group (SALG). Patient Safety Update: 1 January 2012 to 30 March 2012. pp 4. http://www.aagbi.org/sites/default/files/images/PATIENT%20SAFETY%20UPDATE%20-%20Mar%202012.pdf [Accessed 10th March 2014]
3 Bowman S, Raghavan K and Walker IA (2013). Residual anaesthesia drugs in intravenous lines – a silent threat? *Anaesthesia*. 68(6): 557-561
4 Oglesby KJ, Cook TM and Jordan L (2013). Residual anaesthesia drugs – silent threat, visible solutions. *Anaesthesia*. 68(9): 973–986R.
5 Mihai, S. Scott and T. M. Cook (2009). Litigation related to inadequate anaesthesia: an analysis of claims against the NHS in England 1995–2007. *Anaesthesia*. **64**: 829–835