



Patient Safety Alert

Confirming removal or flushing of lines and cannulae after procedures

9 November 2017

Alert reference number: NHS/PSA/D/2017/006

Directive Alert

Residual anaesthetic or sedative drugs may be left in intravenous (IV) lines and cannulae unless they are effectively flushed at the end of the procedure. If they are not, the residual drug can be later inadvertently introduced into the patient's circulation causing muscle paralysis, unconsciousness and respiratory and cardiac arrest.

This risk has been known for some time and a Warning Patient Safety Alert '[Residual anaesthetic drugs in cannulae and intravenous lines](#)'¹ was issued in April 2014. The alert required local system review of the risk of residual anaesthetic drugs being left in cannulae or IV lines after surgery or other procedures requiring anaesthesia. An action plan, if required, should have been developed to reduce the risk of such incidents occurring.

In the three years since the 2014 alert's completion date, 58 similar incidents involving either anaesthetic or sedative drugs in adults or children have been reported to the National Reporting and Learning System (NRLS). Eighteen were reported as causing respiratory arrest and the remaining incidents described effects including temporary paralysis, muscle spasms, and difficulty breathing.





Whilst incidents are still occurring from lapses in identifying and flushing all IV lines and cannulae intended for further use; they are also resulting from failure at the end of a procedure to remove cannulae specifically inserted to administer anaesthetic and sedative drugs. Another important risk is when two or more IV lines or ports are connected to the same cannula, as flushes may not remove drugs that have back-tracked up one of the lines or accumulated in the additional space within multi-lumen connectors.² Use of infusion sets and ports with one way valves reduces the risk of backtracking.

Since the 2014 Warning Patient Safety Alert a range of local procedures have been identified to ensure patients do not return to wards or units with cannulae or IV lines in place that may contain residual drugs. The most effective of these centre on adding prompts to existing procedure documentation and at patient handover from clinicians in the procedural area, confirming that all cannulae and IV lines that may contain residual drugs have been fully flushed or removed. These actions are supported by the National Safety Standards for Invasive Procedures (NatSSIPs).³ This Directive Alert now requires all organisations to embed these changes.

Actions

Who: All hospitals and other units that undertake surgical interventions or other procedures involving anaesthesia or intravenous sedation for NHS-funded patients

When: To begin as soon as possible and be completed by 9 August 2018

-  1 Identify a named individual to take responsibility for co-ordinating the delivery of the actions required by this alert.
-  2 Amend the Sign Out section of the WHO Checklist or equivalent in local use to include confirmation that before a patient leaves the procedural area:
 - a) All IV administration sets and extension sets without active flow have been removed.
 - b) Any multi-lumen connector without active flow through all its arms is removed; or, if this is not possible because a patient cannot tolerate even brief interruptions to essential drug or fluid delivery, that all arms have been adequately flushed.
 - c) All cannulae have been identified and either removed or adequately flushed.
-  3 Include in local documentation for handover from procedural area to recovery, and recovery to the subsequent place of care, the requirement for documented and verbal confirmation that lines not in active use have been removed and multi-lumen connectors and cannulae removed or flushed.
-  4 Establish ongoing systems of audit to ensure these barriers are maintained.*

*This may be part of existing audit systems to support the implementation of the WHO checklist and NatSSIPs.

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NRLS search dates and terms

The NRLS was searched for incidents occurring between 5 May 2014 and 30 September 2017 if reported by 12 October 2017, using a complex combination of keywords related to cannula, flush and symptoms expected if residual anaesthetic or sedative drugs were inadvertently given (NRLS search reference 3976). All incidents (death, severe, moderate, low and no harm) were reviewed.

References

1. NHS England Patient Safety Alert NHS/PSA/W/2014/008: Stage one: Warning. Residual anaesthetic drugs in cannulae and intravenous lines. 14 April 2014 <https://improvement.nhs.uk/news-alerts/residual-anaesthetic-drugs-cannulae-and-intravenous-lines/>
2. Medicines and Healthcare products Regulatory Agency. Medical device alert - Intravenous (IV) extension sets with multiple ports - risk of backtracking (20 September 2010) <https://www.gov.uk/drug-device-alerts/medical-device-alert-intravenous-iv-extension-sets-with-multiple-ports-risk-of-backtracking>
3. NHS England National Safety Standards for Invasive Procedures. 7 September 2015 <https://improvement.nhs.uk/resources/national-safety-standards-invasive-procedures/>

Stakeholder engagement

- College of Operating Department Practitioners
- National Patient Safety Response Advisory Panel (for a list of members and organisations represented on the panel, see improvement.nhs.uk/resources/patient-safety-alerts/)

Advice for Central Alerting System officers and risk managers

This alert requires central coordination and cannot be taken forward by individual teams acting separately. If you are unsure who will co-ordinate implementation of this alert we recommend that acute or specialist trusts seek initial advice from their theatre managers, or clinical leads/specialist nurses for anaesthesia, radiology, gastroenterology and emergency care, who will be able to identify the wider leadership needed to co-ordinate implementation. We recommend that mental health trusts seek advice from clinical leads or specialist nurses who work in their ECT suite.

Sharing resources and examples of work

If there are any resources or examples of work developed in relation to this alert you think would be useful to others, please share them with us by emailing patientsafety.enquiries@nhs.net.