Interim Bulletin

Wrong route administration of an oral drug into a vein

19 February 2018

This interim bulletin contains facts which have been determined up to the time of issue. It is published to inform the NHS and the public of the general circumstances of events and incidents and should be regarded as tentative and subject to alteration and correction if additional evidence becomes available.
Notification of event and decision to investigate

The Healthcare Safety Investigation Branch (HSIB) was made aware of a patient who inadvertently had an oral liquid medication injected into a vein. The patient was a child undergoing an elective procedure with conscious sedation. An oral sedative drug (Midazolam) was prepared but administered intravenously. An initial investigation revealed some steps were missing in the preparation, checking and administration of the prescribed drug.

Following the initial investigation, the Chief Investigator authorised a full investigation as it met the following criteria:

**Outcome Impact – What impact has a safety issue had, or is having, on people and services across the healthcare system?**

There are multiple steps in the process of medication administration involving multiple healthcare professionals. These steps include the prescribing, transcribing, dispensing, administering, and monitoring of medication. Medication errors very rarely happen as a result of an individual act; usually it is a combination of several different steps within the process of prescribing, dispensing and administering of the medicine.

Although rare, deaths have occurred due to oral liquid medicine being given in to a vein. Other adverse outcomes of wrong route medication include psychological harm and a prolonged stay in hospital. The emotional impact of a medication error on a child and its parents is considerable and can create anxiety for future healthcare.

The emotional impact on staff is significant when they are directly involved in a medication error.

**Systemic Risk - How widespread and how common a safety issue is this across the healthcare system?**

Evidence from both research and national reporting systems demonstrates that wrong route medication incidents continue to occur, despite published guidance aimed at preventing them.
A review of incidents reported on the Strategic Executive Information System (StEIS) indicates that during an 18-month period between 1 April 2016 and 30 November 2017, there were 61 wrong route medication errors across England, 36 of these involving oral medication being administered via the wrong route which included 25 cases of oral liquid medication being given intravenously.

The repeated incidents highlight an opportunity for wider system learning in relation to safe medications practice.

“Medication errors occur when weak medication systems and/or human factors such as fatigue, poor environmental conditions or staff shortages affect prescribing, transcribing, dispensing, administration and monitoring practices, which can then result in severe harm, disability and even death.” Medication without Harm, World Health Organisation 2017

Learning Potential – What is the potential for an HSIB investigation to lead to positive changes and improvements to patient safety across the healthcare system?

The investigation will review the safety measures currently in place, seeking to understand why they do not ensure that medication is administered in the prescribed manner. This incident has highlighted an opportunity to look at the complexity of the medications process applying a human factors lens to aid learning. It will seek to identify strategies and opportunities to reduce the risk of this happening again.

History of the event

A nine-year-old child was admitted to hospital for a renal biopsy, a procedure in which a tiny piece (sample) of a kidney is removed from the body. The procedure had been planned in advance and was therefore not an emergency. The child was admitted on the day of the procedure to a day case ward and the biopsy was to be performed in a side room on the ward.

The procedure was being carried out under conscious sedation. This is to ensure the child was as comfortable and pain free as possible during the procedure, without the requirement for a
general anaesthetic. The medication was prescribed by a doctor for intravenous administration. A nurse prepared the medication in the treatment room with the prescribing doctor. The nurse assumed it was for oral administration, and therefore used a bottle of oral Midazolam and prepared the drug using an oral syringe. The plunger of the syringe was purple and the syringe was labelled enteral. The prescribing doctor and nurse checked the medication. This checking process did not alert the nurse that the doctor had prescribed the drug intravenously and did not alert the doctor that the nurse had prepared the drug with the intention of it being given orally.

The nurse was not present in the side room during the procedure. The prescribing doctor entered the side room with the medication and handed the syringe to another doctor who attempted to administer the medication, via the intravenous route. The purple syringe would not physically connect with the cannula and therefore the contents were decanted to a clear syringe which was designed to connect to the cannula. The administering doctor noted that it felt difficult to push the plunger of the clear syringe. During this action, a small amount of the medication leaked on to the administering doctors hand who then realised that something was wrong; the procedure was abandoned.

Subsequently, the mother of the patient was informed and expert advice was sought regarding monitoring of the child for adverse effects. The child was admitted and closely monitored for the next 24 hours. The child underwent the procedure under general anaesthetic the following day.

**National context**

In 2007 the (then) National Patient Safety Agency (NPSA) issued advice to healthcare organisations on action that can reduce the chances of oral liquid medication being given via the wrong route. Oral/enteral syringes were implemented to measure and administer oral liquid medicines which would not connect to an intravenous line. Oral/enteral syringes are generally recognised by a purple coloured plunger or syringe barrel to help differentiate them from intravenous syringes.
A review of other incidents indicates that not all clinical areas have access to oral/enteral syringes and it has been reported that, even when oral/enteral syringes have been available, IV syringes have been used instead.

A Patient Safety Alert was issued by NHS England in September 2015 which requested NHS providers to develop their own local safety standards for invasive procedures (LocSSIPs) based on the national safety standards for invasive procedures (NatSSIPs); these set out the minimum standards considered necessary for the delivery of safe care during invasive procedures as well as underpinning aspects of education and training. The standards demanded that LocSSIPs were developed to include details on the number and skill mix of staff needed to provide safe care to patients undergoing invasive procedures. The investigation has identified that the implementation of LocSSIPs is inconsistent, particularly where invasive procedures are carried out in a non-theatre type environment.

Despite the national initiatives previously implemented, the repeated incidents of wrong route error of oral medication in to a vein would suggest that there are opportunities for improvement. The case has highlighted an opportunity for wider system learning in relation to safe medications practice.

**Identified safety issues**

The following safety issues were identified during the HSIB initial review and will form the basis of the ongoing investigation.

- The effectiveness of current processes for prescribing, preparing and administering medication. This includes a review of the role of the ‘second checker’ in drug preparation and administration.

- The contextual, environmental and human factors which influenced the inadvertent administration of oral liquid in to a vein.

- The effectiveness of current processes for implementation of local safety standards for invasive procedures.
Next steps

As part of the investigation, HSIB will simulate the event in a controlled environment to identify systemic issues and to examine and understand the role of human factors in wrong route medication.

In addition, HSIB will examine other safety initiatives including the use of technology.

The HSIB investigation will continue to explore the identified safety issues and welcomes further information that may be relevant, regardless of source.

The HSIB will report any significant developments as the investigation progresses.