Accidents related to a high-risk medicinal product

Who says potassium (KCl) says maximum vigilance

24 June 2021

It could happen to you too

Event 1

KCl INFUSION TOO FAST LEADING TO TRANSFER TO INTENSIVE CARE

A properly prepared 6 g potassium infusion to correct hypokalaemia is programmed by a trainee nurse. The patient is transferred to intensive care for close monitoring due to the cardiac toxicity of potassium chloride.

What happened? *Immediate cause*

KCl infusion time was set to 1 h instead of 24 h.

Why did it happen? *Root causes, absent or deficient barriers*

- The supervising nurse was distracted on double-checking the pump programmed by the trainee nurse.
- The nursing team members included replacements and temporary staff due to high levels of absenteeism, heavy work load and fatigue among the medical team.

Event 2

GLUCOSE AND KCl AMPOULES MIXED UP, LEADING TO DEATH

After administration of potassium for injection in a first patient, the nurse administered a potassium solution by direct intravenous route to a second patient, which lead to his death.

What happened? *Immediate cause*

The nurse administered an intravenous solution of KCl instead of the glucose solution prescribed.

Why did it happen? *Root causes, absent or deficient barriers*

- KCl was not stored properly. KCl was not marked as a high-risk medicinal product.
- The nurse took an ampoule of KCl instead of glucose, did not check the name of the medicinal product and prepared the wrong ampoule.
- It was extremely busy in the emergency department.
- A computer fault disrupted patient administrative management.
- The computer fault generated an additional workload for the medical teams and increased the number of tasks interrupted.

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Event 3

CARDIAC ARREST DUE TO INCORRECT USE OF THE KCl INFUSION

A potassium infusion is prescribed verbally. After placing the infusion, the nurse notices potassium is missing from the bag. Potassium is added which led to the patient's death.

What happened? *Immediate cause*

The additional KCl was not administered properly. It was administered directly as a bolus in the tubing.

Why did it happen? *Root causes, absent or deficient barriers*

- The verbal prescription and the change of prescription were not confirmed in the prescription software. The initial prescription was therefore incomplete.
- The staff were little experienced (intern and replacement nurse), they did not request confirmation of the prescription from the senior staff.
- The nurse and interns did not have enough supervision.

Event 4

SEVERE HYPOKALAEMIA DUE TO AN ORAL POTASSIUM DOSAGE ERROR

During transfer from a medicine department to a follow-up care department, the patient's potassium prescription was given verbally. A syrup is administered instead of the sachets prescribed. The patient's hypokalaemia was not therefore corrected.

What happened? *Immediate cause*

Administration of potassium syrup instead of the sachet prescribed led to a dosage error.

Why did it happen? *Root causes, absent or deficient barriers*

- The prescription did not specify the sachet dosage.
- The follow-up care department was out of potassium sachet stock.
- No information or protocol were forwarded about the stock shortage and the replacement product by the pharmacy and originating department.
- The doctors did not change the prescription when they became aware of the replacement.
- Conversion between the two forms was incorrect.
- The nurse confirmed the sachet form in the software whereas she administered the syrup.
- The nurse was not informed that the pharmacist was available after 5 p.m. and at weekends.

Key words: Potassium – Drug error – Cardiac arrest – Dyskalaemia – Conversion error

So it doesn't happen again

Under-evaluation of the risk inherent to potassium chloride prescriptions is identified in all the events. Medicinal products containing KCl should therefore be regularly assessed in terms of organisation by all healthcare workers. Numerous recommendations for securing the KCl circuit have been issued in France and abroad. These recommendations are not all equivalent in terms of efficacy on patient safety. Among the existing measures, it is useful to separate:

- measures with high securing effectiveness such as:
  - those subject to authorisation and/or restrictions by management (withdrawal of KCl from treatment units and storage in the hospital pharmacy [PUI] or storage in the separate department units [emergency department, intensive care, critical care]),
  - automation with standardisation of prescription protocols, especially using prescription support software;
- more moderately effective measures such as:
  - reminders, check-list, double-checks (storage with preparation instructions, double-check at all steps in the circuit etc.),
  - simplification of organisation of these drugs (limit and standardise generics and concentrations available, reorganise storage by reinforcing labelling of storage cabinets for example).

- **Always prefer the oral potassium form where the clinical situation allows it.**
- **Always dilute the potassium for injection (KCl) on administration.**

Focus on patient safety collection

The “Focus on patient safety” collection aims to draw the attention of and raise awareness among healthcare professionals as to risk management. Each focus covers a specific and recurrent risk based on care-related adverse events, identified and selected from national care-related serious adverse event reporting databases or doctors’ accreditation.

This alert focusses on the occurrence of adverse events incriminating potassium (KCl). KCl is one of the five medicinal products considered to be the most high-risk due to the serious consequences it causes if it is used incorrectly. Despite this, adverse events still occur. This guide relates events with which healthcare professionals have been confronted and which are always associated with a series of dysfunctions.

Find out more:

- ISMP Ontario (classification of recommendations)
  www.ismp-canada.org/download/ocil/ISMPCONCIL2013-4_EffectiveRecommendations.pdf
- Creation of Never Events NHS, 2018 list
  improvement.nhs.uk/documents/2265/Revised_Never_Events_policy_and_framework_FINAL.pdf
- Tools for securing and self-assessing drug administration
  www.has-sante.fr/jcms/c_946211/fr/outils-de-securisation-et-d-autoevaluation-de-l-administration-des-medicaments
- Preventing drug errors related to potassium injections Free E-learning
  www.omedit-centre.fr/potassium/co/module_Potassium.html
- Understanding serious adverse events (SAEs)
  www.has-sante.fr/jcms/c_2787338/fr/comprendre-lesevenements-indesirables-graves-eigs
- Focus on patient safety
  www.has-sante.fr/jcms/p_3240311/fr/flash-securitepatient
- Certification of healthcare professionals in software use
  www.has-sante.fr/jcms/c_989142/fr/certification-des-logiciels-des-professionnels-de-sante
- **If I want to assess myself**

  Free E-learning
  www.omedit-centre.fr/potassium/co/module_Potassium.html
- **If I wish to assess my hospital**

  Audit form and reference documents available in the section - error on injectable potassium chloride administration
  www.omedit-grand-est.ars.sante.fr/never-events-0?parent=5574

  Self-assessment scale/List of barrier measures
  www.omeditbretagne.fr/kci-injectable/

  Audit scale and guide for evaluating practices
  www.omeditbretagne.fr/kci-injectable/
- **If I want to train**

  Preventing drug errors related to potassium injections Free E-learning
  www.omedit-centre.fr/potassium/co/module_Potassium.html

  Document “Managing hypokalaemia in adults”
  www.omeditbretagne.fr/wp-content/uploads/2019/11/equivalences_hypokaliemies.pdf

  Drugs available for correcting hypokalaemia (not including hypertonic KCl for injection)
  www.omeditbretagne.fr/wp-content/uploads/2019/11/equivalences_hypokaliemies.pdf

The HAS would like to extend its thanks to the OMéDITS who helped proofread this flash.

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