Focus on
patient safety

MEASURING
& IMPROVING
QUALITY

Curare storage

Not so uncommon mistakes

28 April 2022

It could happen to you too

Event 1

ADMINISTRATION OF A CURARE BY MISTAKE, LEADING TO RESPIRATORY ARREST

A female patient in her 30s is admitted to a nutrition department for assessment of morbid obesity. During the stay, a Synacthène® (TETRACOSACTIDE) test is prescribed. The patient went into respiratory arrest during the test, and required transfer to the post-anaesthesia care unit.

What happened? *Immediate cause*

An ampoule of curare containing SUXAMETHONIUM CHLORIDE (Célocurine®) was administered instead of **TETRACOSACTIDE (Synacthène®)**.

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

- Although TETRACOSACTIDE was prescribed as a test, the test procedures were not specified on the prescription and there was no protocol in the department.
- Medicinal product labelling was not harmonised and led to the two products being mixed up; two different methods of identifying medicinal products in the storage container are used: international nonproprietary name (INN) for one of the medicinal products and trade name for the other. The nurse thought CÉLOCURINE® was the INN for TETRACOSACTIDE.
- The products were not checked against the prescription before administration. For all that, the prescription software could not be used to do that since TETRACOSACTIDE appears as prescription for a blood test and not as a medicinal product prescription.
- There are no rules concerning high-alert medicinal product storage in the refrigerator. They should have been stored in a separate container but they weren't.
- A complex "HR" issue:
  - the nurse was a replacement nurse, new to the department, and was unaware of the test procedures;
  - although this test was scheduled, the nurse was not informed of it during the handover;
  - as several patients were being discharged and other tests were scheduled for this patient, the nurse came under increasing pressure which generated significant stress.

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Event 2

ADMINISTRATION OF A CURARE BY MISTAKE, LEADING TO RESPIRATORY ARREST OF A WOMAN IN LABOUR

A woman in labour is admitted to the maternity ward following spontaneous rupture of membranes. She is taken to the delivery room six hours after her admission. Once completely dilated, expulsion efforts were ineffective. The midwife in charge asked for an ampoule of OXYTOCIN to be prepared and decided to transfer the patient to the delivery room, where she gave birth to a baby boy 40 minutes later. However the patient went into respiratory arrest once managed delivery was complete.

What happened? *Immediate cause*

SUXAMETHONIUM CHLORIDE (curare) was administered instead of OXYTOCIN (uterotonic).

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

- The ampoule of SUXAMETHONIUM CHLORIDE, usually in a blister pack and stored in a special container, had been removed from the blister pack and placed in the OXYTOCIN container by mistake.
- Medicinal products are usually stored by proprietary medicinal product name in the refrigerator, on separate shelves, in containers marked according to hospital labelling procedures. Here, the OXYTOCIN container had recently been moved from its shelf.
- The two products look similar.
- It was not checked prior to preparation. The label on the ampoule marked "CURARE" was not read as per good practice procedures.
- The syringe was not labelled after being prepared.
- The midwife who prepared the product was not the midwife who administered it.

Event 3

ADMINISTRATION OF A CURARE BY MISTAKE, LEADING TO RESPIRATORY DISTRESS

A male patient in his 60s is admitted to the post-anaesthesia care unit (PACU) after a colonoscopy under general anaesthesia. As he was in pain, the nurse looking after the patient applied a "lower GI endoscopy postoperative pain management" protocol by administering two ampoules of PHLOROGLUCINOL and one ampoule of TRIMEBUTINE MALEATE in a 100 ml infusion. The patient was then transferred to his room where the doctor found him in respiratory distress. He was intubated and placed on ventilation and transferred to intensive care.

What happened? *Immediate cause*

ATRACURIUM BESILATE (curare) was administered instead of TRIMEBUTINE MALEATE (antispasmodic).

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

- The curare and the antispasmodic were not stored separately in the refrigerator.
- The product was not checked prior to preparation. The product name on the ampoule was not read.

Event 4

ADMINISTRATION OF A VASOPRESSOR INSTEAD OF THE CURARE, LEADING TO TRANSFER TO INTENSIVE CARE

A male patient is hospitalised for elective laparoscopic cholecystectomy. During anaesthesia induction, the patient presented with a high spike in blood pressure along with tachycardia leading to cardiac decompensation. The patient was therefore transferred to the cardiology intensive care unit.

What happened? *Immediate cause*

During induction, NORADRENALINE (vasopressor) was administered instead of the curare (ATRACURIUM BESILATE).

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

- ATRACURIUM BESILATE was stored in the anaesthesia cart at ambient temperature whereas it should be stored in the refrigerator.
- During preparation, the ampoule of NORADRENALINE was mistaken for the ampoule of ATRACURIUM BESILATE. The syringe which should have contained the curare was prepared with the vasopressor.
- The 2 products look similar.
- The product was not checked prior to preparation. The label on the ampoule was not read.

Key words: *curare – storage – medication-related error – packaging*

So it doesn't happen again

Non-observance of good storage practices for curares and high-alert medicinal products is often the cause of treatment-related serious adverse events.
However, prevention measures exist.

- **Optimising therapeutic guidelines** for anaesthesia medicinal products:
  - in order to reduce the choice and stock available of each proprietary medicinal product to the **strict minimum**, and this, in multidisciplinary review meetings, in each of the departments using them;
  - to avoid as often as possible the coexistence of several pack sizes for the same curare in the same department. If this is the case, specific labelling should be used to prevent mix-ups occurring.
- **Choosing a suitable storage system**
  - Identify curares as "high-alert medications".
  - Adopt clear, formalised storage, with specific labelling (INN) and related information, in consultation with all healthcare professionals using them.
  - Store in the refrigerator according to curare good storage practices as curares are often sensitive to heat.
  - Store certain curares away from light in their original packaging.
- **Double-check** during preparation and administration
  - Identify similar pack sizes by their format, their proprietary medicinal product name, to reduce their number as far as possible, inform professionals and report them to the French National Agency for Health Products' Safety.
  - Be aware of changes in pack size, packaging or concentration and always inform all users of these changes at the same time.
  - Differentiate prepared syringes using coloured labels (standard ISO 26825: 2008 - User-applied labels for syringes containing drugs used during anaesthesia).

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 focus discusses the occurrence of adverse events incriminating medication-related errors related to the use of curares. This focus relates events with which healthcare professionals have been confronted and which are always associated with a series of dysfunctions.

Find out more:

- **If I want to stay abreast of changes**

  Proprietary medicinal products used in anaesthesia-intensive care
  www.omedit-paysdelaloire.fr/qualite-securite-et-vigilances/never-events/anesthesie-reanimation/

  Recommendations for the safe use of curares in small packaging formats
  www.omedit-paysdelaloire.fr/wp-content/uploads/2020/11/preconisations_securisation_utilisation_petit_conditionnement_curares_sfpc_sfar_resomedit.pdf

  Prevention of medication-related errors in anaesthesia and intensive care (long version). Recommendations by the French Society of Anaesthesia and Intensive Care in partnership with the French Society for Clinical Pharmacy. 2016 update
  sfar.org/wp-content/uploads/2016/11/texte-long-Preconisations-2016-erreurs-med-SFAR-SFPC-version-finale-25-oct-2016.pdf

  Administration errors with proprietary medicinal products used in anaesthesia-intensive care in the theatre
  www.omedit-normandie.fr/boite-a-outils/never-events/never-events,2798,3177.html

  (French National Authority for Health) (HAS). Tools for safe medicinal product administration and self-assessment (2016)
  www.has-sante.fr/upload/docs/application/pdf/2011-11/guide_outil_securisation_autoevalusation_medicaments_complet_2011-11-17_10-49-21_885.pdf

  French National Authority for Health (HAS), French Society of Anaesthesia and Intensive Care (SFAR), French college of anaesthetists (CFAR). Task interruption during anaesthesia procedures in the theatre and the post-anaesthesia care unit. Best practice guidelines. March 2020.
  www.has-sante.fr/upload/docs/application/pdf/2020-04/guide_it_anesthesie_vd.pdf

- **If my organisation wishes to self-assess**

  CAQES IDF audit on safe administration: identification of medicinal products administered by oral and injectable route.
  www.omedit-idf.fr/wp-content/uploads/2020/07/Grille-audit-Identification-des-medicaments_V7_17072020.xlsx

  Toolkit guides on similar-looking medicinal products
  omedit-mip.jimdofree.com/securite-qualite/ev%C3%A8nements-ind%C3%A9sirables/medicaments-qui-se-ressemblent/

  Prevention of medication-related errors in anaesthesia and intensive care (long version). Recommendations by the French Society of Anaesthesia and Intensive Care in partnership with the French Society for Clinical Pharmacy. 2016 update
  sfar.org/wp-content/uploads/2016/11/texte-long-Preconisations-2016-erreurs-med-SFAR-SFPC-version-finale-25-oct-2016.pdf

  Audit scale "emergency cart and curares" by the drug, medical device and therapeutic innovation observatory Nouvelle-Aquitaine
  www.omedit-nag.fr/outils-guides/nouvelle-certification-v2020

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