



Ministry of Health

Department of Quality
Directorate General of Health Planning

RATIONALE

The Scope of this Recommendation is to offer information to healthcare workers regarding particularly dangerous conditions which can cause patients severe or fatal consequences.

This recommendation proposes to increase the knowledge and awareness of the potential risk of certain events, indicating the appropriate actions to be taken in order to reduce errors.

The Ministry of Health by the 3rd Office- Quality of Activities and Services of the General Management of Healthcare Programming, Essential Care Levels and Ethical Principals of Systems, the Coordination of Regions and Autonomous Provinces for Patient Safety are developing a monitoring system for clinical conditions at high risk for error, with the objective to:

- Alert healthcare workers about potentially dangerous procedures
- Provide effective tools to implement actions that are able to reduce risks
- Promote the responsibility of actions to favour a change in the system.



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RECOMMENDATION FOR THE CORRECT USE OF POTASSIUM CHLORIDE SOLUTIONS – KCL -- AND OTHER CONCENTRATED SOLUTIONS CONTAINING POTASSIUM

Potassium Chloride – KCL -- via intravenous can cause lethal effects if it is administered in an inappropriate manner

The intravenous administration of Potassium Chloride-KCL- is object of this Recommendation.

The administration of Potassium Chloride has also implicated incidents of death in our country, as in many other countries. Many hospitals have already activated procedures to remove this substance from departments that are not employed in critical activities. It is necessary that these procedures are rapidly implemented in all hospital structures in our country.

Recommendation #1, March 2008

The present version of this document has been approved by the Ministry of Health and by the Coordination of the Regions and the Autonomous Provinces for Patient Safety.

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1. Premise

Experience and international literature recognize that the inappropriate use of concentrated solutions containing potassium (K) for intravenous (IV) use entails a serious risk to the patient and is one of the principal causes of fatalities in the Operative Unit of a hospital.

The most frequent errors that are associated with the improper use of KCL are the exchange of vials, the lack of dilution, the incorrect preparation of the product to be infused/injected and the incorrect patient identification.

The effective implementation of this recommendation requires the active interest of the entire organizational context and therefore it is addressed to health trust management, health management, physicians, pharmacists and nurses.

Analogous recommendations have been elaborated in other countries, for example England, United States, Canada and Australia and their adoption of similar recommendations have been effective in drastically reducing the number of fatal accidents due to the inappropriate use of potassium (K) concentrated solutions.

2. Objective

Reduce the risk of accidental overdose of K from the improper use of concentrated solutions of KCl and other solutions with a high content of K, while ensuring the timely availability of the pharmaceutical in case of need.

3. Areas of Application

This recommendation is applied to KCl solutions and other solutions containing K for I.V. use with the following concentrations:

- 1meq/ml
- 2meq/ml
- 3meq/ml

3.1 Critical Care Areas

Critical care areas are the Intensive Care and Resuscitation , Coronary Unit, Nephrology, Cardiac surgery, Neonatal Intensive Care, Operating Room, First Aid (accident and emergency) and

Emergency Departments and other assistance areas identified by the health trust and regional programs, in which the urgent use of the pharmaceutical is needed.

4. Actions

The action which must be implemented in a hospital setting cover the following critical points:

- 4.1 Preservation of concentrated solutions of KCl and other solutions having a high concentration of K;
- 4.2 Prescription of concentrated solutions containing K;
- 4.3 Preparations of dilute solutions containing K;
- 4.4 Checking the correct preparation and use of solutions containing K;
- 4.5 Process Management of the correct usage of concentrated solutions of K.

4.1 Preservation of concentrated solutions of KCl and other solutions having a high content of K

A. Concentrated solutions of KCl and other solutions with a high concentration of K for IV use must be removed, where present, **from all stocks of drugs commonly used by various departments.** The preservation of KCL concentrated solutions and other solutions with a high content of K for IV use must be solely limited to the pharmacy, the critical areas and other care areas, identified by the health trust and regional programs and in those areas where its use is urgently requested.

B. Pharmacies and operating units which are expected to store concentrated solutions containing KCl and other solutions with high content of K for IV use should keep these solutions separate, where possible, from other medications in locked cabinets and in containers that bear the warning "**Dilute before administration: infusion/ injection fatal if not diluted.**"

C. Concentrated solutions containing KCl and other solutions with a high content of K for IV use mustn't be transferred between various operating units and all supplies must be carried out directly from the pharmacy. The K containing solutions must be produced in hospitals, a procedure that ensures, when pharmacy services are not available, the supply of the drug in case of necessity.

4.2 Prescriptions of K containing solutions

A. Solutions containing K for I.V. use should be prescribed in commercial formulations already diluted and ready for use, when clinical circumstances permit to do so.

B. Traceability must be ensured in the patient's clinical documentation the doctor's prescription (dosage, frequency and velocity of infusion, signature, date and time).

4.3 Preparation of diluted solutions containing K

A. Where the patient's clinical condition requires use of dilution solutions that are not commercially available, the solutions must be prepared in the hospital pharmacy.

B. When one cannot adhere to point A, the solutions can be prepared directly in the operative units, according to the written protocol of the health trust.

4.4 Checking the correct preparation and administration of solutions containing K

A. A second health care professional should always examine the correct identification of the product, dose, route of administration, the calculation of the dilution compared to the prescription given, the mixing, proper labeling of the product prepared.

B. During administration, the second operator must verify the patient's identity and the correct rate of infusion.

C. The administration should be immediately recorded in the nursing clinical file plotting dose, route of administration, infusion speed, date, time and signature of the operator.

4.5 Managing the process for the correct use of concentrated solutions containing K

In hospitals, management develops specific procedures for the proper risk management associated with the use of K concentrated solutions, utilizing a multidisciplinary approach, which includes guidelines, checklists, pre-printed application forms, detailed procedures regarding packaging, identification of drug and training.

The health trust management performs the following actions:

- A. Identification of assistance areas where preservation of concentrated K solutions are permitted.
- B. Production of procedures that provide clear guidance on:
 - Appropriate prescription;
 - Supply methods of solutions containing K from operational units in order to ensure, in case of need, timely availability of the pharmaceutical;
 - Guidelines for safe conservations of K concentrated solutions;
 - Written protocols for the preparation of diluted solutions;
 - Directions to ensure traceability and administration of the prescription;
 - Monitoring of applications and consumption in order to assess the appropriateness of use.

5. Training

As part of continuing education programs for health care personnel involved in care pathways, specific warnings about the risks associated with the storage, prescription, preparation and administration of concentrated solutions containing K and procedures to minimize risks must be provided for.

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