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POLICY ON THE USE OF STRONG POTASSIUM WITHIN NOTTINGHAM CITY HOSPITAL NHS TRUST

Author Job Title:

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Divisional Directors
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Heads of departments
Divisional Nurses
Clinical Nurse Managers
Ward Managers
Director of Post Grad. Education
Clinical Nurse Educators
Pharmacy Teacher-Practitioner

OBJECTIVES

1. To ensure that the Trust implements the actions listed in the NPSA alert on potassium issued July 2002.

2. To ensure that the Trust has safe systems in place for:

   2.1. The storage and handling of potassium chloride concentrate and other strong potassium solutions.

   2.2. The prescribing of solutions containing potassium.

   2.3. The preparation of dilute solutions containing potassium.

   2.4. The checking of strong potassium solution in clinical areas.

3. To ensure that the risks associated with potassium use are included in induction training and other training on IV drug preparation and administration.

POLICY:

1. STORAGE & HANDLING OF POTASSIUM CHLORIDE CONCENTRATE & OTHER STRONG POTASSIUM SOLUTIONS

1.1. Potassium chloride concentrate solutions will be restricted to the following areas within the Trust:

1.1.1. Pharmacy

1.1.2. Adult Intensive Care (AICU)

1.1.3. High Dependency Unit (HDU)

1.1.4. Cardiac Intensive Care (CICU)

1.1.5. Coronary Care Unit (CCU)

1.1.6. Cardiac Theatres (Theatre 4)

1.1.7. Barclay Thoracic Unit (BTU)

1.1.8. Neonatal Intensive Care (NNU)

1.1.9. Paediatric Intensive Care (Linby)

1.1.10. Labour Suite are authorised to request potassium chloride 15% injection (2mmol/ml) on a named-patient basis for intra-cardiac terminations only.

1.1.11. Lambley are authorised to request Potassium chloride 15% Injection (2mmol/ml) on a named patient basis for addition to peritoneal dialysis bags

1.2. Potassium chloride concentrate solutions will be stored in locked controlled drugs cupboards in the above areas i.e. away from common diluents such as Sodium Chloride (normal saline).

1.3. All supplies for potassium chloride concentrate solutions will be requested through the Pharmacy department. The transfer of stock between clinical areas will not be allowed. Out of hours, supplies will be obtained through the 'oncall' pharmacist.

1.4. Potassium Chloride concentrate solutions will only be supplied from pharmacy against a correctly completed order written in an official Potassium Order Book signed by a registered nurse.

1.5. The procedure for requisition, supply, receipt and administration of potassium chloride concentrate solutions will follow that outlined in the current edition of the Nottingham City Hospital Drug Custody and Administration Code of Practice for Controlled Drugs.

2. PREPARATION OF DILUTE SOLUTIONS CONTAINING POTASSIUM

2.1. The Pharmacy department at Nottingham City Hospital does **not** provide an IV additive service.

2.2. Potassium additions to infusion bags **should be avoided** (except in areas defined in 1.1). Commercially prepared ready to use diluted products should be used wherever possible. (Refer to Appendix)

2.3. In the rare event that Potassium dihydrogen phosphate is required in a non-specialist area for phosphate replacement (as no commercially available diluted preparation),the ward can request a named patient supply from pharmacy , as in 1.4 above.

3. PRESCRIBING OF SOLUTIONS CONTAINING POTASSIUM

3.1. All prescriptions for potassium should specify the potassium in mmol not grams.

3.2. Potassium solutions for intravenous administration should be prescribed in those concentrations which are available as commercially prepared, ready to use diluted products. (Refer to Appendix).

4. CHECKING USE OF STRONG POTASSIUM SOLUTIONS IN CLINICAL AREAS

4.1. All intravenous & dialysis solutions prepared from potassium chloride concentrate solution and other strong potassium solutions must be

checked by **two persons**, one of whom must be a registered nurse. Refer to the current edition of the Nottingham City Hospital Drug Custody and Administration Code of Practice. Another practitioner must also second check all potassium solutions prepared by a Doctor.

4.1.1. In cardiac theatres, potassium solutions may be prepared by a Clinical Perfusionist and checked by an Anaesthetist.

4.2. The second practitioner should check both during the preparation and again prior to administration for:

4.2.1. Correct product

4.2.2. Dosage dilution

4.2.3. Mixing

4.2.4. Labelling

5. TRAINING

5.1. The risks associated with the storage, prescribing, preparation and administration of potassium will be highlighted in the induction training of nurses, doctors and pharmacists and will be included in other training material on intravenous drug preparation and administration.

5.2. Those persons responsible for the training of doctors, nurses, pharmacists and other healthcare professionals should ensure that the risks associated with the storage, prescribing, preparation and administration of potassium are included in both undergraduate and postgraduate education and training programmes.

5.3. Line managers should identify any other staff involved in the medication process who should receive training in the risks associated with potassium.

6. POLICY IMPLEMENTATION: RESPONSIBILITIES & ACCOUNTABILITIES

6.1. Compliance with this policy is mandatory by all staff.

6.2. The Director of Pharmacy ensures the policy is maintained and ratified through the correct procedure when reviewed.

6.3. Divisional Directors, Divisional Nurses and Heads of Departments undertake the day to day management of the policy.

6.4. Line Managers ensure compliance within their sphere of responsibilities and control

FURTHER INFORMATION FROM:

Director of Pharmacy ext 47198

GLOSSARY

1. **NPSA**

   National Patient Safety Agency

2. **Potassium Chloride concentrate solutions**

   Potassium Chloride Injection 15% 1.5g in 10ml (2mmol/ml)

   Potassium Chloride Injection 20% 1g in 5ml (2.7mmol/ml) –Not available

3. **Other strong potassium solutions**

   Potassium dihydrogen phosphate 13.6% 50ml (1mmol/ml)

STRONG POTASSIUM PREPARATIONS STOCKED IN PHARMACY FOR ISSUE TO WARDS

Potassium Salt	% concentration	Mmol Potassium in 1ml	Total Volume of product
Potassium Chloride	15%	2	10ml amp
Potassium Dihydrogen Phosphate	13.6%	1	50ml vial

Appendix

POTASSIUM REPLACEMENT IN HYPOKALAEMIA

Hypokalaemia is defined as a serum potassium below 3.5mmol/Litre. A low serum potassium can affect neuromuscular, cardiovascular and renal function. Symptoms usually become apparent once serum potassium levels fall below 2.5mmol/Litre. However, dysrhythmia can develop when serum potassium falls below 3.5mmol/Litre especially in post-surgery patients.

Oral replacement

Whenever possible, potassium replacement should be by the oral route. In cases of established potassium depletion, **dose of up to 100-200mmol per day may be required**, soluble formulations being the most suitable (Sando K contains 12mmol potassium per tablet). The modified release forms of potassium (slow K), should be avoided at they possess a lower potassium content and have been associated with a risk of oesophageal ulceration. **Extreme caution should be exercised in providing potassium replacement in any patient taking potassium-sparing agents (e.g. amiloride).**

The dose of oral potassium intake is usually governed by patient acceptability, rather than a maximum daily ceiling. **Sando K 2 tablets tds (72 mmols) is a commonly employed regimen in cases of proven depletion.**

Parenteral replacement

If the oral route is not suitable (e.g. strict NBM, extreme depletion), the parenteral (IV) route may be employed. **The usual recommended peripheral rate of intravenous potassium administration is 10-20mmol/hr, but in urgent cases, 40mmol/hr may be given.** It is advisable to use ECG monitoring if rates in excess of 10mmol/hr are given, but this measure may only be appropriate if the ward personnel possess ECG interpretation skills. **The serum potassium should be checked after every 80mmol of potassium has been delivered.**

The maximum daily replacement should not generally exceed 200-300mmol, (3mmol/kg/day).

The maximum recommended infusion concentration peripherally is 40mmol/Litre but patients may be able to tolerate up to 80mmol/Litre without undue phlebitis occurring.

NB: Care must be taken not to overload the patient with fluid when attempting parenteral potassium replacement. Excessive use of dextrose solutions should be avoided to reduce the risk of dilutional hyponatraemia.

Availability

The pharmacy department does not provide an IV additive service. **Potassium chloride 15% (2mmol/ml), 10ml ampoules are only stocked in restricted specialist areas (stored in CD cupboards).** Whenever potassium is added to an infusion bag, the contents must be thoroughly agitated to prevent pooling of potassium at the base of the bag. **The transfer of stock between wards is not allowed.** In all other areas of the hospital, potassium solutions for intravenous administration or dialysis must be prescribed as standard, ready diluted bags. The following standard infusion bags containing potassium are stocked in pharmacy:

Fluid	Potassium	Mmol	volume
Sodium Chloride 0.9%	**Potassium Chloride**	**10**	**500ml**
Sodium Chloride 0.9%	**Potassium Chloride**	**20**	**1000ml**
Sodium Chloride 0.9%	**Potassium Chloride**	**40**	**1000ml**
Sodium Chloride 0.9%	**Potassium Chloride**	**60**	**1000ml**
Sodium Chloride 0.9%	**Potassium Chloride**	**80**	**1000ml**
Sodium Chloride 0.9%	**Potassium Chloride**	**40**	**500ml**
Sodium Chloride 0.9%	**Potassium Chloride**	**40**	**100ml**
Dextrose 5 %	**Potassium Chloride**	**10**	**500ml**
Dextrose 5 %	**Potassium Chloride**	**20**	**1000ml**
Dextrose 5 %	**Potassium Chloride**	**40**	**1000ml**
Dextrose 5%	**Potassium Chloride**	**40**	**500ml**
Dextrose 5%	**Potassium Chloride**	**40**	**100ml**
Dextrose 10%	**Potassium Chloride**	**10**	**500ml**
Dextrose 4%Saline 0.18%	**Potassium Chloride**	**10**	**500ml**
Dextrose 4%Saline 0.18%	**Potassium Chloride**	**20**	**1000ml**
Dextrose 4%Saline 0.18%	**Potassium Chloride**	**40**	**1000ml**
Dextrose 4%Saline 0.18%	**Potassium Chloride**	**20**	**500ml**
Dextrose 5%Saline 0.45%	**Potassium Chloride**	**20**	**500ml**
Dextrose 5%Saline 0.45%	**Potassium Chloride**	**10**	**500ml**

The above guidelines are applicable to the routine ward setting and it should be emphasised that specialist units may employ alternative administration methods, especially when central IV access is available.

Pharmacy Department

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