

Drug Utilization Review of Potassium Chloride Injection Formulations Available in a Private Hospital in Kuching, Sarawak, Malaysia

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Abstract

Background: The concentrated potassium chloride injection is a high-alert medication and replacing it with a pre-mixed formulation can reduce the risks associated with its use. The aim of this study was to determine the clinical characteristics of patients receiving different potassium chloride formulations available at a private institution. The study also assessed the effectiveness and safety of pre-mixed formulations in the correction of hypokalaemia.

Methods: This was a retrospective observational study consisting of 296 cases using concentrated and pre-mixed potassium chloride injections in 2011 in a private hospital in Kuching, Sarawak, Malaysia.

Results: There were 135 (45.6%) cases that received concentrated potassium chloride, and 161 (54.4%) cases that received pre-mixed formulations. The patients' clinical characteristics that were significantly related to the utilization of the different formulations were diagnosis ($P < 0.001$), potassium serum blood concentration ($P < 0.05$), and fluid overload risk ($P < 0.05$). The difference observed for the cases that achieved or maintained normokalaemia was statistically insignificant ($P = 0.172$). Infusion-related adverse effects were seen more in pre-mixes compared to concentrated formulations (6.8% versus 2.2%, $P < 0.05$).

Conclusion: This study provides insight into the utilization of potassium chloride injections at this specific institution. The results support current recommendations to use pre-mixed formulations whenever possible.

Keywords: potassium chloride, electrolytes, hypokalaemia, drug utilization evaluation, drug-use review

Introduction

Concentrated potassium chloride injections are high-alert medications with the potential to cause grievous harm when misused. Hyperkalaemia, which can lead to ventricular fibrillation, is the main risk with the use of intravenous potassium chloride (1–3). Rimmer JM et al., reported that 58% of hyperkalaemia episodes were due to potassium chloride intravenous supplementation and are more common in the elderly and patients with renal insufficiency (2). The manufacturer also advises that potassium chloride injections should be used with great care in renal impairment due to potential potassium retention (4). In addition to hyperkalaemia, concentrated potassium chloride injections are also associated with medical errors, with even fatalities being reported (5–8). Errors

identified include incorrect identification of product and incorrect preparation or dilution (9,10). Therefore, risk-reduction strategies have included the implementation of guidelines for the administration of concentrated potassium chloride injections, separation of storage areas, applying high-alert labelling, removal from patient care areas, and the use of pre-mixed formulations (11,12).

In this private hospital, these steps have been implemented in the interest of patient safety. The use of pre-mixed formulation was introduced in 2010, which were specially imported as it was not registered in Malaysia. This study was conducted to gain insight into the utilization of the different potassium chloride injections available at this institution and to assess the effectiveness and