Evaluation of urinary chloride dipsticks for the rapid estimation of hydration status in patients receiving artificial nutrition

Key Words: Dehydration, sodium, urinary, parenteral, nutrition, electrolytes

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Abstract

Background

Patients with Intestinal Failure (IF) have insufficient bowel function to maintain their fluid, electrolyte or protein-calorie balance. They therefore require long term intravenous support at home. As such these patients are at high risk of dehydration and consequent electrolyte abnormalities. National guidance recommends spot testing of urinary sodium concentration as a measure of dehydration, which requires sending a sample to hospital with the associated delays and costs. A chloride dipstick has been shown to accurately measure urinary chloride which closely correlates with urinary sodium [submitted]. In people with IF these dipsticks could provide a rapid, accurate, and cost-effective assessment of hydration status, potentially leading to improvements in hydration status and quality of life. However, the previous study included few people with IF and was focussed on inpatients with suspected dehydration, rather than people living at home. In addition, before undertaking an appropriately powered study of the effect of home hydration monitoring using dipsticks in people living at home on home parenteral nutrition (HPN), we need to determine the feasibility of collecting the necessary data and the acceptability of self-testing urine in this patient population.

Aims & Objectives

1. To determine whether dipstick measured urinary chloride correlates with laboratory urine chloride concentration in people living at home on HPN

2. To investigate the feasibility of a larger RCT that will examine the effect of home urine monitoring on hydration status and quality of life in people living at home on HPN

The co-primary objectives of this study are to:

1. Assess the validity of dipstick measures of urinary chloride concentrations in an HPN population.

2. Assess the acceptability of the data collection protocol

The secondary objectives are to:

1. Establish the optimal cut-point on the urine dipstick to identify people on HPN with low urinary sodium

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2. Assess the inter-rater reliability of dipstick measures

3. Assess whether administration of intravenous fluid when a patient feels dehydrated subjectively improves quality of life

4. Establish the frequency of IV fluid administration in the HPN population

Method

Scoping work will be undertaken with people on HPN to establish whether the proposed research question is of relevance to people on HPN and to incorporate their input into the design of the study. We will recruit 3-4 people on HPN into a PPI group who will be consulted on the rationale for the study, the intended study design and the materials used for data collection (completed).

1. The aim is to recruit 20 independent HPN patients.

2. All patients will be provided with urine pots for collection and urine dipsticks with instructions for use.

3. Over a 4-week period participants will complete questionnaires and urine electrolyte testing as indicated below:
   a. Baseline – demographics, HPN-QoL, clinical details
   b. Weekly – HPN-QoL
   c. Weekly – urine sample collection (irrespective of whether or not they feel dehydrated) and urine dipstick recording
   d. If IV fluid administered due to feeling dehydrated (as per usual practice)
      i. urine sample collection and urine dipstick recording before and approximately 1 hour after administration of IV fluids
      ii. prior to and after completion of IV fluid infusion, participants will rate their feeling of wellness using a 5 point visual scale
   e. Participants will document any additional IV fluids received during the study period beyond those included in their normal prescription
   f. End-point – HPN-QoL

4. We will also recruit inpatient intestinal failure patients and apply the protocol. Over 4 weeks we would expect to see 6 patients.

5. We will conduct a qualitative interview on a sample of patients (approximately 5).
Outcome measures

1. Urinary chloride measured with urine dipstick by a) patient and b) laboratory staff
2. Urinary electrolytes measured in laboratory
3. QOL before and after IV fluid administration
4. Frequency of IV fluid administration