

Harnessing innovative pump technology to improve the experience and outcomes of patients receiving home parenteral nutrition

Infusion pumps play a key role in the life of patients on home parenteral nutrition (HPN). They ensure the accurate delivery of fluid and alert patients to potential infusion or catheter related problems. Pumps have typically not permitted analysis of this information meaning that the nature and frequency of alarms is not known. In addition, infusion history is a vital part of HPN monitoring. This has traditionally relied on informal methods such as patient recall, measurement of stock used and/or stock ordered. Consequently, little is known of infusion rates, hours infusing, or if patients regularly under or over infuse. Being able to review an individual's infusion history would assist in the ongoing assessment of patient's requirements and hopefully reduce the number of unnecessary infusions or inappropriate prescription changes.

Collaboration with Industry (Micrelcare™) allowed the development of a unique system which would record details of the type and time of all pump alarms and send a notification email via a secure server to named professionals caring for the patient. The system would also record patient's infusion histories and pressures and export them anonymously via GPRS technology to a secure server. This was achieved by attaching a special external battery pack to the pump and switching on the device prior to commencing an infusion.

This study aimed to evaluate the technology and how it could benefit patients on HPN, the specific goals being to;

- i. Quantify the characteristics and rate of infusion alarms in a group of patients receiving HPN
- ii. Determine patient's infusion histories
- iii. Identify the normal range of infusion pressures and if these could aid in the diagnosis and treatment of catheter related problems such as thrombosis or occlusion.

21 patients consented to have their infusion histories and pressures monitored using the Micrel PN+ pump. Any patient receiving HPN (not just those using the Micrel PN+) experiencing a partial or total occlusion had their infusion pressure measured pre and post intervention to restore patency to assess the efficacy of the intervention. Any patient regularly under or over infusing was contacted to see if any infusion related problems could be established and remedied. Patients experiencing multiple alarms during a single infusion were also contacted to see if any intervention was necessary. Patient feedback was determined at routine follow up appointments.

This lecture will present the results from this study which contained data from more than 5000 infusions collected from 21 patients over a 3 month period. These measurements allowed the normal range of infusion pressures to be identified and whether sudden spikes in infusion pressure could be indicative of an upcoming complication. Examples whereby the data aided in the detection of catheter or infusion related problems, such as identifying the cause behind multiple downstream occlusion alarms and determining overage in the parenteral nutrition regimen, will also be presented and discussed alongside patient feedback regarding the technology and the possible future clinical applications.