Use of Parenteral Vitamins and Trace Elements for Critically Ill Patients: A Survey of Practice in the United Kingdom

Lynda K. Cameron,1,3 Nuttha Lumertgul,1,2 Marlies Ostermann,1,3 ‘Guy’s and St Thomas’ NHS Foundation Trust, London, United Kingdom; 2‘King Chulalongkorn Memorial Hospital, Bangkok, Thailand; 3‘King’s College London, London, United Kingdom.

Background: Micronutrient products, including parenteral vitamins and trace elements, are prescribed commonly to critically ill patients in the UK for different reasons. One aim was to explore the clinical practice of prescribing micronutrients in the absence of clear evidence or consensus practice guidelines. We were particularly interested in prescribing practice in patients receiving renal replacement therapy (RRT) for acute kidney injury (AKI).

Methods: A 12-question survey was designed and distributed through professional networks of clinicians (physicians, nurses, pharmacists and dietitians) working in UK intensive care in late 2019 – early 2020.

Results: A total of 217 responses to the survey were received from physicians (58%), nurses (16%), pharmacists (15%) and dietitians (11%). Table 1 shows the proportion of respondents who stated they would prescribe/recommend micronutrient products for renal indications in the ICU. The reasons underlying prescribing decisions for patients receiving RRT were variable: to replace water soluble vitamins lost via the filter circuit (20%), to treat concurrent disease states (8%), to both replace losses and treat an underlying condition (24%), unsure (18%), for another reason (6%) and declined to answer (24%).

Conclusions: These results show heterogeneity in reported prescribing practice. Only 1 in 5 respondents considered AKI in critical illness (whether receiving RRT or not) to be an indication for parenteral micronutrient administration, despite altered micronutrient status being reported in this cohort. A decision to prescribe micronutrients to patients on RRT may be based on the loss of water soluble substances in RRT effluent (which has been demonstrated for some micronutrients), a potential treatment effect of micronutrients, or a combination of both. As the evidence base and cost-benefit ratio in this population is uncertain, further research is needed to better define their place in therapy.

Renal indications for prescribing micronutrients in ICU

| Renal indication | Micronutrient product (parenteral) | Micronutrient product (oral) |
|-----------------|----------------------------------|-----------------------------|
| AKI             | Vitamin supplements              | Micronutrient products      |
| Renal failure   |                                  |                             |
| Chronic dialysis|                                  |                             |

AKI = acute kidney injury; ESRD = end stage renal disease; RRT = renal replacement therapy

Severe Hyperparathyroidism Is Associated With Nutritional Impairment in Maintenance Hemodialysis Patients

Sinee Disthabanchong, Mahidol University Faculty of Medicine Ramathibodi Hospital Department of Medicine, Bangkok, Thailand.

Background: Severe hyperparathyroidism predicts poor outcomes and parathyroidectomy is associated with improved survival in patients with kidney failure. Mechanisms underlying these observations have not been clearly elucidated. The issues regarding nutritional impairment in severe hyperparathyroidism have rarely been addressed. The present study examined nutritional status among maintenance hemodialysis (MHD) patients with different degree of hyperparathyroidism.

Methods: Seven hundred forty-five patients were categorized into four groups according to PTH levels: group 0, PTH<200; group 1, PTH<200-599; group 2, PTH<600-1499; and group 3, PTH≥1500. Group 0 was excluded because low PTH level was linked to older age and malnutrition. Patients in groups 1 and 2 were matched to group 3 by propensity score yielding 410 patients in the final analysis. Nutritional parameters at baseline (Year 0) and the preceding 1 and 2 years (Year -1 and Year -2) were analyzed.

Results: At baseline, lower serum albumin (P<0.001), creatinine (P<0.001), height in female (P=0.001), creatinine/body surface area (Cr/BSA) (P<0.001) and higher number of patients with serum albumin <38 g/L (P=0.001) were observed in group 3 compared to groups 1 and 2. Higher PTH level was independently associated with serum albumin <38 g/L (P<0.001) and serum Cr/BSA <380 µmol/L (P<0.001). Lower serum albumin, creatinine and Cr/BSA and higher number of patients with serum albumin <38 g/L were observed at Year 0 compared to Year -1 and Year -2 among patients in group 3. Between group comparisons confirmed a significant difference in serum albumin, the number of patients with serum albumin <38 g/L, serum creatinine and Cr/BSA between baseline and the preceding the 1 and 2 years in group 3 compared to groups 1 and 2. The number of patients with serum Cr/BSA <380 µmol/L was also significantly different between baseline and the preceding 1 and 2 years in group 3 compared to group 1. Weight loss was more substantial in group 3 compared to group 2 (P<0.03) and the number of patients with ≥5% weight loss was higher in group 3 compared to groups 1 (P<0.005) and 2 (P<0.03).

Conclusions: MHD patients with severe hyperparathyroidism had deterioration of nutritional status compared to patients with moderate hyperparathyroidism and patients with PTH level within the recommended range.

Higher 25-Hydroxyvitamin D Associates With Gastrointestinal Bleeding Events

John W. Larkin,1 Yue Jiao,1 Suman K. Lama,1 Sheetal Chaudhuri,1 Joanna Williets,1 Anke Winter,2 Manuela Stauss-Grabos,2 Len A. Usvyat,1 Jeffrey L. Hymes,1 Franklin W. Maddux,1 Peter Stenmark,3 Jürgen Flego,3 on behalf of the INSPIRE Core Group 1Fresenius Medical Care, Global Medical Office, Waltham MA; 2Fresenius Medical Care, Global Medical Office, Bad Homburg, Germany; 3University Hospital Aachen, Division of Nephrology and Clinical Immunology, Aachen, Germany; 4Fresenius Medical Care AG & Co KGaA, Bad Homburg, Germany; 5Karolinska Institutet, Stockholm, Sweden.

Background: In an effort within the INSPIRE collaboration, we built a gastrointestinal (GI) bleed hospitalization risk model and unexpectedly found higher serum 25 hydroxyvitamin D concentration (25OH Vit D) was one of the most predictive factors in hemodialysis (HD). To investigate this signal, we assessed all-cause and GI bleed hospitalization rates by 25OH Vit D levels.

Methods: We used data from adult HD patients in the United States with at least 25OH Vit D lab during Jan 2016-Dec 2020. We calculated % patients with all-cause or GI bleed admission within 180 days after a 25OH Vit D lab by groups (<15, ≥15 to <30, ≥30 to <50, ≥50 to <60, ≥60 ng/mL).

Results: Among 225,459 patients (mean age 63.1 years, 57.4% male, 56.2% white race & HD vintage 3.3 years), those with 25OH Vit D <15 ng/mL had the highest all-cause and highest GI bleed admission rates (Figure 1). Patients with 25OH Vit D ≥50 to <60 had the lowest all-cause and highest GI bleed admission rates. Patients with 25OH Vit D ≥60 had a higher all-cause admission rate than the a≥30 to <50 and ≥50 to <60 ng/mL, had the lowest all-cause and highest GI bleed admission rates. Patients with 25OH Vit D ≥60 had a higher all-cause admission rate than the a<30 to <50 and ≥60 ng/mL, and a GI bleed admission rate slightly lower than the a<30 to <50 ng/mL group.

Conclusions: We found an inverse association between all-cause and GI bleed admission rates based on 25OH Vit D levels. It appears 25OH Vit D >30 ng/mL may be representative of specific comorbidities that explain the all-cause admission rates in this group. Given the higher recommendations for 25OH Vit D in kidney disease (≥30 ng/mL) versus general population (≥20 ng/mL), further analysis accounting for competing risks are needed.

Funding: Commercial Support - Fresenius Medical Care