Early Prediction of Oral Calcium and Vitamin D Requirements in Post-Thyroidectomy Hypocalcaemia

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RESULTS AND DISCUSSION

168 patients were analyzed; 85.1% were female, 49.3% had BMI > 30, and 64% had vitamin D deficiency. 25.6% had post-thyroidectomy hypocalcemia, of whom 18 (44.9%) were symptomatic and received intravenous calcium. 1st and 6th hour percent of drop in PTH correlated positively with the severity of hypocalcemia (p < 0.0001). The GLIMMIX prediction model for oral calcium requirement was based on 1st hour percent change from preoperative PTH level, preoperative actual PTH, BMI, and thyroid function. The same predictors were identified for Vitamin D, except that thyroid function was replaced with vitamin D status (Table 2). These factors were used to build predictive equations for calcium and vitamin D doses (Figure 2). It is clinically meaningful and statistically reassuring (from the model building perspective) that 1-hour PTH percent change, which is a model-based significant predictor of the required doses of calcium and vitamin D, is also significantly correlated with the clinical endpoint of hypocalcemia symptoms and signs as well as length of hospital stay (both reflective of severity of post-thyroidectomy hypocalcaemia) (figure 3). None of the previous studies incorporated the perioperative percent change in PTH (as a key factor), nor take into account the multi-variant prediction approach (e.g using BMI, thyroid function status and vitamin D status) in their dose selection strategies.5,6,7 These factors may not play a role in developing hypocalcemia per se, and the post-operative PTH drop remains the main cause, yet these factors have a significant impact on the patient response to treatment, as we show here, and adding them to the evaluation and dose prediction process improves the management plan and the outcome prediction (Figure 2).

CONCLUSIONS

Factors that affect both oral calcium and vitamin D requirements are percent of perioperative PTH change, preoperative PTH level, BMI, preoperative thyroid function and vitamin D status. Implementation of this model with patients in early identification of those who are not at risk of hypocalcemia and thus allow early discharge. Additionally, the model also obviates unnecessary supplementation of calcium and vitamin D, and guides early effective and optimal management of those at risk of hypocalcemia, therefore decrease the suffering from frequent hypocalcemia symptoms and ultimately reducing the health care expenses including the hospitalization cost.

REFERENCES