Vitamin D Status & Risk of Post-Thyroidectomy Hypocalcemia

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INTRODUCTION

Transplant hypocalcemia after thyroidectomy is a complication caused by accidental parathyroidectomy, injury, or desiccation1, and is reported to occur at rates as high as 30%. A preventive strategy for hypocalcemia would be desirable. Several studies have suggested that preoperative vitamin D deficiency (VDD) predisposes to post-thyroidectomy hypocalcemia1,2,3. This hypothesis is supported by Henry et al's animal study suggesting that decreased vitamin D levels are correlated with parathyroid hypertrophy and hyperplasia independently of serum calcium levels4,5. The protocol for surveillance and treatment following thyroidectomy is outlined in Figure 1. Patients on chronic peritoneal dialysis or with baseline hypocalcemia will be scored 5. Other electrolyte abnormalities including magnesium and phosphorus were corrected upon detection.

METHODS

Following local research ethics approval, a retrospective study involving 315 consecutive patients who underwent thyroidectomy by a single surgeon. Preoperative 25-hydroxy vitamin D (25OHD) levels were measured. Hypocalcemia was assessed at 24 hours postoperatively. Hypocalcemia was defined as 25OHD ≤ 70 nmol/L (28ng/mL). Several studies have used 25-hydroxy vitamin D (25OHD) values <25-37 nmol/L (10-15 ng/mL) as a threshold for vitamin D deficiency6,7,8,9,10. However, recent research on vitamin D metabolism observing biomarkers such as PTH 1-84, 1-25 PTH, and 25-hydroxy vitamin D suggests that this threshold should be set much higher than previously thought11.

Several patients with low preoperative vitamin D levels have been identified at risk of hypocalcemia following total thyroidectomy. Physicians are concerned about vitamin D toxicity if patients are taking vitamin D supplements and extended hospitalization, and may additionally show at-risk risk factors preoperatively.

RESULTS

We used the more physiological threshold of 70 nmol/L (28ng/mL), in order to compare our results with previous studies. In contrast to previous studies, our results suggest that VDD may in fact be protective against post-thyroidectomy hypocalcemia, transient hypocalcemia appears to occur less frequently in patients with LVD. Multivariable logistic regression analysis suggests that vitamin D could be predictive for low intraoperative PTH levels, which is consistent with previous studies showing a strong association between low intraoperative PTH levels and patients who were hypoparathyroid postoperatively. All patients had concurrent central neck lymph node dissection (CND).

CONCLUSIONS

In this study, none of the patients who were VDD became hypocalcemic. Lower vitamin D was associated with decreased risk of hypocalcemia by univariate and multivariable analysis.

DISCUSSION (continued)

This data suggests that patients with suboptimal vitamin D levels may have parathyroiditis at are better able to compensate for injury or loss that occur during thyroid surgery. Although the reason for this is not yet fully understood, it is possible that vitamin D-deficient patients may have a more robust response to injury, and that this could result in decreased parathyroid stress. This in turn may be related to the fact that vitamin D is a hormone that has been shown to be beneficial for bone health and other systems.

REFERENCES