BRIGHAM AND WOMEN'S HOSPITAL

Effect of Vitamin D Status and Repletion on Postoperative Total Joint Arthroplasty Complications

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Introduction

Total joint arthroplasty patients are commonly Vitamin D insufficient (serum levels <30ng/mL), which is associated with increased risk of postoperative complications. This ongoing randomized controlled trial aims to determine if preoperative correction of hypovitaminosis D in TJA patients reduces postoperative complications.

Methods

Eligible TJA patients with serum vitamin D concentrations >30ng/mL formed the control group, and those with levels between 10–29ng/mL were randomized to low- or high-dose supplementation ITable). Serum vitamin D levels were measured on the date of surgery for supplemented patients, and were followed up at 3 months. T-tests were used to compare differences between groups. Fisher's exact test determined if there was a difference in emergency department visits between supplemented groups.

Group	Arm	N	Serum 25(OH)D at Baseline	Supplementation Regimen
1	Low-Dose Vitamin D_3 Supplementation (**Intervention**)	200	10 – 29 ng/mL	Preoperative - Dose: 800IU oral vitamin D_3 (cholecalciferol) - Timing & Duration: daily for 1 month - Total Duration: 1 month Postoperative - Dose: 800IU oral vitamin D_3 (cholecalciferol) - Timing & Duration: daily for 3 months Total Duration of Supplementation: 4 months
2	High-Dose Vitamin D_3 Supplementation (**Intervention**)	200		Preoperative - Dose: 50,000 IU oral vitamin D_3 (cholecalciferol) - Timing & Duration (week 1): twice/week (Mon. & Thurs.) - Timing & Duration (weeks 2-4): once/week (Mon.) - Total Duration: 1 month Postoperative - Dose (month 1): 50,000 IU oral vitamin D_3 (cholecalciferol) - Dose (months 2-3): 800 IU oral vitamin D_3 (cholecalciferol) - Timing & Duration (month 1): once/week for 1 month (Mon.) - Timing & Duration (months 2-3): daily for 2 months Total Duration of Supplementation: 4 months
3	No Intervention (**Control**)	500	≥30 ng/mL	Consented and enrolled study participants with serum 25(OH)D levels ≥30 ng/mL will not receive any supplementation for the entire duration of the study (preoperative or postoperative) as their levels are considered sufficient. Serum 25(OH)D levels will be measured 3-months postoperatively.

Table 1: Treatment Protocol

Results

Control patients presented with a mean preoperative Vitamin D level of 42.23 ng/mL±10.76. The low-dose supplementation group had a mean preoperative vitamin D of 21.67ng/mL±5.37 and a postoperative level of 33.8ng/mL±7.73. The high-dose supplementation group had a mean preoperative vitamin D level of 24.08ng/mL±4.54 and a postoperative level of 33.8ng/mL±11.52. There were no statistically significant differences in emergency department visits between cohorts (p=0.39).

Conclusion

Both Vitamin D supplementation regimens increased serum vitamin D to sufficient levels in low vitamin D patients with similar complications.

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