

The effect of calcium supplements on levothyroxine after total thyroidectomy: A single centre analysis

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ABSTRACT

Introduction: Calcium supplements may be administered along with thyroid hormone replacement (levothyroxine) to overcome hypocalcaemia following total thyroidectomy. Even though clinically significant interaction between the two medications has been documented, such literature is still lacking in the local setting. This study aimed to assess the effect of calcium supplements on levothyroxine after total thyroidectomy. **Materials and Methods:** A retrospective study was conducted from 1 April to 30 September 2022 using a clinical registry which was the thyroid case proforma from the surgical department, Hospital Raja Perempuan Zainab II, Kota Bharu, Kelantan, Malaysia. The inclusion criteria were all patients who underwent total thyroidectomy in Hospital Raja Perempuan Zainab II from 1 January 2019 to 31 December 2020, prescribed either levothyroxine or levothyroxine with calcium supplements for at least three months after surgery. Those with incomplete data of thyroxine (T4), thyroid stimulating hormone (TSH) and calcium levels were excluded from the study. Eligible subjects were determined from the thyroid case proforma based on the study criteria. Since all patients who fulfilled the study criteria were included, no sample size calculation and sampling method was applied. Information on their demographic, clinical characteristics and laboratory results were further obtained from electronic medical records which was the Patient Management System (SPP) and documented in the data collection form. T4, TSH and calcium levels were compared between patients receiving levothyroxine with and without calcium supplements using independent t-test in Statistical Package for Social Sciences (SPSS) version 22. A statistically significant test result was set at a P-value of less than 0.05. **Results:** They were all Malay with mean (SD) age of 44.9 (15.2) years old, mostly female (82%, n=41) and married (86%, n=43). The diagnosis was mainly goitre (68%, n=34) with mean (SD) length of hospitalization after total thyroidectomy was 4.9 (1.8) days. Many of them had no comorbidities (60%, n=30) but were taking concomitant medications (78%, n=39) which were not known to interfere with levothyroxine (88%, n=44). Also, the majority were prescribed levothyroxine with calcium supplements (74%, n=37) When compared, it was found that the mean (SD) T4 levels were significantly different between patients receiving levothyroxine with calcium supplements and levothyroxine alone. The patients receiving levothyroxine with calcium supplements had lower T4 levels than those on levothyroxine only [11.56 (4.04) vs 15.68 (7.59) pmol/L, P=0.017]. The mean (SD) levels of TSH in both groups were also significantly different. The patients receiving levothyroxine with calcium supplements had higher TSH levels than those on levothyroxine only [9.66 (12.44) vs 1.13 (1.54) mIU/L, P<0.001]. However, there was no significant difference of calcium levels between patients receiving levothyroxine with and without calcium supplements [2.13 (0.22) vs 2.13 (0.16) mmol/L, P=0.929]. **Conclusion:** Calcium supplements were observed to have an effect on levothyroxine after total thyroidectomy. The interaction caused lower T4 levels and higher TSH levels in patients taking both medications. Thus, it is important for patients and healthcare providers to be aware that calcium supplements can interact with levothyroxine by affecting its absorption. Continuous education can help to decrease the risk of this clinically significant interaction.