



TO IDENTIFY INDIVIDUALS WHO ARE AT INCREASED RISK FOR DEVELOPING SYMPTOMATIC HYPOCALCAEMIA AFTER TOTAL THYROIDECTOMY

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KEYWORDS :

INTRODUCTION:

Production of parathyroid hormone (PTH) play an indispensable role regulating serum calcium, increasing the calcium levels in blood by increasing renal reabsorption of calcium, bone resorption and activation of calcidiol to stimulate intestinal calcium absorption; all this by means of PTH receptors coupled to G proteins present in these tissues. Thus, any injury to the PGs leading to the reduction or loss of their function will generate a reduction in serum calcium which, when severe, can be life threatening, or in a lesser extent, affect importantly the quality of life of the patients and increase the days of in hospital care^[1,2].

Serum iPTH levels take before, during and after thyroidectomy have been evaluated in different studies as a predictive factor for mild to severe post-surgical hypocalcemia and post-surgical hypoparathyroidism. It is a known fact to every surgeon that in order to prevent postoperative hypoparathyroidism while performing thyroid surgeries, the best effort must be made to avoid any kind of damage, either directly to the PGs or to the blood supply.

Acute hypocalcemia can result in severe symptoms requiring hospitalization, Symptoms of hypocalcemia most commonly include paresthesia, muscle spasms, cramps, tetany, circumoral numbness, and seizures. Hypocalcemia can also present with laryngospasm, neuromuscular irritability, cognitive impairment, personality disturbances, prolonged QT intervals, electrocardiographic changes that mimic myocardial infarction, or heart failure.

MATERIALS AND METHODS:

This cross sectional study was conducted at Sri Ramachandra Institute of Higher Education and Research, Chennai, from June 2017 to October 2019. Patients above the age of 18 years undergoing total thyroidectomy for both benign and malignant etiology were included in the study. Patients with known secondary hyperparathyroidism secondary to chronic renal failure and patients who have already undergone thyroid or parathyroid surgery were excluded from the study. After obtaining the Institutional Ethics committee approval (REF: CSP-MED/18/JUN/44/92). The patient having been informed in detail about the nature of the study in a language understandable to the patient and after obtaining informed consent, the study was conducted in the following manner. The detail history, demographic parameters and clinical examination of all the patients were done. The relevant Laboratory investigation such as thyroid function tests, ultrasound neck, FNAC and pre operative Calcium were all noted and entered in the proforma. After Total thyroidectomy, one hour post operative intact parathyroid hormone was measured using immunoassay DXI-800 and ionised calcium measurement were taken by arterial blood gas analysis. Post operatively after 24 hours another ionised calcium level was measured. Patients were observed in the ward for signs and symptoms of hypocalcemia, such as Chvosteks, trousseaus sign, perioral numbness, tingling and muscle spasms. Patients who were found to be clinically hypocalcemic were given slow intravenous infusion of 10ml of 10% calcium

gluconate. Patients were subsequently assessed for clinical signs of hypocalcemia and if found, were given oral calcium supplementation 500mg thrice daily. In patients who had low biochemical ionised calcium post operatively without symptoms or clinical signs of hypocalcemia were given prophylactic oral calcium supplementation 500mg thrice daily.

RESULTS:

The mean age among the study participants was 43.3 years and standard deviation was 13.4. Majority of the study participants were male which was 66.7% and the remaining 33.3% were females. Papillary carcinoma thyroid formed 56.7% of the study participants and 43.3% had multi nodular goitre. FNAC among study participants showed that 60% had papillary carcinoma thyroid and 40% had Adenomatoid nodule. Ultrasound among study participants showed that 12 people had multi nodular goitre, 9 with solitary nodular goitre left, 8 with solitary nodular goitre right and 1 had adenomatoid nodule. 18 out of 30 participants showed positive Chvostek sign which was 60% and 12 out of 30 participants showed negative Chvostek sign which was 40%.

18 out of 30 participants showed positive Trousseau sign which was 60% and 12 out of 30 participants showed negative Trousseau sign which was 40%. 18 out of 30 participants showed positive Trousseau sign which was 60% and 12 out of 30 participants showed negative Trousseau sign which was 40%. In 17 out of 30 participants Perioral paresthesia, Numbness and tingling was present which was 56.7% and in 13 out of 30 perioral paresthesia, Numbness and tingling was absent which was 43.3%. Pre operatively Free T 3, Free T 4, TSH, Pre-op Calcium were measured the means of them were 3.39, 0.98, 6.13 and 8.7 respectively. The mean of Intact parathormone, calcium at 1 and 24 hours among all the study participants were 31.74, 0.98 and 6.13 respectively.

DISCUSSION:

The present study was designed to assess prospectively the individuals who are at increased risk for developing symptomatic hypocalcaemia after total thyroidectomy.

In our study the mean age among the study participants was 43.3 years, majority of the study participants were male which was 66.7% and the remaining 33.3% were females. The mean age in our study was nearly similar with A.C. Reddy et al. A total of 100 patients were included in the statistical analysis of the study; with age ranging from 17 to 72 years (median age 48.5 years)^[3]. In contradictory to our study according to a study by A.C. Reddy et al., in 2016, 29 males and 71 females were included in the statistical analysis^[3].

In our study Papillary carcinoma thyroid formed 56.7% of the study participants and 43.3% had multi nodular goitre. Montana Suwannasarn et al., in 2017, Thirty-nine patients (60%) were diagnosed with papillary thyroid carcinoma which was similar to our study, while the rest were multinodular goiter (21.5%) and Graves' disease (7.7%). Significant immediate hypocalcemia was observed in 25 (38.5%) patients^[4].

In our study, FNAC among study participants showed that 60% had papillary carcinoma thyroid and 40% had Adenomatoid nodule. According to Heydar Ali Esmaili et al. FNAC diagnostic criteria, papillary carcinoma was diagnosed in 85 (66.4%) cases, follicular carcinoma in 14 (10.9%), medullary carcinoma in 13 (10.1%), undifferentiated carcinoma in 14 (10.9%), non-Hodgkin lymphoma with large cells in 1 case (0.78%), and finally metastatic carcinoma from kidney was diagnosed in 1 (0.78%) case^[5]. In our study 18 out of 30 participants showed positive Chvostek sign which was 60% and 12 out of 30 participants showed negative Chvostek sign which was 40%. In the study conducted by Vitalijus Eismontas, et al. Chvostek's signs were present in 14 patients (5.4% of the patients with post-operative hypocalcemia^[6]. In comparison to other studies in our study there were more number of patients showing positive chvostek sign.

In our study 18 out of 30 participants showed positive Trousseau sign which was 60% and 12 out of 30 participants showed negative Trousseau sign which was 40%. According to Mejia MG Trousseau's signs (absent in a third of patients with hypocalcemia)^[7]. In our study 28 out of 30 participants muscle spasm was present which was 93.3% and in 2 out of 30 muscle spasm was absent which was 6.7%. Rosa KM, et al. The symptoms includes cramps, tingling sensation, paresthesia, tetanic contractions, seizures, muscle spasms, and prolong QT interval prolongation on electrocardiogram^[8]. In our study 17 out of 30 participants Perioral paresthesia, Numbness and tingling was present which was 56.7% and in 13 out of 30 perioral paresthesia, Numbness and tingling was absent which was 43.3%.

Mejia MG said that in acute hypocalcemia, the first symptoms described are neurological; with paresthesias in the perioral region, hands and feet and if untreated progressing to cramps, hyperreflexia and muscle spasms^[7].

CONCLUSION:

Hypocalcemia secondary to hypoparathyroidism after thyroidectomy is a frequent complication leading to increased morbidity and mortality. The use of predictive factors allows timely identification of patients at risk and the prevention of complications. Early monitoring of iPTH and ionized calcium levels after total thyroidectomy are the most appropriate tests used to diagnose transitory and permanent hypoparathyroidism.

Tables and figures:

| Variable | Frequency | Percentage |
|-------------------------------|-----------|------------|
| Male | 20 | 66.7% |
| Female | 10 | 33.3% |
| Diagnosis: | | |
| Multi Nodular Goitre | 13 | 43.3% |
| Papillary Carcinoma Thyroid | 17 | 56.7% |
| FNAC: | | |
| Adenomatoid nodule | 12 | 40% |
| Papillary Carcinoma Thyroid | 18 | 60% |
| USG: | | |
| Adenomatoid nodule | 1 | 3.3% |
| Multi Nodular Goitre | 12 | 40% |
| Solitary Nodular Goitre Left | 9 | 30% |
| Solitary Nodular Goitre Right | 8 | 26.7% |
| Chvostek sign: | | |
| Positive | 18 | 60% |
| Negative | 12 | 40% |
| Trousseau sign: | | |
| Positive | 18 | 60% |
| Negative | 12 | 40% |
| Muscle spasms: | | |
| Present | 28 | 93.3% |
| Absent | 2 | 6.7% |

| Perioral paresthesia, Numbness and tingling | | |
|---|----|-------|
| Present | 17 | 56.7% |
| Absent | 13 | 43.3% |

Pre-operative Biochemical evaluations

| Parameters | Mean | Standard deviation | Range |
|----------------|------|--------------------|-------------|
| Free T 3 | 3.39 | 0.51 | 1.9 – 4.9 |
| Free T 4 | 0.98 | 0.79 | 0.26 – 4.95 |
| TSH | 6.13 | 17.6 | 0.01 – 95.7 |
| Pre-op Calcium | 8.7 | 0.55 | 7.6 – 9.6 |

Chart: Pre-operative Biochemical evaluations

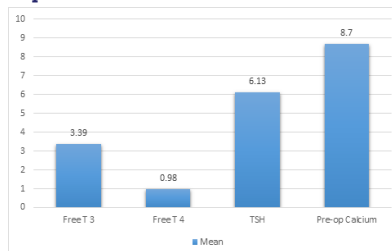
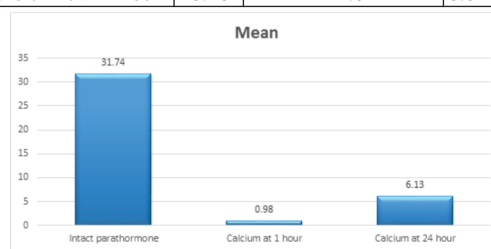


Table: Post-operative Biochemical evaluations

| Parameters | Mean | Standard deviation | Range |
|---------------------|-------|--------------------|-------------|
| Intact parathormone | 31.74 | 24.2 | 0.6-106.5 |
| Calcium at 1 hour | 0.98 | 0.79 | 0.26 – 4.95 |
| Calcium at 24 hour | 6.13 | 17.6 | 0.01 – 95.7 |



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