CALCITONIN

INTRODUCTION
Calcitonin or Thyrocalcitonin is a polypeptide hormone secreted by parafollicular C cells of thyroid. It acts directly on osteoclasts to decrease bone resorbing activity and decrease serum calcium levels.

NORMAL RANGE

<table>
<thead>
<tr>
<th>REFERENCE GROUP</th>
<th>REFERENCE RANGE IN pg/mL</th>
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</thead>
<tbody>
<tr>
<td>Males</td>
<td>&lt; 8.4</td>
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<tr>
<td>Females</td>
<td>&lt; 5.0</td>
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CLINICAL USE

- Diagnose and monitor patients with Medullary thyroid carcinoma (MTC) which occurs as a sporadic disease or as a part of the syndromes of MEN-2A, MEN -2B & Familial MTC. Calcitonin is primarily used for diagnosing sporadic MTC / Index case in Familial MTC / monitoring MTC.
- Routine screening of Nodular thyroid disease to detect unsuspected sporadic MTC.
- For provocative testing in MTC, Calcitonin stimulation test is recommended to increase sensitivity of detection.
- To monitor effectiveness of surgery by serial measurement of basal and stimulated calcitonin concentrations.

INTERPRETATION

Increased Levels

- Medullary carcinoma thyroid
- C-cell hyperplasia
- Non thyroidal cancers like Oat cell carcinoma / Small cell carcinoma, Intestinal / Bronchial / Gastric Carcinoids, Melanoma, Pheochromocytoma, Pancreatic carcinoma & Breast carcinoma
- Hypergastrinemia & other Gastrointestinal disorders
- Acute & Chronic Renal failure
- Hypercalcemia of any etiology stimulating Calcitonin production
- Pulmonary disease
- Pernicious anemia
- Zollinger – Ellison syndrome

HIGH RISK FACTORS FOR MTC
- Familial MTC – accounts for 5% of Thyroid cancer. The 3 familial forms are MEN2A, MEN2B & MTC without features of MEN. MTC is more aggressive in MEN2B as compared to other two forms. Familial MTC is much more aggressive than sporadic MTC

**LABORATORY DIAGNOSIS**

- Fine needle aspiration cytology (FNAC) of Thyroid nodule
- Biopsy
- Ultrasound
- Calcitonin levels
- RET mutation detection – recommended for familial MTC

**LIMITATIONS**

- Basal Calcitonin levels may be normal in approximately one third cases of Medullary thyroid carcinoma
- Calcitonin levels have a circadian pattern peaking after lunch time
- Very high levels of Calcitonin are almost always associated with MTC but rarely may be seen in cases of Renal failure or ectopic production of Calcitonin
- This test is not useful for evaluating calcium metabolic diseases
- Procalcitonin and other calcitonin precursors may also be detected in MTC
- Falsely elevated values may be seen in serum of patients who have developed Human anti-mouse antibodies or heterophilic antibodies