Thyroid

HPT-AXIS AND THYROID HORMONE ACTION

Elevated Pre-Op Thyrotropin Levels Are Associated With Increased 30-Day Mortality in Patients Undergoing Cardiac Surgery With Cardiopulmonary Bypass

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BACKGROUND: The association between thyroid dysfunction and postoperative mortality is contentious. Thyroid function is frequently depressed during and after cardiopulmonary bypass surgical procedures, and this may adversely affect myocardial performance and postop outcome.**OBJECTIVES:** To study i) the changes and clinical significance of serum thyroid hormones during cardiopulmonary bypass (CPB), and ii) the association between biochemically assessed peri-op thyroid function and 30-day mortality after CBP**STUDY DESIGN:** Prospective Cohort Study**SUBJECTS:** 279 patients undergoing various cardiac surgeries under cardiopulmonary bypass.**METHODS:** All consenting patients undergoing open heart surgery in last five years at a tertiary care centre in North-India were studied. The thyroid hormone levels (Total T3, T4 and TSH) were measured before admission, and postoperatively on Day 1 & 7, and 3 months following surgery. The patients' gender, age, weight, body mass index, heart disease details, previous cardiac surgeries, and cardiac surgery-related data such as pump time, aortic clamping time, hypothermia duration, postoperative hemodynamic status and postoperative use of inotropic drugs were recorded and analysed. Patients were classified as having biochemically overt or subclinical hyperthyroidism or hypothyroidism, normal thyroid function, or non-classifiable state based on preoperative thyroid-stimulating hormone and total T4 values. Outcome data were collected from hospital records. Biochemical thyroid dysfunction was not systematically treated. Outcomes measured were length of ICU stay, postoperative complications and 30-day mortality.**RESULTS:** There was significant changes in thyroid function in patients undergoing cardiopulmonary bypass surgery (Fig 1). All patients showed a decrease in T3, T4 and TSH after surgery. Post-op complications were observed in 137 patients (49%) most common being atrial fibrillation (34%) followed by acute kidney injury (23%), infections (18%), dyselectrolytemia (7%), bleeding (1.4%) and ARDS (1.4%). Of 263 patients followed, eventually 26 patients expired with a mortality rate of 8.89% (95% CI, 0.4 - 19.4). Perioperatively, there was a significant correlation between 30-day with type of surgery (r, 0.26), aortic clamp time (r, 0.45), CBP time (r, 0.48), number of inotropes used (r, 0.57), hours of mechanical ventilation (r, 0.4), ICU stay (r, 0.13) and post-op complications (r, 0.24), as well as with the reduction in the thyroid hormone levels; 17 (7%), 3 (20%) and 6 (46%) patients of those with pre-op TSH level of <6.5, >6.5 and >10.5 mIU/L expired (p <0.001).**CONCLUSION:** Pre-op thyroid dysfunction is associated with increased mortality in patients undergoing cardiac surgery with CBP. Excess mortality with elevated serum TSH levels suggests the importance of timely detection and intervention in individuals with thyroid dysfunction undergoing cardiac surgery.Table of Contents
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oFig 1. Changes in serum thyroid hormones during CPB surgery

Reproductive Endocrinology

HYPERANDROGENISM

Androgenic Profiles of Patients With Severe Insulin Resistance

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Background Patients with severe insulin resistance have ovarian hyperthecosis, high testosterone (T) and minimal adipose tissue. Recent studies have found elevated levels of 11-oxygenated (11-oxy) androgens in women with polycystic ovary syndrome (PCOS) compared to age and sex-matched controls. 11-oxy-androgens are produced by CYP11B1, an enzyme expressed predominantly in the adrenal, with minor ovarian expression. We analyzed 11-oxy-androgens in women with severe insulin resistance. **Methods** We performed retrospective analysis of women with severe insulin resistance (lipodystrophy or insulin receptor defects) seen at the NIH and identified 19 patients with testosterone ≥ 80 ng/dl (immunoassay) and available serum samples. Quantitation of androgens was performed by LC-MS/ MS and compared to age, sex and BMI-matched controls. Data between groups was compared using non-parametric Mann-Whitney U test. Correlation analyses utilized the Pearson and Spearman's rho. **Results** Median patient age was 18yrs (IQR 17-26) with median fasting insulin of 63mcU/ mL (IQR 40-184). Serum insulin correlated strongly with fold elevation of T in patients relative to controls (r= 0.47, *P=0.04*). Median levels of all androgens except 11-hydroxytestosterone (11OHT) were significantly higher in patients than controls, including 11-ketotestosterone (11KT), a clinically relevant androgen in both congenital adrenal hyperplasia and PCOS [69 ng/dl (IQR 27-82) vs 24 ng/dl (IQR 16-40), *P < 0.001*]. 11KT/ T was lower in patients (0.30, IQR 0.12-1.15) compared to controls (1.1, IQR 0.41-1.5, *P = 0.04*).