

## THE USE OF CARBIMAZOLE AND ESMOLOL IN THE TREATMENT OF THYROTOXICOSIS (GRAVE'S DISEASE) BY SUB-TOTAL THYROIDECTOMY IN NORTHERN GHANA

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### ABSTRACT

For decades, the preparation of a hyperthyroid patient for surgery took several weeks or months utilizing thyroid blocking agents and iodine [24, 25]. Since the 1960s, propranolol has been the agent of choice to attenuate the heightened  $\beta$ - blocker effects of thyrotoxicosis[25]; also in 1973, a preliminary report of 20 patients with hyperthyroidism treated with propranolol and thyroidectomy was presented [25, 31]. It was found that thyrotoxic patients could be prepared for surgery within 24 hours with oral or intravenous propranolol. Propranolol (non-selective  $\beta$ -blocker) effectively neutralizes the symptoms of autonomic hyperactivity including sweating, tremors, fever, tachycardia, hypertension, arrhythmias, dilatation of blood vessels, increased pulse rate and resultant heart failure [11, 12, 13, 25], which significantly affect the thyroid function; this also results in reduced incidence of post-operative hypothyroidism, recurrent laryngeal nerve damage or post-operative hypo-parathyroidism [32]. Esmolol is a newer cardio-selective  $\beta_1$ -blocker [1, 30]. The beneficial effects of esmolol over propranolol is its cardio selective  $\beta_1$ -receptor blocker property and its rapid onset ability [1, 24]. Esmolol also has a very short duration of action and no significant intrinsic sympathomimetic or membrane stability activity at therapeutic dosages. It is a class-2 antiarrhythmic drug; decreases the force and rate of heart contractions by blocking  $\beta_1$ -adrenergic receptors in the heart and other body organs. Esmolol also prevents the actions of adrenaline and non-adrenaline in the body. It is therefore used in surgery (during induction and endotracheal intubation, perioperative and postoperative periods) to prevent or treat tachycardia, hypertension, acute supraventricular tachycardia or aorta dissection [1, 2, 3, 4, 24]; it suppresses the manifestations of Grave's disease related increased sympathetic activity. Grave's disease is said to be the most common cause of hyperthyroidism (80-90%) [9]. Literature shows the newer cardio-selective agents such as esmolol is thought to be a "jack of all trades" among drugs used in anaesthesia because it prevents and treats cardiovascular responses due to perioperative stimuli. In addition to its effects on the sympathetic nervous system, esmolol also influences core components of an anaesthetic regimen such as analgesia, hypnosis and memory function [2-5]. Antithyroid drugs are one of the treatment options for Grave's disease [24,28 ,30]. Carbimazole, an antithyroid drug is said to be widely used as the drug of choice in thyrotoxicosis (Grave's disease) except in pregnancy [8]. This study sought to investigate and evaluate the effects of carbimazole and esmolol combination in the management of thyrotoxicosis by sub- total thyroidectomy in Northern Ghana from 2011 to 2013 at Tania Specialist Hospital, Tamale. To the best of our knowledge, no such study has been done in the past. Bilateral sub-total thyroidectomy was performed on 20 patients with thyrotoxicosis in whom tablet carbimazole was administered 7 to 10 days pre- operatively. Intra- operatively esmolol was also given. Then post- operatively, carbimazole was again given for a period of 5 to 10 days to prevent cardiac complications, before, during and after surgery. Transient complications, intra- and post-operatively were monitored and observed for, including hypoparathyroidism, bleeding or haematoma, wound infection, tracheal collapse, recurrent

laryngeal nerve damage, but none was detected in all cases. Thyroid function tests (TSH, T<sub>3</sub>, T<sub>4</sub>) levels returned to normal levels in all cases within the post-operative period from two (2) to four (4) weeks.

**Conclusion:** This study recommends bilateral sub-total thyroidectomy for Grave's disease (thyrotoxicosis) in patients managed with carbimazole and esmolol combination. This has advantages over the convectional use of carbimazole and potassium iodide combination for same indication.

**Keywords:** Carbimazole, Esmolol, Thyrotoxicosis/Grave's Disease, Sub-total thyroidectomy, Northern Ghana.