

## Post-thyroidectomy life-threatening complications in Graves' disease.

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*An experience of postoperative airway obstruction as a life-threatening complication after subtotal thyroidectomy has been presented in a 28-year-old female who underwent surgery for primary thyrotoxicosis of Graves' disease at a small rural hospital. This unfortunate patient had a 9-day preoperative control of hyperthyroid state with a combination of propylthiouracil and propranolol, which rendered her clinically euthyroid. In the early postoperative period she suffered from hemorrhage, due to a slipped ligature on the left superior thyroid arterial stump, which resulted in rapid tracheal compression and complete asphyxia. Immediate evacuation of the hematoma and control of the bleeding point was followed by an initial unconsciousness for 48 hours and a subsequent satisfactory recovery over the next 7 days. A hyperthyroid crisis encountered in the early postoperative period and clinical symptoms of transient hypocalcemia were successfully managed. An unusual method of airway management is also presented.*

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รายงานนี้เสนอประสบการณ์ในการรักษาภาวะแทรกซ้อนที่อันตรายที่สุดอย่างหนึ่ง คือ ภาวะอุดกั้นของทางเดินหายใจหลังการผ่าตัด subtotal thyroidectomy เพื่อรักษาคอพอกเป็นพิษ Graves' disease ในผู้ป่วยหญิงไทยหนึ่งรายที่สถานีกาชาด 10 อำเภอหัวหินจังหวัดประจวบคีรีขันธ์ ผู้ป่วยได้รับยา propylthiouracil และ propranolol เป็นเวลา 9 วัน และอยู่ในภาวะ euthyroid ก่อนผ่าตัด หลังผ่าตัดผู้ป่วยประสบภาวะเลือดออกจาก stump ของ superior thyroid artery ข้างซ้ายเนื่องจากไหมที่ผูกไว้หลุด และลิ้มเลือดคคหลอดเลือดเกิดภาวะ asphyxia อย่างรวดเร็วหลังจากการผ่าตัดเปิดแผลผ่าตัดเพื่อเอาลิ้มเลือดออกและห้ามเลือดอย่างรีบด่วน ผู้ป่วยหมดสติอยู่เป็นเวลา 48 ชั่วโมง หลังจากนั้นจึงค่อย ๆฟื้นขึ้นมาจนปกติตามลำดับในเวลาอีก 7 วัน นอกจากนี้ผู้ป่วยยังมีอาการ hyperthyroid crisis และอาการของระดับแคลเซียมในเลือดต่ำชั่วคราวหลังผ่าตัด ซึ่งได้รับการรักษาได้ผลดี

Surgery on the thyroid gland is one of the more common operations performed in Thailand, surgeons in hospitals ranging from 30 - bed district hospitals to university hospitals, perform large volumes of thyroid operations each year, with relatively few mortality and morbidity. One of the most dreaded complications is postoperative hemorrhage resulting in airway obstruction, which could easily lead to a fatal outcome. Therefore, the necessity of careful hemostasis in any major thyroid surgery has been repeatedly emphasized time and again in standard surgical teaching as the most important precautionary step in avoiding this complication. And once encountered, the life-saving remedial action should be to promptly open the surgical incision, evacuate the hematoma and thus, relieve its compression on the trachea as well as gain immediate airway control. This has led to the commonly advocated routine practice of having a tracheostomy tray placed at the patient's bedside after a major thyroid operation.<sup>(1)</sup> However, due to the low incidence of this complication,<sup>(2,3)</sup> the tray is almost never used or even "seems unnecessary". Then, complacency prevails. And just like any good precautionary advice in surgery that seems superfluous, the practice is gradually and finally discarded, until the day comes when it is really needed.

The following case report occurred at the Tenth Red-Cross Health Station in Hua Hin district, a small rural seaside town, in Prachuabkirikhan province, 250 kilometers from Bangkok. It is regularly stationed by nurses and midwives who provide basic elementary health care for the indigenous population. Two summer months out of each year, rotating surgical teams from the Department of Surgery, Chulalongkorn Hospital, come here to provide "standard" surgical services to the local people, converting the station into a 20-bed hospital with standard operating rooms and equipments.

### Case Report :

T.P. is a 25-year-old Thai female teacher who presented herself to the Tenth Red-Cross Health Station with a one-month history of a noticeable lump in the neck. She also noted a slight recent weight loss despite a normal appetite, as well as slight bulging of both eyeballs. Examination revealed a young adult female in otherwise good physical condition, with no sign of distress. Her blood pressure was 140/70, HR 116/min-regular. A significant degree of eye staring without lid lag was observed. Neck examination revealed generalized smooth enlargement of both thyroid lobes, approximately twice normal size, with no audible bruit detected on auscultation. Her blood count was normal with a hematocrit of 33 vol %. A diagnosis of primary thyro-

xicosis of Graves' disease was made, and she was started on propylthiouracil 100 mg TID and propranolol 40 mg TID.

Seven days later she returned with a heart rate of 80/min and feeling well, at which time surgery was offered. She was admitted and continued on her medication, while a pulse rate during sleep of 76/min was recorded. Two days later, she was scheduled for subtotal thyroidectomy under general anesthesia. Initial attempt at orotracheal intubation was unsuccessful due to the presence of a moderate degree of overbite and a slightly receding chin, and nasotracheal intubation had to be resorted to. The operation proceeded uneventfully, removing all but two grams of thyroid tissue on each lobe, and with both recurrent laryngeal nerves carefully dissected and preserved. Satisfactory hemostasis was achieved and the incision was closed over a small close suction tube drain. A stable blood pressure of 140/90 and average regular heart rate of 80/min was maintained throughout the operation.

Initially after surgery, partial but satisfactory recovery from anesthesia was ascertained prior to extubation, at which time recorded blood pressure was 130/90, HR 88/min and body temperature was 37.4°C. Despite close observation, fifteen minutes later, she rapidly developed asphyxia and, within seconds, apnea. In extreme haste, the neck incision was completely opened at bedside and the compressing hematoma evacuated. Brisk bleeding was noted to be coming from the left superior thyroid arterial stump, from which a previously placed ligature had slipped. Direct digital pressure was immediately applied. Meanwhile immediate airway control had to be secured by performing tracheostomy directly through the operative wound, because of the difficulty with translaryngeal intubation. She was rushed back to the operating room, while digital pressure on the bleeding point was continuously maintained. After antiseptic skin prep, the bleeding arterial stump was recontrolled with silk ligature. It was felt that postoperative airway management via a tracheostomy would be undesirable due to the contamination of tracheal secretion into the operative wound. However, because of prior failure at direct translaryngeal tracheal intubation, another technic was attempted as follows. Temporarily losing airway control and ventilation for few minutes, the tracheostomy tube was removed, a levin tube was swiftly passed through the tracheostomy opening upwardly through the larynx and retrieved out of the mouth. And using it as a guide, an endotracheal tube was manoeuvred down the larynx into the trachea over it. The levin tube was then removed and airway control

reestablished. The inverted U-shaped tracheostomy opening flap was then primarily closed with prolene sutures. All through the second operation the patient remained comatose, despite minimal anesthetic agent used. Blood pressure, however remained stable at 120/80 and HR 80/min.

Postoperatively she was left intubated, although breathing spontaneously. Four hours later, her temperature rose to 39°C, HR 150/min and she remained unconscious. A diagnosis of hyperthyroid crisis was entertained, and she was started on large doses of propylthiouracil and propranolol. Body temperature was controlled with frequent sponging and antipyretic. She remained delirious with intermittent agitation, requiring heavy sedation for the next 48 hours. A few episodes of carpopedal spasm had to be controlled with intravenous calcium administration. Over the next several days, her conscious level and general condition gradually improved, until she was able to return home on the ninth postoperative day, at which time she required neither beta-blocker nor calcium supplement. Her voice was normal and the operative wound healed well.

#### Discussion:

Traditional wisdom dictates that surgery for primary thyrotoxicosis of Graves' disease should be regarded as an elective operation, to be performed only when the patient's hyperthyroid state has been brought well under control. Thiocarbamide drugs, such as propylthiouracil and methimazole, despite some side effects, have been the mainstay of therapy aiming at bringing the patient's condition to euthyroid state, which generally takes at least four to six weeks.<sup>(1)</sup> The addition of iodine, in the forms of saturated solution of potassium iodide (SSKI) or Lugol's solution, serves to make the thyroid gland firmer and less vascular, hence rendering an easier operation. More recently, since the early 1970's, the effectiveness of beta-adrenergic blockades, such as propranolol, in controlling the clinical manifestations of thyrotoxic state, has led to its employment in the preoperative control of primary thyrotoxicosis.<sup>(4)</sup> Claiming rapid onset of action and shorter preparation time before surgery, it quickly gained popularity, either used alone or as an adjunct to antithyroid drugs in controlling excessive hyperthyroid symptoms. Studies have confirmed its clinical effectiveness and safety as single-drug preparation, even with a preoperative time of as short as less than 24 hours, despite the fact that patients, although clinically euthyroid, remain metabolically hyperthyroid.<sup>(5)</sup> Be that as it may, it has hardly, over the years, replaced antithyroid drugs as the sole agent of choice for preoperative control.<sup>(1, 6, 7)</sup> This is because,

as stated earlier, surgeons still regard subtotal thyroidectomy for primary thyrotoxicosis as an elective operation. It thus implies better judgement to avoid even the smallest chance of a postoperative hyperthyroid crisis, no matter how slight, and have the patient in a euthyroid state, both clinically and metabolically, by adequate antithyroid drug preparation, before coming to surgery.<sup>(8, 9)</sup> In the case presented, the development of postoperative hyperthyroid crisis, even when the patient was clinically euthyroid before surgery, serves only to endorse this concept.

Permanent postthyroidectomy hypoparathyroidism, one of the most distressing postoperative morbidity in thyroid surgery, results from direct operative injury to the parathyroid glands or disruption of their blood supply, namely, the inferior thyroid arteries. Leaving the posterior capsule of the thyroid remnants intact during a subtotal thyroidectomy for thyrotoxicosis gives certain degree of assurance from direct operative injury on the parathyroids. Avoiding ligation of the inferior thyroid main arterial trunk, by keeping the dissection close to the thyroid capsule and interrupting only those branches that go directly to the parts to be removed, will preserve the blood supply to the thyroid remnants as well as the parathyroids.<sup>(10)</sup> However, the transient hypocalcemic episodes as manifested by carpopedal spasm seen in the presented case is generally thought to be due to the operative removal of the hyperthyroid stimulation of bony resorption in a thyrotoxic patient, the so-called "hungry bone syndrome." Additionally, changes in the circulating levels of thyrocalcitonin may affect the postoperative serum calcium levels.<sup>(11)</sup>

One of the thousands of ligatures a surgeon carefully places during surgical operations performed day in and day out through his lifetime, is bound to come loose sometimes; as mistakes are made, lessons learned and experiences gained, on the way to becoming a better surgeon. When that happens, the result could be as simple as a wound hematoma or as tragic as costing the life of a patient, as has almost been the case in the experience demonstrated in this unfortunate patient. While careful attention to perfect surgical technics can never be overemphasized, it is also a safe surgical principle to always anticipate the worst and be alert for any possible disaster. A tracheostomy tray, together with resuscitation equipments within easy reach, routinely placed at bedside after any major thyroid surgery, or at least the conscious awareness that it might be needed, satisfies this principle. One is tempted to draw an analogy to an experienced driver who always wears his seatbelt while driving, as he knows that accident is bound to happen one day, no matter how careful he might be.

While the overwhelming majority of thyroid operations being performed every day are followed by smooth postoperative courses, one should not let complacency

develop, lest one day the missing tracheostomy tray may become conspicuous.

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