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METHODS OF HEMOSTASIS IN THYROIDECTOMY

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Abstract. Post-thyroidectomy neck hematoma represents a major concern for surgeons because it can result in severe and even life-threatening complications. In fact, postoperative hemorrhage may result in airway compression and respiratory distress, and therefore, effective hemostasis is an important goal in thyroid surgery. Postoperative hematoma occurs at a rate of approximately 0.1% to 1.1%. Almost all cases occur in the first 6 h after surgery and can be the result of several surgeon or patient factors. For many years the clamp-and-tie technique has been the most common way to divide the main vascular pedicles of the thyroid gland. Alternatively, bipolar electrocautery has been used for only very small vessels. Other hemostatic systems have been introduced and proved to be potentially very useful in neck surgery and, in particular, for thyroid surgery.[1] Treatment of hematomas really depends on the symptoms. Most hematomas need to be evacuated and reexplored, but only an unstable or progressively worsening hematoma in a patient requires immediate evacuation at the bedside. Reintubation in a controlled operating room environment is often possible. The most senior endoscopist should perform the intubation because significant epiglottis and arytenoid edema may be present. During surgical history, numerous technical advances have emerged in hemostasis, the suture ligatures, vessel ligating clips, electrocoagulation by mono- or bipolar instruments, and topical hemostatic agents, the use of which is mainly promoted in the last years in thyroid surgery as in other surgical disciplines.

Key words: Neck hematoma, hemostasis, thyroid surgery, treatment.

We decided to use the hemostatic products that are currently available in our operating room, an equine collagen patch coated with human fibrinogen and human thrombin (CFTP) and oxidized regenerated cellulose gauze, following our favorable initial experience with these topical hemostatic agents in general surgery. So we proceeded to design a prospective study to compare the efficacy of CFTP and cellulose gauze to traditional procedures in patients undergoing thyroid surgery, in terms of blood loss and the incidence of hemorrhagic events, always in relation to other complications.[2] Several options exist for the intraoperative ligation of blood vessels. Conventional techniques include clamp, tie, and cut methods, with or without cautery. Some surgeons use monopolar cautery; however, this causes a significant amount of heat dispersion and puts adjacent structures at risk for injury. Bipolar cautery is more pinpoint and allows less dispersion of heat. For many years the clamp-and-tie technique has been the most common way to divide the main vascular pedicles of the thyroid gland. Alternatively, bipolar electrocautery has been used for only very small vessels. This coagulation system is still considered appropriate to thyroid surgery because it concentrates all of the electrical energy in one limited point, thus reducing the heat transmission to the critical structures. Electrocautery is not, however, effective to obtain hemostasis on larger vessels, and therefore, the clamp-and-tie technique cannot be avoided. Other hemostatic systems introduced in the last decade have proved to be potentially very useful in neck surgery and particularly for thyroid surgery. This new class of instruments is generally better known as “energy devices”, because they all use different forms of energy

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such as radiofrequency or ultrasound. Although they all generate a significant elevation of temperature in the tissues, as in any form of energy, the temperatures reached by these instruments are never as high as the standard monopolar electrocautery.

All surgeons have encountered the situation of minimal but persistent ooze from the superior pedicle or from the area directly adjacent to the nerve during thyroid surgery. Use of any of the previously described techniques to control this type of bleeding can markedly increase the risk of nerve injury. Several studies have assessed the use of adjunctive hemostatic agents during thyroidectomy. Surgicel is an oxidized cellulose mesh that adheres to tissue especially in areas of bleeding and helps form a hemostatic clot. In 2013, Amit and colleagues performed a study of 190 consecutive subjects undergoing total thyroidectomy. They placed a 2 cm × 2 cm patch of surgicel in the thyroid bed and avoided placement on the recurrent laryngeal nerve. They found no difference in the hematoma rate between the two groups; however, they found significantly higher postoperative drain output (133 *vs.* 93 mL), delayed time of drain removal (1.87 *vs.* 1.4 days), and longer hospital stay (2.7 *vs.* 1.8 days) in the surgicel group compared with the control group.[3]

Hemostasis in thyroid surgery continues to be the most important goal after preserving vital structures. The harmonic scalpel and LigaSure systems have been shown to significantly decrease operative times without increasing costs or complications.Adjunctive hemostatic agents have shown equivalent differences when added to standard methods from a clinically significant perspective. Surgicel has actually shown increases in drain output, making its use less desirable in routine thyroid surgery. Postoperative drain use plays no role in routine thyroid surgery because it increases hospital stay and pain without improving patient outcomes. Thyroidectomy and neck dissection were the most commonly performed surgeries on the neck and had low morbidity rates. Hematoma formation after thyroidectomy is a well-known complication, but with improved surgical technique and meticulous hemostasis, it has become a rare occurrence [3]. Nevertheless, if not detected early and managed properly, it is potentially life-threatening.

In fact, patients with postoperative cervical hematoma required reoperation and longer hospital monitoring.The patient shows respiratory distress and pain or pressure sensation in the neck. Progressive neck swelling, suture line bleeding, and stridor are the most common signs in association with significant drain tube losses if a drain has been left in situ.In 89% of cases postoperative hematoma occurs within 12 hours after surgery and 72% within 6 hours юRisk factors associated with postoperative hemorrhage are classified into those related to the patient and those related to thyroid diseases and to surgical technique.

Evidently, patients with coagulation disorders and chronic renal failure or patients that take antiaggregant and/or anticoagulant medications present a higher risk of bleeding [4].Other risk factors are represented by Basedow's disease, toxic multinodular glands because of the increased vascularity of the thyroid, and intrathoracic goiters because of the altered vascularity and the increased size of the gland and the greater extension of the operating field.Surgical technique evidently plays a crucial role in preventing postoperative bleeding: firstly the mode of access and the dissection of strap muscles, the means of hemostasis, and the presence of residual thyroid tissue.The use of instruments as the harmonic scalpel and radiofrequency or thermal devices also improves vessel sealing and several studies confirm their effectiveness to prevent hemorrhagic events [4].Also anesthetic factors play a crucial

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role in prevention of neck hematoma such as a smooth extubation without significant coughing and the control of both postoperative vomiting and pain to avoid raised venous and arterial pressures.

The ability of suction drainage to reduce the incidence of postthyroidectomy hemorrhage is a debated topic. The aim of drain tube in thyroid surgery is to obliterate the dead space, to evacuate collected blood and serum, and to early detect postoperative bleeding. Recently, the use of drains has decreased considerably and several reports regarding the function of drains in thyroid surgery have not justified their use [5] and have demonstrated their association with surgical site infections and prolonged hospital stay. Means to prevent and control intra- or postoperative bleeding have always been a topic of most importance. The first step in preventing postoperative hemorrhagic complications is meticulous hemostasis during surgical procedures. During the last few years various topical hemostatic agents have become available to improve hemostasis during surgery. Although uncommon, postoperative bleeding after thyroid surgery remains a potentially life-threatening complication. Whilst the surgical haemostatic armamentarium has progressed significantly in the last century, a surgical technique based on experience is essential.

The use of CFTP showed a statistically significant reduction in drainage volume. In the CFTP group there was no bleeding, unlike the other two groups, but the limited numbers do not make this difference significant. So we can say that the use of CFTP reduces the drainage volume; it potentially reduces bleeding complications; patients enjoy more comfort, by the shorter hospital stay and the faster recovery of normal daily activities. These findings confirm the efficacy of CFTP, promoting its use in thyroid surgery.

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