

Which Hemostatic Surgical Devices Should Be Used for Thyroid Surgery, or Should We Just Continue to Clamp and Tie?

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HEMOSTASIS IS EXTREMELY IMPORTANT in thyroid surgery. In order to avoid postoperative complications such as hematomas, which can lead to airway obstruction and/or damage to the recurrent laryngeal nerve and the parathyroid glands, meticulous dissection with minimal blood loss is necessary. There have been significant advances in hemostatic surgical devices for the occlusion and division of blood vessels during surgical procedures, but using such devices in thyroid surgery raises concerns about damage to vital structures from lateral thermal spread. Two such devices are now used in thyroid surgery: a bipolar energy-sealing system (Ligasure, Mansfield, MA) and ultrasonic coagulation (harmonic scalpel). Several prospective studies have shown reduced operative times and costs when using these surgical devices compared with conventional techniques (clamp-and-tie) for thyroidectomies (1–3). More recent randomized control trials have compared these two devices in thyroid surgery, finding no difference in postoperative morbidity (4,5), but shorter operative time with ultrasonic coagulation (5). Other studies have found no difference in cost and operative time between these two devices (6).

In this issue of *Thyroid*, Garas and colleagues (7) report on the effectiveness of surgical devices in thyroid surgery in a network meta-analysis of 35 randomized control trials, including 2856 patients, conducted between 2000 and June 2012. The analyses included studies that compared three techniques: the ultrasound-based harmonic scalpel, the Ligasure system, and/or the conventional clamp-and-tie method. The analyses used the network meta-analysis method for both direct and indirect comparison between the three techniques. This method allows for the analysis of the effectiveness of experimental treatments among similar patient populations that have not been directly compared in a randomized clinical trial (8,9). The primary outcome for the analysis was postoperative hypoparathyroidism and recurrent laryngeal nerve paralysis, which are the most common complications in thyroid surgery, even though they are rare. The analysis found ultrasonic coagulation to rank first, followed by Ligasure, and then the clamp-and-tie technique, with regard to low rates of postoperative hypoparathyroidism, blood loss, and drain output. Furthermore, ultrasonic coagulation had the shortest operative time and length-of-hospital stay. However, ultra-

sonic coagulation was associated with a higher rate of recurrent laryngeal nerve palsy, followed by Ligasure, when compared to the clamp-and-tie technique (OR=1.93 [95% CI, 1.00–3.57] and OR=1.35 [95% CI, 0.52–2.98], respectively).

The study by Garas and colleagues (7) is the largest meta-analysis to date of thyroidectomy outcomes using hemostatic devices, and it uses a network meta-analysis method to circumvent the limitations of a traditional meta-analysis. Since network meta-analyses extend the number and type of studies being combined, there is more potential for combining studies that are not adequately similar, thus increasing the likelihood of errors (10). However, Garas *et al.* (7) limited the heterogeneity between studies, which was more than moderate in this study, by conducting a meta-regression analysis that adjusted for publication year (technological evolution of devices) and Jadad score (quality of randomized clinical trials). This showed that the publication year was significantly associated with operative time.

The authors are to be congratulated on their rigorous meta-analysis with the goal of providing data to establish guidelines for using new hemostatic devices in thyroid surgery, while acknowledging the limitations of their study (7). Although the global trend lies with the use of new hemostatic devices, the important clinical complication of recurrent laryngeal nerve paralysis was shown to be lower with the conventional clamp-and-tie technique. As the authors acknowledge, surgeons' experiences could not have been evaluated in this study, although these experiences are an important factor when evaluating complication rates in thyroid surgery (11). The data from Garas *et al.* (7), at the very least, suggest that there should be an effort towards standardizing the use of hemostatic surgical devices during thyroidectomies to avoid injury to sensitive structures such as the recurrent laryngeal nerve and the parathyroid glands. It is unlikely that future studies with primary outcome measures that include important endpoints such as recurrent laryngeal nerve injury and hypoparathyroidism will have adequate power to detect small differences (<1%–2%) because these complications are very low for thyroidectomies performed by experienced surgeons. Selecting which device to use, or not use, will likely depend on individual surgical experience and the resources available at a surgeon's institution, and this selection process will also change as new devices are developed.

Disclosure Statement

The authors declare that no competing financial interests exist.

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