

THE IMPORTANCE OF PRESERVING THE PARATHYROID GLANDS DURING THE THYROIDECTOMY PROCEDURE: A LITERATURE REVIEW

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Abstract: Among the head and neck surgeries, one of the routine procedures is the total thyroidectomy, the surgery however has a risk of transient or permanent hypoparathyroidism, being a challenge in the clinical-surgical practice. A bibliographic review was carried out with fifteen articles published from 2010 to 2020. It is understood that the *in situ* preservation of the parathyroid glands is still the safest, most feasible and economical method to prevent post-thyroidectomy hypoparathyroidism, even alternatives such as self and allotransplantations can be effective, requiring further studies for a better understanding.

Keywords: Thyroidectomy; hypoparathyroidism; hypocalcemia.

INTRODUCTION

Among head and neck surgeries, one of the most routine procedures is total thyroidectomy, indicated mainly in cases of physiological, neoplastic or anatomical disorder of the gland. Surgery, although common, carries the imminent risk of transient or permanent hypoparathyroidism (PH) and, according to (KURILOFF et al., 2010), inadvertent parathyroidectomies can occur in at least 21% of cases. The PH condition evolves with a reduction in parathyroid hormone (PTH) levels and interference in calcium metabolism, which leads to hypocalcemia (LORENTE-POCH et al., 2015). In addition, between 8 and 19% of patients who underwent total thyroidectomy for papillary thyroid carcinoma had post-surgical hypoparathyroidism (SITGES-SERRA et al., 2018).

Keeping the glands *in situ* is the most effective way to ensure that HP does not develop, although it needs accuracy and surgeon experience (ORLOFF et al., 2018). Bearing in mind this premise established by the ATA (American Thyroid Association),

this topic of great relevance in the area of Head and Neck Surgery was chosen for the elaboration of this review work.

METHODOLOGY

A bibliographic review was carried out with the selection of 15 articles, published between 2010 and 2020, on the PubMed platform using the keywords “parathyroid preservation”, “thyroidectomy”, “hypoparathyroidism” and “hypocalcemia”.

The selection took place on 09/11/2020 and relevance in the themes of parathyroid preservation during thyroidectomy and parathyroid transplantation techniques was adopted as the main inclusion criterion.

RESULTS AND DISCUSSION

The most common complication after thyroidectomy is hypocalcemia due to acute hypoparathyroidism (PH) (LORENTE-POCH et al., 2015). The parathyroids (PG) can be inadvertently removed, have their blood supply compromised, or suffer mechanical or thermal trauma during this procedure. The visualization of these structures intraoperatively is not simple and, on average, only 2.28 parathyroids can be identified during a thyroidectomy (GSCHWANDTNER et al., 2018). In addition, one of the factors that relate to hypoparathyroidism after thyroidectomy is the experience of the surgeon. Inexperienced surgeons are a risk factor for the development of the aforementioned condition (ORLOFF et al., 2018).

Conventional HP treatment requires lifelong medication that can cause some side effects, such as asthenia, muscle dysfunction, myositis, fasciitis, cataracts, cerebellar calcifications, dental malformations, gastritis and urolithiasis, resulting in a decrease in the patient's quality of life (PARALETI et al., 2016).

A challenge in the preservation of PGs

concerns their visibility during the procedure, since not all of them can be visualized due to their variable anatomical location (GSCHWANDTNER et al., 2018). For (ORLOFF et al., 2018), it is necessary to visualize at least two glands during thyroidectomy and, although the inferior glands are more difficult to visualize, they are generally better preserved as they are further away from the inferior pole of the thyroid. Furthermore, in the study (GSCHWANDTNER et al., 2018) the number of PGs identified was inversely correlated with postoperative parathyroid insufficiency: when 4, 3 and 1-2 PGs could be saved in situ, permanent hypoparathyroidism occurred in 2.6%, 6.5% and 16% of cases, respectively. In view of this difficulty, maintaining viable GPs *in situ* is still the best strategy, as new alternative techniques for maintaining GPs are costly and require a greater technical apparatus.

If there is no possibility of preserving the glands in situ, autotransplantation can usually be chosen due to its technical simplicity, seeking to reduce the risk of developing permanent hypoparathyroidism (LORENTE-POCH et al., 2015). It has an unpredictable rate of success in the endocrine function of the grafts and its implementation increases the chances of transient hypocalcemia occurring in the postoperative period (KURILOFF et al., 2010).

Allotransplantation is also an option in severe cases of hypocalcemia resulting from severe hypoparathyroidism (KHRYSHCHANOVICH et al., 2016), however, the best option is still in situ preservation (LORENTE-POCH et al., 2015). With regard to the methods for evaluating the viability of the gland, it is known that the change in color may indicate a permanent vascular impairment of the gland (devascularization), although there are chances of indicating only a transient vascular dysfunction. Currently,

techniques for detecting the gland by fluorescent angiography with indocyanine green or other contrasts are auspicious (METHA et al., 2020).

One of the advances in parathyroid preservation concerns a technique using topical lidocaine (KURILOFF et al., 2010). This study sought to analyze the conservation rates of parathyroid glands with signs of devascularization after the application of 2% lidocaine, as this substance prevents vasoconstriction and allows the visualization of profuse bleeding during the intraoperative period (KURILOFF et al., 2010). No form of interaction of lidocaine with PTH secretion is expected, due to its mechanism of action. The study concluded that this technique is useful, inexpensive and exposes the patient to minimal risks, although further studies are needed.

Paradoxically, some authors state that the active search for the location of the glands and extracapsular dissection techniques increase the risks of a possible accidental devascularization in such a way that, when PGs are found and preserved but not dissected for identification, the risk of temporary and permanent hypoparathyroidism is decreased.

CONCLUSIONS

Since the classic extracapsular dissection and full visualization of the glands is, in some studies, fearful in terms of compromising local vascularization, techniques that use angiography with contrasts to verify the vascular viability of PGs can be considered promising. As the inexperience of the professional is a risk factor for post-surgical thyroid dysfunction, the importance of trained and experienced professionals to perform the procedure is evident.

Furthermore, techniques using 2% lidocaine for the same purpose are even more encouraging because they have low complexity,

reduced cost and, so far, no clinically relevant side effects have been observed.

Even so, the prerogative remains that the in situ preservation of the thyroid glands is still the safest, most feasible and economical method of preventing post-thyroidectomy PH.

The alternatives of auto and allotransplantation can be effective, but they

demand more financial resources, surgical skill and the results are not always predictable and satisfactory.

However, based on the reviewed literature, it is unequivocal to state that all the techniques discussed require further studies, especially with regard to reproducibility and long-term patient follow-up.

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