International Journal of Surgery 41 (2017) S94–S102

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Review

Swallowing disorders after thyroidectomy: What we know and where we are. A systematic review

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HIGHLIGHTS

- Dysphagia and hoarseness can be observed in patients that underwent thyroidectomy.
- The current literature available on MEDLINE database, concerning the swallowing disorders appearing after the thyroidectomy was reviewed.
- Different diagnostic procedures could be used to study patient discomfort, as well as intraoperative nerve monitoring, fiber optic laryngoscopy, endoscopy, pH monitoring, esophageal manometry and videofluorography.
- The diagnostic procedures described can help to identify the mechanisms involved in swallowing disorders. More studies are needed for understanding the causes of the dysphagia appearing after thyroidectomy.

ARTICLE INFO

Article history:
Received 13 December 2016
Received in revised form
24 March 2017
Accepted 28 March 2017

Keywords:
Thyroidectomy
Swallowing
Laryngeal nerves
Gastroesophageal reflux

ABSTRACT

Introduction: Dysphagia and hoarseness are possible complications that can be observed in patients undergoing thyroidectomy or other neck surgery procedures. These complaints are usually related to superior and inferior laryngeal nerves dysfunction, but these can appear even after uncomplicated surgical procedure.

Methods: We reviewed the current literature available on MEDLINE database, concerning the swallowing disorders appearing after the thyroidectomy. The articles included in the review reported pathophysiology and diagnostic concerns.

Results: Twenty articles were selected for inclusion in the review. Depends on the possible causes of the difficulty swallowing (related to nerve damage or appearing after uncomplicated thyroidectomy), different types of diagnostic procedures could be used to study patient discomfort, as well as intraoperative nerve monitoring, fiber optic laryngoscopy, endoscopy, pH monitoring, esophageal manometry and videofluorography. Among all these procedures, videofluorography is considered the gold standard to evaluate the entire swallowing process, since that allows a real-time study of all the three phases of swallowing: oral phase, pharyngeal phase and esophageal phase.

Conclusion: The diagnostic procedures described can help to identify the mechanisms involved in swallowing disorders, with the aim to choose the best therapeutic option. More studies are needed for understanding the causes of the dysphagia appearing after thyroidectomy.

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http://dx.doi.org/10.1016/j.ijsu.2017.03.078
1743-9191/

1. Introduction

Patients candidate to thyroidectomy or other neck procedures, such as parathyroidectomy, often complain voice and swallowing disorders [1,2].

The symptoms concerning the swallowing, also called aero-digestive symptoms, can occur not only after the surgical procedure, but often appear even before. They are reported as generic discomfort, tightness, lump, foreign body, difficulty or pain during swallowing and are often slight [2]. These are frequently complained by patients with thyroid diseases and considered a possible indication to surgery apart from thyroidectomy [3,4]. Otherwise, they can persist or appear after the thyroidectomy in the presence of complications, such as a laryngeal nerve damage (superior laryngeal nerve - SLN, or inferior laryngeal nerve - RLN) as well as after a thyroidectomy in which a postoperative SLN and/or a RLN damage can be excluded by means of an ORL evaluation performed just after the thyroidectomy [2,5–7]. Then, two main categories of swallowing changes should be distinguished: related to nerve damage or appearing after uncomplicated thyroidectomy.

The aim of this study is to revise the available literature for data concerning the swallowing complaints arising after thyroidectomy, with the aim of analysing its causes and pathophysiology, providing answers for questions regarding the management of these symptoms and, in particular, outlining the diagnostic exams actually available.

2. Methods

This work is fully compliant with PRISMA criteria [8]. According to these guidelines, selection of the studies to include in the review has been conducted as follow.

2.1. Literature search strategy

An electronic literature research was performed on PubMed and MEDLINE by two independent investigators (GS and CT) to identify articles in the English language investigating swallowing disorders after thyroidectomy. The search included papers published in the English language, available online, up to 2003 until February 2016.

The following medical subject headings (MeSH) and terms were used to achieve broad and specific searches: “swallowing” *and* “thyroidectomy” with the Boolean operators AND or OR.

Moreover, the research was expanded considering the related references cited by the above-mentioned paper or related subjects concerning relevant aspects emerging during the illustration of the diagnostic and surgical techniques on the discussion.

We also checked the most recent articles concerning the diagnostic procedures for the investigation of swallowing disorders. Finally, we reviewed the published data of our personal experience.

2.2. Selection criteria

We took into consideration clinical trials as well as reviews and meta-analyses that investigate about swallowing disorders appeared in patients that had previously undergone thyroid surgery.

We included articles that reported pathophysiology and diagnostic concerns.

Conference presentations were excluded.

2.3. Study selection

A total of 143 papers were found according to the search strategy.

In the first stage, of all search results, the titles and abstracts were read and selected based on the mentioned selection criteria.

In the second stage, full text was obtained for relevant papers, as well as any citations for which a decision could not be made from the abstract.

Final decision regarding inclusion was based after reading the full article, and a total of 20 papers was considered eligible for this review.

3. Results

The search process was performed as in Fig. 1.

A total of 143 abstracts and titles were reviewed for potential eligibility. One-hundred and thirteen abstracts were excluded after reading title or abstract based on the criteria for inclusion. A total of 29 articles were selected for further reading. Nine studies were excluded after full reading by several reasons (listed in Fig. 1). Finally 20 articles were selected for inclusion in this systematic review [1–5,7,9–22].

The data available from the selected papers suggested a classification of the post-thyroidectomy swallowing disorders on the base of the correlation with a neural damage (concerning the recurrent laryngeal nerve or the superior laryngeal nerve) identified with a direct laryngoscopy.

3.1. Swallowing disorders related to laryngeal nerve damage

The Thyroid surgery performed for benign diseases as well as for malignancies can be complicated with motor or sensory nerve injuries. The nerves that can be involved in the surgery lesions are branches of the vagus nerve. As a consequence, the patients can suffer from voice and swallowing symptoms [9,23–26]. A SLN palsy changes the pitch of the voice and causes an inability to make explosive sounds due to paralysis of the cricothyroid muscle. Both the SLN and the RLN are involved in swallowing mechanisms. The internal branch of the SLN provides sensitive innervation of the supraglottic space and vocal folds. Its lesion can determine, in some cases, dysphagia and aspiration [7] while the external branch (EB-SLN) provides the motility of the cricothyroid muscle, which improves the tension of the vocal folds but its damage is occasionally followed from various rates of swallowing symptoms [23,27]. As confirmed in animal models, the EB-SLN provides the laryngeal protective response so a damage of this branch can be involved in dysphagia [28]. The RLN, that arises from a contingent of fibers of the vagus nerve in the anterior mediastinum, anteriorly the aortic arch, innervates all the intrinsic laryngeal muscles except the cricothyroid one [1]. Its branches provide different groups of muscles: the anterior branch shows an intense response after stimulation during nerve monitoring [29]; the posterior branches are responsible for the motility of the cricopharyngeal muscle. It explains why the patients that underwent unilateral RLN paralysis suffer from swallowing impairment in about 30% of cases [3,25,26]. A RLN injury is associated with an incomplete glottis closure and, as a consequence, a swallowing dysfunction. The anatomy of the right RLN is different from the left one. The right RLN encompass the subclavian artery and emerges from the anterior superior mediastinum in a lateral position. Along a 6 cm-way it provides some sensitive branches to the esophagus thus entering into the larynx. Occasionally, owing to an abnormal embryologic development, concerning a major vascular abnormality in which the brachiocephalic artery does not exist, a right aberrant subclavian artery originates directly from the aortic arch. This vessel, also called “lusorian artery”, runs behind the esophagus. In this case, the right inferior laryngeal nerve originates directly from the cervical portion of the vagus nerve, so it assumes a non-recurrent course