ABSTRACT

INTRODUCTION Benign and malignant thyroid diseases affect a large population worldwide. Total Thyroidectomy is one of the most commonly performed intervention in general surgery. The most feared and dangerous complication of thyroidectomy is the paresis or paralysis of the recurrent laryngeal nerve (RLN). Therefore, endocrine surgeons have been prompted to include, among the preoperative examinations, the evaluation of vocal cords function through flexible fiberoptic laryngoscopy (FFL). RLN injuries have a low incidence in referral center with experienced surgeons and, a routine FFL could be uncomfortable for patients and leads to unjustifiable increase of health care costs. Transcutaneous laryngeal ultrasonography (TLUS) has been proposed as a non-invasive and painless indirect examination of vocal cords function as alternative to direct FFL. TLUS is an easy and feasible technique and is a non-invasive, inexpensive, rapid, painless, repeatable and well tolerated by the patient. The aim of this study is to assess TLUS reliability as an alternative method to direct FFL in the evaluation vocal folds function in patients candidate to thyroid surgery.

MATHERIAL and METHOD We conducted a prospective observational multicentric cohort study on 396 consecutive patients diagnosed with benign and malignant thyroid disease referred to the Thyroid Surgery Division of the University of Campania "Luigi Vanvitelli" and to the General and Specialistic Surgery Division of the “A. Cardarelli” Hospital. Patients were stratified into 2 groups according to BMI in a non-overweight group (BMI <25) and in an overweight or obese group (BMI ≥25). Transcutaneous laryngeal ultrasonography was performed for each patients by and experienced surgeon trained in ultrasound examination and, after TLUS, all patients underwent routine preoperative FFL by a blinded experienced otolaryngologist. Findings were classified as normal or impaired vocal cord function.

RESULTS Sensitivity was equal to 100% (98 – 100%), specificity was 99,5% (98 – 99,9%), positive predictive value 66,7 % (61,8 – 71,3%), negative predictive value 100% (98 – 100%). The probability of a vocal cord alteration in case of negative TLUS was 0% (0 – 10,4%) and if it resulted positive was 66,7% (60,7 – 72,3%). In our series, no False Negative have been observed. The prevalence of VCP in our series was 1% (0,3 – 2,7%). The results showed a concordance between TLUS and FL of 99,5%, with a Cohen's K value of 0,798.

DISCUSSION Thanks to the standardization of the ultrasound technique, we registered a high overall assessability rate was 96.46%, a sensitivity of 100%, a specificity of 99.5%, a positive predictive value of 66.7% and a negative predictive value of 100% in the identification of vocal cords alterations. Our results showed a concordance between TLUS and FL of 99.5%, with a Cohen's K value of 0.798. These encouraging data allowed us to consider TLUS as part of the routine preoperative screening, as it is absolutely reliable in identifying healthy patients without paresis of the vocal cords. In case of doubts on the motility of the vocal cords, however, TLUS allowed to select patients that should be addressed to FFL. Our study confirmed some difficulty in identifying the vocal cords in male patients with hypertrophy of the thyroid cartilage without calcification. This difficulty was solved thanks to adoption of a different acoustic window in lateral approach, as our investigator had undergone specific training in ultrasound of the cervical region.

CONCLUSION TLUS is a valid non-invasive and painless alternative method in the preoperative assessment of vocal cords for a selected population, such as pediatric patients, cardiopathic patients, patients who do not tolerate invasive exams, patients with no diagnosis or suspicion diagnosis of malignancy and patients who do not have voice changes. It could save a high percentage of patients from FFL and in the same time could accurately select patients candidate to second level examinations