

New Approaches to Reconstruct the Laryngeal Recurrent Nerve after Injury during Thyroidectomy

Chala Andres, Valencia Maurici, Gomez JF and Orozco A

Javeriana University, Colombia

Introduction: Thyroidectomy is the most common procedure in head and neck surgery as well as in endocrine surgery. The NRL might be inadvertently injured in 1 to 3 % of the cases, sometimes it also must be sacrificed as part of the thyroidectomy when it is involved, and if a shaving procedure is no possible. The consequent morbidity is related to dysphonia and glottic insufficiency that may last for a long time and usually affects quality of life and increases health care costs, including phoniatic therapy or additional procedures like vocal cord medialization. If bilateral paralysis is present a tracheotomy may be necessary. A comprehensive knowledge of neck anatomy and its variations as well as a careful dissection is necessary to avoid its lesion; Its clear that the best treatment is prevention, but once the lesion of the recurrent laryngeal nerve is established, if possible every effort to reconstruct the nerve must be done. Different techniques have been proposed with variable results. We propose to reconstruct of the recurrent laryngeal nerve with a loop of the vagus nerve and perform a termino-terminal anastomosis as a novel technique with promising results.

Materials and Methods: We prospectively compare the reconstruction of the recurrent laryngeal nerve between two techniques: The first is a recurrent to recurrent nerve anastomosis in a termino terminal anastomosis and the second one is dissecting a loop from the Vagus nerve and make a termino terminal anastomosis to the proximal end of the recurrent nerve A five-year prospective study was conducted between January 1 of 2015 until December 31 of 2019 at the head and neck service in the Caldas University. Patients with unintentional lesion of the recurrent laryngeal nerve or when intraoperative resection was needed were included only if after the lesion an immediate reconstructive procedure was performed. Postoperative six month follow up included, voice record, quality, endoscopic evaluation, therapy, electromyographic evaluation of the larynx.

Results: A total of 20 patients were collected, six male and fourteen female between 16 and 76 year-old, medium 50. Unintentional lesion were present in 8 cases and Necessary resection in 12 cases. Two cases in a subtotal thyroidectomy for benign disease, one a parathyroidectomy for a big adenoma and the rest for cancer. All cases included total thyroidectomy and central neck dissection , and 9 cases included comprehensive lateral neck dissection Two cases had surgery before and a central re-exploration was needed including intraoperative nerve monitoring which usually is not done unless a previous surgery or preoperative vocal cord paralysis is detected. Due

to a previous contralateral lesion or bilateral affection a subsequent tracheostomy was necessary in two cases, one temporal and one was definitive. All were reconstructed with a termino-terminal anastomosis under magnification with a Microscope Olymplus, The technique included perineural separate stitches using 9-0 nylon Four cases were reconstructed by anastomosing distal and proximal ends of the recurrent laryngeal nerve and fifteen cases were reconstructed separating and dissecting a loop from the main trunk of the vagus and crossing it over the vessels to reach the central compartment and performing the anastomosis to the proximal end of the recurrent nerve. Immediate postoperative voice of acceptable quality was reach in twelve cases, Up to three months after surgery and the phoniatic therapy fifteen patients reach good tonal voice, after six months four patients remain with just audible voice and with glottic insufficiency, three of them needed a medialization of the vocal cord and one remained with tracheostomy due to bilateral invasion and paralysis. All patients had endoscopic evaluations, twelve reach bilateral partial or complete movement, and seven had paralysis of the vocal cord, three of them medial so they had acceptable quality of voice. The finding of the electromyographic study revealed twelve cases with partial or complete recovery and seven with no function and de-ervation signs. Only one of the four cases with recurrent to recurrent anastomosis reach partial motion and good quality of voice, but thirteen (86%) of the reconstruction to the vagus nerve recovered partial or complete movement and reach good quality of voice.

Conclusions: The main goal in thyroid or parathyroid surgery is to identify and dissect safely the superior laryngeal nerve and specially the recurrent laryngeal nerve, and of course to avoid the unintentional lesion of the nerve. Sometimes when is no possible to preserve its integrity due to gross invasion a resection may be needed. Any attempt to reconstruct the nerve must be done, especially if a proximal end of the nerve in its entry to larynx is viable. We propose immediate reconstruction by designing a loop of the vagus nerve with similar wide of the recurrent, also as long as needed to avoid tension and performing a microscopic termino terminal anastomosis, offering the patient a good possibility to recover the motion of the nerve or at least favoring medial vocal cord paralysis and enough tone to avoid a long term dysphonia and glottic insufficiency. The anastomosis between the two ends of the residual recurrent nerve was not as good as the loop in reach that goal so we finally discard it as the main reconstruction technique.