Delayed Recurrent Laryngeal Nerve Palsy after Anterior Cervical Discectomy and Fusion C5-C7: Case Report

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Introduction:

One complication known to be associated with surgeries of the cervical region, such as procedures instituted for treating thyroid pathologies, is recurrent laryngeal nerve palsy (RLNP). In neurosurgical patients, it may occur following anterior cervical discectomy and fusion (ACDF) [1]. The most common causes justifying this procedure are cervical myelopathy, disc herniations, and cervical fractures.

The epidemiological data available in the literature on the topic vary. A multicenter study conducted in 2017 estimated that the risk of RLNP after cervical spine surgeries ranged from 0.6%–2.9%. It was found that 16% of patients experienced partial resolution with residual effects, and 74% resolved completely [2].

The possible causes currently accepted to explain the injury mechanism would be intraoperative nerve compression or traction, and less commonly due to its direct section [3].

Patients with unilateral or bilateral RLNP suffer from dysphonia, aspiration, and dysphagia; some cases experience no symptoms at all [4,5]. RLNP classically presents with hoarseness and dysphagia in the immediate postoperative period. However, a rare type of RLNP, delayed recurrent laryngeal nerve palsy (DRLNP), occurs in weeks to months postoperatively [6,7].

After extensive research in the literature, it was observed that DRLNP is well described in cases of patients undergoing thyroidectomy surgery. Our study group found only one case report presenting one patient who experienced DRLNP on the 3rd postoperative day after ACDF [8]. To our knowledge, this is the second report of DRLNP in patients undergoing ACDF.

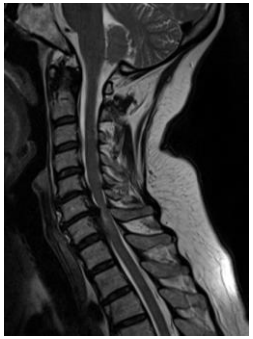

Figure 1: Preoperative cervical spine MRI T2 weighted in sagittal view, demonstrating severe central stenosis at C5-C7 with myelopathy.

Case Report:

A 68-year-old woman came to the medical service complaining that she has had bilateral cervicobrachialgia and paresthesia in the upper limbs for 1 year. Presenting progressive difficulty in holding objects with hands, especially the right, she reported intense pain with neuropathic characteristics in both upper limbs. She denied sphincter symptoms. Neurological examination showed spastic tetraparesis, which was worse in the right upper limb (%). She had brachial and tricipital hyperreflexia and was positive for Hoffmann's sign ipsilaterally. In addition, she had hypesthesia in the 4 limbs, which was worse in the right upper limb.

She underwent a cervical MRI showing C5-C6-C7 cervical stenosis and myelopathy (Figs. 1 and 2). The patient opted for treatment with right ACDF with the aid of intraoperative electrophysiological monitoring. The procedure was performed without any intraoperative complications using polyetheretherketone cages in the C5–C6 and C6–C7 intervertebral spaces. The surgical site was closed with an intradermal stitch, without the placement of a drain. Postoperative X-ray showed adequate positioning of the cages, screws, and plate (Fig. 3).

The patient's limb weakness improved after the surgical procedure, but there were no major changes in her hypesthesia. The patient had no respiratory complaints or swallowing dysfunction and presented a habitual voice. She was discharged on the 2nd postoperative day. She returned on the 15th postoperative day for evaluation, complaining of hoarseness, dysphagia, and cough, without fever, which started 3 days before. The surgical wound was dry and without signs of infection or bleeding. A new cervical MRI was performed, showing no evidence of residual canal stenosis or signs of worsening of myelopathy after surgical manipulation (Fig. 4). After ruling out the need for another surgical intervention, otolaryngology (ORL) evaluation was requested.

The ORL examination identified right vocal fold paralysis through nasolaryngoscopy, with minimal response to the treatment instituted with speech therapy. The right vocal fold paralysis remained in the reevaluation of 3 months, 6 months, and 1 year of follow-up, showing partial improvement.

Discussion:

RLNP is a possible complication in patients undergoing ACDF [1]. It usually occurs in the immediate postoperative period with late development of symptoms. Consequently, its cause is still unknown. Regarding pathophysiology, early RLNP occurs differently from DRLNP. Although there is no exact explanation in the literature of what differentiates early RLNP from DRLNP, some studies suggest hypotheses based on injuries to other nerves, such as the facial nerve (Schwannoma surgeries) [9]. In a study by Bures et al., recovery of laryngeal nerve function was investigated in patients with early RLNP and DRLNP undergoing thyroidectomy.

The recovery rate was worse in patients with early-onset RLNP [10]. Possible causes justifying the late evolution of the symptoms of RLNP are edema and hematoma secondary to the inflammatory response of the surgical cavity, microvasculature vasospasm, and venous congestion, with consequent late ischemia of the nervous tissue [7,10, 11,12,13].

Infectious causes have also been linked to DRLNP. Elevated herpes simplex virus 1 and 2 titers were found in patients undergoing tumor resections that resulted in facial nerve palsy [14]. In addition, a case report presented a patient who developed bilateral vocal cord paralysis after an acute infection with the herpes simplex virus [15]. In addition to the causes mentioned, some authors advocate that the surgical procedure itself due to the stress inherent in the manipulation of structures can promote changes in the patient's immune system, providing a latent viral reactivation that could cause neuropraxia [16].

DRLNP is extremely rare in previous surgical approaches to the cervical spine, having been documented mainly in studies dealing with thyroid surgery [10–17]. To our knowledge, this is the second case report of DRLNP in patients undergoing ACDF. The first report by Yemeni et al. dealt with a 75-year-old woman with myeloradiculopathy who presented with motor and sensory symptoms and chronic urinary incontinence.

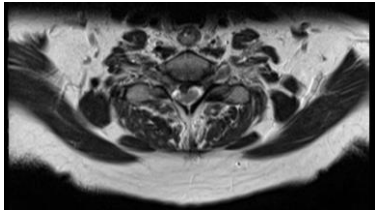

Figure 2: Preoperative cervical spine MRI T2 weighted in axial view, demonstrating spinal compression in C7 level.

The patient underwent C4–C7 ACDF with the iliac crest bone allograft substituting the intervertebral spaces. In the report by Yemeni et al., there were also no symptoms of laryngeal nerve palsy in the immediate postoperative period; however, on postoperative day 3, the patient developed hoarseness and dysphagia with an examination confirming left vocal cord paralysis. After treatment with steroids and speech therapy, at the 6-month follow-up visit, her hoarseness and dysphagia symptoms have resolved spontaneously without any additional intervention. Comparing our case to that of Yemeni et al., the profile of the patients and surgical approaches used were similar. However, the appearance of symptoms in our report occurred later, with only partial recovery of the deficit. Based on what has been reported in the literature, we believe that the delayed neuropraxia of the laryngeal nerve ipsilateral to the operated side is due to changes in the microvasculature or immune response, while early manifestations are due to direct nerve damage or manipulation of surrounding structures.

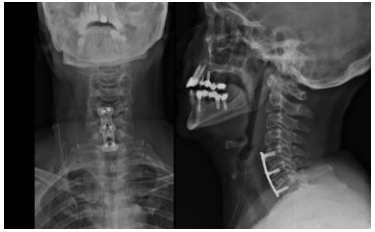

Figure 3: Post-operative x-rays demonstrating proper position of the cervical spinal implants.

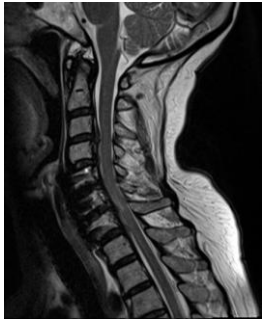

Figure 4: Pos-operative cervical spine MRI T2 weighted in sagittal view, demonstrating improvement of stenosis in the cervical canal after decompression and fusion.

Conclusion:

Therefore, RLNP is a complication still poorly described in the neurosurgical literature in the context of ACDF, especially when it occurs late. Although some hypotheses on the mechanisms justifying the late onset of symptoms of injury have already been described, the etiology and pathophysiology of DRLNP remain unknown. Given this situation, further studies should be conducted to establish the definitive causes of DRLNP.