

# Bilateral vocal cord paralysis due to direct invasion of right and left recurrent laryngeal nerves in a small cell lung cancer patient

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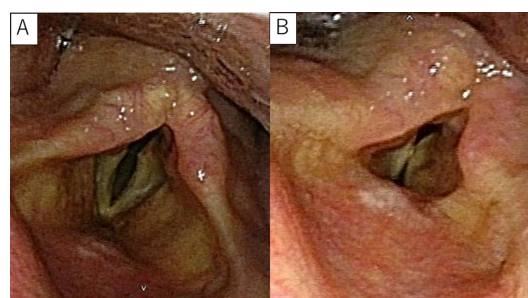
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## DESCRIPTION

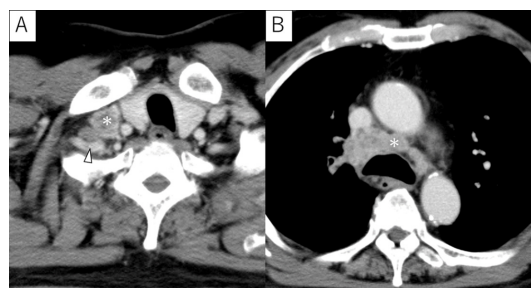
A 67-year-old man presented to our department with a 2-day history of dyspnoea and worsening voice hoarseness. He had a smoking history of 92 pack-years, and had been on chemotherapy for extensive small cell lung cancer for 7 months. His treatment history was complicated by a right vocal cord paralysis confirmed laryngoscopically 2 months prior to consultation, and voice hoarseness persisted thereafter. At that time, the right recurrent laryngeal nerve injury was suspected to have been caused by a mass lesion located near the right subclavian artery (figure 1A). On arrival, vital signs and physical examination yielded unremarkable findings, without any signs of stridor or lung crackles. Careful inspection of the CT of the chest revealed progression of mass lesions under the aortic arch, which was suggestive of a left recurrent laryngeal nerve injury (figure 1B). Laryngoscopy revealed both vocal cords in the paramedian position with minimal symmetrical mobility and the presence of a phonation gap, indicating bilateral vocal cord paralysis (BVCP) (figure 2). Subsequently, he continued with another chemotherapy without any intervention, as the vocal cords were fixed open, which would unlikely lead to upper airway obstruction. Monthly laryngoscopy revealed no improvement in the mobility of the vocal cords. Finally, he died due to pneumonia after 2 months postdiagnosis of BVCP.

BVCP is a rarely reported condition in malignancies. Some of its reported mechanisms include paraneoplastic neuropathy, iatrogenic injuries such as surgical complications and immune-related



**Figure 2** Laryngoscopy images revealing bilateral vocal cords in the paramedian position with minimal symmetrical mobility (A) and the presence of a phonation gap (B), indicating bilateral vocal cord paralysis.

adverse events due to immune checkpoint inhibitors.<sup>1–3</sup> However, in our case, BVCP was due to the direct invasion of both recurrent laryngeal nerves by separate lesions at different onsets, a condition rarely reported in the literature. It is important to understand that the recurrent laryngeal nerves loop at different levels: at the subclavian artery for the right and the aortic arch for the left.<sup>4</sup> Additionally, this aetiology is distinguishable from other mechanisms due to the unique progression pattern of voice hoarseness, which occurs in a stepwise manner, as described herein. Moreover, BVCP is a serious condition that may be fatal due to airway obstruction.<sup>5</sup> Although we could not predict this patient's BVCP, he was fortunate to have his airway preserved. For such cases, a careful investigation of the underlying cause of the vocal cord paralysis and awareness of the potential future risk of BVCP is beneficial, as it may enable clinicians to discuss possibilities of future conditions with the patient. For a patient largely at risk for upper



**Figure 1** A CT slice showing a mass lesion (white star) located near the right subclavian artery (white arrowhead), obstructing the right recurrent laryngeal nerve (A). A CT slice showing multiple mass lesions (white star) located under the aortic arch, obstructing the left recurrent laryngeal nerve (B).

## Learning points

- ▶ A rare case of bilateral vocal cord paralysis (BVCP) was reported in a small cell lung cancer patient, caused by the direct invasion of both recurrent laryngeal nerves by separate lesions at different onsets.
- ▶ When clinicians encounter a lung cancer patient with unilateral vocal cord paralysis, it is critical to search for lesions obstructing the contralateral recurrent laryngeal nerve to assess future risk of BVCP and discuss airway management in advance.



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airway obstruction, surgical interventions such as tracheostomy or cordotomy, as well as botulinum toxin injection, may be performed. In this case, we mainly continued with the clinical course considering the highly invasive nature of the procedures. When clinicians encounter a lung cancer patient with unilateral vocal cord paralysis, it is critical to search for lesions obstructing the contralateral recurrent laryngeal nerve to assess the future risk of BVCP and discuss airway management in advance.

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