

# Vocal Cord Paralysis Following I-131 Ablation of a Postthyroidectomy Remnant

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Vocal cord paralysis has been reported following I-131 therapy of thyrotoxicosis and following ablation of the whole thyroid. However, this rare complication has not previously been described following I-131 ablation of a postthyroidectomy remnant. We report a patient who required tracheostomy for bilateral vocal cord paralysis following I-131 ablation after near-total thyroidectomy for papillary thyroid carcinoma.

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Injury to the recurrent laryngeal nerve is a recognized hazard of thyroid surgery. However, there have been only four reports of cord paralysis following I-131 therapy; three for hyperthyroidism (1-3), and one case following ablation for the whole thyroid (4). Bilateral vocal cord paralysis following I-131 therapy after near-total thyroidectomy has not been reported. The present case is reported to alert clinicians to the possibility of this rare complication, which may become more common with increasing use of near-total thyroidectomy for differentiated carcinoma of the thyroid.

## CASE REPORT

A 40-yr-old woman presented with a 2-mo history of a neck mass without prior radiation to the neck. Physical examination revealed a small nodule in the left lobe of the thyroid. No cervical nodes were palpable. An I-131 thyroid scan confirmed a 2-cm solitary cold thyroid nodule and ultrasonography established the mass to be solid. Fine needle aspiration biopsy was consistent with papillary thyroid carcinoma. Serum thyroid hormones were normal, x-rays demonstrated no abnormal cervical calcifications, and there was normal movement of both vocal cords preoperatively.

At surgery, it was apparent that tumor had invaded the overlying muscles. Intraoperative biopsy confirmed malignancy and a near-total thyroidectomy was performed which included the involved muscle and ipsilateral regional lymph nodes. Both recurrent laryngeal nerves were identified and care was exercised to prevent injury during the procedure. As the endotra-

cheal tube was withdrawn after the operation, laryngospasm developed and reintubation was required. Several attempts at extubation were unsuccessful because of stridor and the endotracheal tube was left in place for 24 hr. The next day, following extubation, the patient continued to experience some stridor. Direct laryngoscopy confirmed that the cords moved poorly, but were otherwise unremarkable. Methylprednisolone 40 mg daily was administered and, over the course of 10 days, normal cord motion was reestablished.

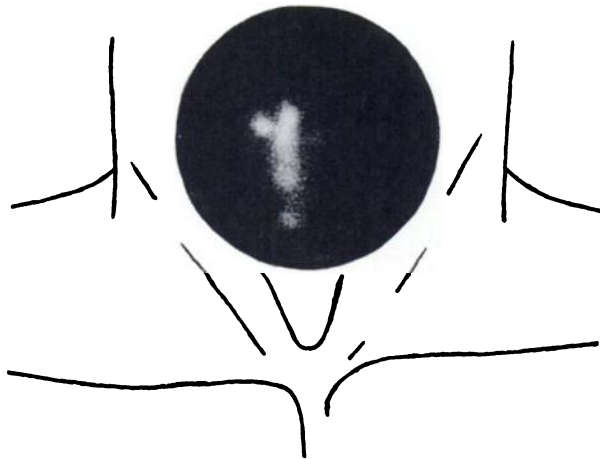
The final pathologic diagnosis was infiltrating well-differentiated carcinoma, primarily papillary variant with direct extension to the cervical musculature. Regional lymph nodes were free of metastatic disease.

After the fourth postoperative week, the neck incision was well healed and the patient's TSH levels exceeded 50 IU. The patient was given 5 mCi (185 MBq) of I-131 orally. The I-131 uptake measured 0.8% of the administered dose in the right thyroid remnant at 24 hr (Fig. 1). There was no residual thyroid on the left. Thirty-three days after surgery, she was given 150 mCi (5.55 GBq) of I-131 orally to ablate the residual thyroid tissue. The distribution of the therapeutic dose of I-131 was identical to the tracer dose distribution. The patient experienced mild sialoadenitis which was relieved by hard candy and forcing fluids. Gradually, over the next 72 hr, she developed severe laryngeal stridor. Indirect laryngoscopy revealed both cords to be paralyzed and some laryngeal edema was present. A tracheostomy was performed.

Four weeks later, slight abduction was noted in both cords. Eight weeks following tracheostomy both cords moved normally. The tracheostomy tube was closed for several days without ill effect and subsequently removed. In the 12 mo since extubation, no laryngeal or respiratory problems have recurred.

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**FIGURE 1**  
Anterior pinhole image of functioning postsurgical thyroid remnant. The uptake of I-131 was 0.8% of administered dose at 24 hr

## DISCUSSION

The relatively rapid onset of laryngeal stridor following administration of I-131 strongly suggests a causal relationship between recurrent laryngeal nerve injury and the therapy with I-131. If the following dosimetric assumptions are made:

1. 1 g to 2 g of thyroid tissue were left in the neck to preserve parathyroid function;
  2. The maximum uptake of 0.8% of 150 mCi of I-131 was reached in 12 hr;
  3. The effective half-life of I-131 in the thyroid is 6 days;
  4. The S-factor for a 20-g thyroid is 0.022;
- then the cumulated dose in 48 hr would be from 10,000 to 20,000 rad, depending on the remnant size. This amount of radiation and dose rate could be expected to produce local edema, which in proximity to the right recurrent laryngeal nerve, might result in neuropraxia.

To induce complete vocal cord paralysis both recurrent laryngeal nerves must be affected. When only one side is involved, the airway is adequate. However, vocal stridor may occur until one cord compensates by adducting over to the opposite cord. If both abductor and

adductor motor groups are involved and nerve injury is bilateral, an airway problem usually develops, necessitating tracheostomy (5). Because of the postsurgical stridor it must be assumed that the patient sustained injury to the left recurrent laryngeal nerve during surgery. Presumably, the addition of right-sided edema from radiation thyroiditis was sufficient to induce bilateral nerve injury. We can conceive of no other explanation for the stridor and obvious respiratory distress in this patient.

This case has certain features similar to a case described by Pochin in 1956 (4). A patient with extensive cervical metastases who had stridor prior to I-131 therapy was deemed unsuitable for thyroidectomy. Consequently, he was given an ablation dose of 80 mCi. Respiratory difficulty increased rapidly within a few hours of therapy and tracheostomy became necessary 18 hr after the dose. Pochin wrote:

Since edema may develop in the region of the thyroid or a functioning metastasis after therapeutic radioiodine, caution should be observed after the ablation dose, as after other doses, where the trachea is grossly narrowed by tumor tissue, even if the latter has not been shown to concentrate iodine; and intubation and tracheostomy sets must be part of the equipment of a radioiodine ward although they will probably never be used.

Pochin's advice is as appropriate now as it was 30 years ago.

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