Bilateral Hypoglossal Nerve Injury After Bilateral Carotid Endarterectomy

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A case of severe bilateral injury to the hypoglossal nerves after two-stage carotid endarterectomy is described. Injury to the hypoglossal nerve occurs in up to 20% of patients undergoing carotid endarterectomy and may result in mild or unnoticed deficits. These injuries must be carefully searched for in patients who will undergo a similar procedure on the opposite side since a bilateral deficit of the hypoglossal nerve is poorly tolerated, causing potentially serious impairment of speech and risk of aspiration. (Stroke 1988;19:261-262)

Trauma to the hypoglossal nerves is known to occur due to excessive manipulation or traction in 1-20% of patients undergoing carotid endarterectomy.1-3 Unilateral injury of this type to the hypoglossal nerve causes mild and transient deficits often unacknowledged by patients or overlooked by surgeons. Some patients with these deficits subsequently undergo contralateral carotid endarterectomy, and the other hypoglossal nerve may be injured resulting in major speech handicaps and risk of aspiration. This article describes such a case, reviews the pertinent literature, and emphasizes the importance of recognizing a mild "asymptomatic" injury to the hypoglossal nerve when subsequent contralateral carotid endarterectomy is planned.

Case Report

A 67-year-old man had had brief episodes of generalized weakness and inability to speak for which he was hospitalized elsewhere. Carotid angiography revealed moderately severe bilateral stenosis of the carotid arteries, and right carotid endarterectomy was performed. The patient recalled no symptoms or deficits postoperatively except for some neck pain. Carotid endarterectomy was performed on the other side 6 days later. The patient noted some difficulty with breathing and speech the next day. When the patient was initially seen at the Lahey Clinic Medical Center 2 weeks after the second carotid endarterectomy, he complained of difficulty in swallowing liquids and changes in his speech.

On physical examination, the patient was dysarthric, particularly for lingual sounds; bilateral weakness of the tongue, with inability to elevate or protrude it, was also present. No asymmetry of the tongue position at rest, atrophy, or fasciculations were noted. Electromyography performed 5½ weeks after initial carotid endarterectomy revealed abnormal insertional activity with spontaneous fibrillations in the lingual and infrahyoid muscles bilaterally associated with a considerable diminution in number of motor units firing, with the right side affected more than the left. Findings on computed tomography of the neck were unremarkable. Dysarthria and difficulty in chewing and swallowing resolved slowly, and by 6 months the patient was free of symptoms.

Discussion

Carotid endarterectomy is a well-accepted and frequently used therapeutic approach to carotid artery disease. Awareness of the possibility of injury to various cranial and cervical nerves that traverse the operative field has been heightened by many reports,1-4,10-15 with consequent improvement in surgical technique. However, the incidence of injury to the hypoglossal nerves continues to vary from 5 to 20% in most studies, with the exception of two series of <1%6 and 3%.12 Although unilateral deficits may be mild and patients may have no symptoms, such deficits interfere with mastication, swallowing, and articulation of speech. The incidence of these complications is also higher in prospective studies1,4,6 in which patients are examined by neurologists and speech pathologists.

In general, these neurologic deficits subside within 1-6 months. However, documentation of these deficits in the records of patients who will require carotid endarterectomy on the opposite side is very important. Bilateral palsy of the hypoglossal nerves is poorly tolerated and may cause upper airway obstruction in the immediate postoperative period, which on rare occasion requires tracheostomy (Table 1). Distressing symptoms associated with speech and dysphagia also occur with the risk of aspiration.

Because of these complications, great care is necessary to avoid injury to the hypoglossal nerve in patients who will require bilateral carotid endarterectomy. The second procedure should be performed only after confirmation that no deficit is present subsequent to the initial operation. If unilateral damage to the hypoglossal nerve is documented, contralateral carotid endarterectomy should be delayed for at least a few months or longer, especially if being performed for the currently controversial indication of asymptomatic carotid stenosis.16
### TABLE 1. Bilateral Hypoglossal Nerve Palsy After Bilateral Carotid Endarterectomy in Five Patients

<table>
<thead>
<tr>
<th>Authors</th>
<th>Time between operations</th>
<th>Symptoms/signs before second operation</th>
<th>Immediate postoperative complications</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imparato et al⁶</td>
<td>7 days</td>
<td>No</td>
<td>Upper airway obstruction</td>
<td>Within 4 weeks</td>
</tr>
<tr>
<td>Satiani et al¹⁰</td>
<td>7 days</td>
<td>No</td>
<td>Upper airway obstruction</td>
<td>Within 4 weeks</td>
</tr>
<tr>
<td>Bageant et al¹³</td>
<td>&lt;7 days</td>
<td>Yes</td>
<td>Upper airway obstruction; tracheostomy</td>
<td>Unknown</td>
</tr>
<tr>
<td>Gurez and Jones, present study</td>
<td>30 days</td>
<td>Yes</td>
<td>Upper airway obstruction</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>6 days</td>
<td>No</td>
<td>Minor respiratory difficulty</td>
<td>6 months</td>
</tr>
</tbody>
</table>

### References


**KEY WORDS**
- carotid artery diseases
- endarterectomy
- operative
- surgery
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