

# SHORT COMMUNICATION

# Surgical emphysema and Collet–Sicard syndrome after cryoblockade of the inferior alveolar nerve

### P. J. Willy,\* P. McArdle, † W. J. Peters ‡

\*Senior House Officer; †Locum Consultant Oral and Maxillofacial Surgeon; ‡Consultant Oral and Maxillofacial Surgeon, Department of Oral and Maxillofacial Surgery, Level 7, Derriford Hospital, Plymouth, PL6 8DH, UK

SUMMARY. We present a case of Collet–Sicard syndrome (palsy of cranial nerves IX–XII) together with cervicofacial emphysema after cryoblockade to the mandibular division of the trigeminal nerve. © 2003 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Science Ltd. All rights reserved.

# INTRODUCTION

Cervicofacial emphysema is an uncommon complication of oral and maxillofacial surgery, which is usually self-limiting and resolves spontaneously over time. Collet–Sicard syndrome has been previously reported after compression of the glossopharyngeal, vagal, accessory and hypoglossal nerves as a result of lesions at the base of the skull. To our knowledge this is the first paper to report Collet–Sicard syndrome in association with surgical emphysema.

# CASE REPORT

A 62-year-old retired operating theatre nurse was referred to the maxillofacial department with refractory trigeminal neuralgia of the mandibular division. Her medical history was unremarkable, and she smoked between 20 and 30 cigarettes a day.

Under general anaesthesia an incision was made to expose the inferior alveolar nerve at the level of the mandibular foramen. A nitrous oxide cryomachine was used, aqueous gel being applied to the cryoprobe to facilitate formation of an ice ball. The lingual tissues were retracted and the cryoprobe tip was placed in contact with the mandibular nerve. Three freeze–thaw cycles, each of 3 minutes duration, were completed. The nerve thawed rapidly between each freeze. The incision was closed with 3/0 polyglactin interrupted sutures.

During the early postoperative recovery phase she developed persistent coughing and complained of great difficulty in swallowing. She developed facial emphysema which involved the right periorbital region and cheek (Fig. 1).



Fig. 1 Extensive facial swelling in association with surgical emphysema.

The following morning she complained of dysphagia and inability to swallow saliva. Emphysematous swelling extended to the right side of the neck inferiorly as far as the clavicle and suprasternal notch. hoarseness of the voice, associated with sluggish movement of the right vocal cord. A spinal accessory nerve palsy was diagnosed as the patient had limited abduction of the right arm to  $90^{\circ}$ . Hypoglossal nerve weakness was shown by deviation of the tongue to the contralateral side on protrusion.

After 2 months the glossopharyngeal and vagus nerves had fully recovered and the weakness of the accessory and hypoglossal nerves had improved. At 4 months the patient had a full range of movement in the right arm and normal protrusion of the tongue.

### DISCUSSION

Collet–Sicard syndrome (palsy of cranial nerves IX–XII) has been reported following internal carotid dissection,<sup>1</sup> metastatic cancer,<sup>2</sup> haemangiopericytoma,<sup>3</sup> neurinoma<sup>4</sup> and head injury.<sup>5</sup>

Palsy of the lower cranial nerves has not previously been linked to cryosurgery or surgical emphysema. In our case, we suggest two possible mechanisms of neurapraxia, thermal injury from cryoblockade and soft tissue distortion from surgical emphysema.

#### Cryoblockade

Previous authors have found that the size of the ice ball varies according to the type of cryomachine used and the diameter of the tip of the probe.<sup>6</sup> Using the same nitrous oxide cryomachine and probe as at the operation, we found that freezing was limited to 5 mm from the tip of the probe in a block of red meat placed within a warming bath at 37 °C. The cryoprobe could, therefore, not have affected the structures in the carotid sheath, 30 mm away from the site of freezing of the inferior alveolar nerve.

#### Surgical emphysema

There are no previous reports of cranial nerve palsies after cervicofacial emphysema. In our case persistent coughing seems to have resulted in the passage of air into the neck. The most likely site of entry of air was the access incision as no other tears could be seen on contrast swallow and nasendoscopy.

Nitrous oxide leakage from the tip of the probe during the operation was not possible as there was no surgical emphysema during the immediate postoperative period.

Space occupying lesions within or adjacent to the carotid sheath at the level of the jugular foramen may cause palsies of cranial nerves IX-XII (Collet-Sicard



**Fig. 2** Axial CT showing air medial to the mandibular ramus and in the facial tissues with extension to the left prevertebral tissues.

syndrome). The computed tomogram (CT) showed no evidence of air or other lesion at this level (Fig. 2), but the volume of air lower down in the neck may have caused compression at the cranial base.

In summary, the exact cause of the cranial nerve palsies is not clear. The most likely cause seems to be the florid surgical emphysema with distortion of the adjacent nerves, whereas altered function of the lower four cranial nerves secondary to cryoblockade is unlikely.

#### ACKNOWLEDGEMENT

We thank the Medical Photography Department at Poole Hospital for their help with preparation of the photographs, and the Microbiology Department at Poole Hospital for providing laboratory facilities.

#### REFERENCES

- Waespe W, Niesper J, Imhof HG, Valavanis A. Lower cranial nerve palsies due to internal carotid dissection. Stroke 1988; 19: 1561–1564.
- Schweinfurth JM, Johnson JT, Weissman J. Jugular foramen syndrome as a complication of malignant melanoma. Am J Otolaryngol 1993; 14: 168–174.
- Sehitoglu MA, Uneri C, Celikoyar MM, Tutkin A, Kullu S. Haemangiopericytoma as the cause of Collet–Sicard syndrome. ORL J Otorhinolaryngol Relat Spec 1990; 52: 133–136.
- Solymosi L, Wassmann H, Bonse R. Diagnosis of neurinoma in the region of the jugular foramen – a case report. Neurosurg Rev 1987; 10: 41–46.
- Wani MA, Tandon PN, Banerji AK, Bhatia R. Collet–Sicard syndrome resulting from a closed head injury: case report. J Trauma 1991; 31: 1437–1439.

 Popken F, Seifert JK, Englemann R, Dutkowski P, Nassir F, Junginger T. Comparison of iceball diameter and temperature distribution achieved with 3 mm Accuprobe cryoprobes in porcine and human liver tissue and human colorectal liver metastases in vitro. Cryobiology 2000; 40: 302–310.

#### The Authors

P. J. Willy MFDS, RCPS Senior House Officer P. McArdle FDS, RCS, FRCS (OMFS) Locum Consultant Oral and Maxillofacial Surgeon

### W. J. Peters FDS, RCS

Consultant Oral and Maxillofacial Surgeon Department of Oral and Maxillofacial Surgery Level 7, Derriford Hospital, Plymouth, PL6 8DH, UK

Correspondence and requests for offprints to: Mr Paul McArdle FDS, RCS, FRCS (OMFS), Locum Consultant Oral and Maxillofacial Surgeon, Department of Oral and Maxillofacial Surgery, Level 7, Derriford Hospital, Plymouth, PL6 8DH, UK. Tel.: +44 (0) 1752 763764; Fax: +44 (0) 1752 763212; E-mail: PMca166431@aol.com

Accepted 13 February 2003