Available online at www.sciencedirect.com
SciVerse ScienceDirect
British Journal of Oral and Maxillofacial Surgery 52 (2014) 230–235
BRITISH Journal of Oral and Maxillofacial Surgery
www.bjoms.com

Does the great auricular nerve predict the size of the main trunk of the facial nerve? A clinical and cadaveric study

S. Colbert[a,*,1], David A. Parry[b,1], Beverley Hale[c], James Davies[d], P.A. Brennan[a]

[a] *Department of Oral and Maxillofacial Surgery, Queen Alexandra Hospital, Portsmouth PO6 3LY, UK*
[b] *Guys Campus, GKT, London SE1 1UL, UK*
[c] *University of Chichester, College Lane, Chichester, West Sussex PO19 6PE, UK*
[d] *Department of Oral and Maxillofacial Surgery, Queen Alexandra Hospital, Cosham, Portsmouth, Hampshire PO6 3LY, UK*

Accepted 2 December 2013
Available online 25 December 2013

Abstract

There seems to be only individual clinical experience and some anecdotal evidence about a relation between the width of the great auricular nerve (GAN) and the size of the main trunk of the facial nerve during parotidectomy. To our knowledge no anatomical studies have been published. In this cadaveric and clinical study we measured the widest point of the GAN as it crosses the sternomastoid muscle before it divides, and the main trunk of the facial nerve before it bifurcates. Measurements were obtained from 16 patients who required formal superficial parotidectomies with identification of the facial nerve, and from 21 cadavers (16 formalin-fixed and 5 fresh frozen) where both sides were dissected. We recorded the results and the side of dissection. The mean (SD) width of the GAN and facial nerve from all the dissections was 2.75 (0.53) mm and 2.83 (0.54) mm, respectively. There was a strong correlation between the width of the nerves from both sides (left: $r = 0.934$, $p < 0.001$; right: $r = 0.940$, $p < 0.001$). The nerves did not differ significantly in size in patients or cadavers (GAN: right, $p = 0.873$; left, $p = 0.486$; facial nerve: right, $p = 0.931$; left, $p = 0.691$). We have found that the GAN accurately predicts the width of the main trunk of the facial nerve. This is particularly useful surgically as a narrow GAN can alert the surgeon to expect a small facial nerve.

Keywords: Great auricular nerve; Facial nerve; Width; Parotidectomy; Correlation; Predictor

Introduction

The great auricular nerve (GAN) is at risk of injury during many procedures in the head and neck and is reported as the nerve most commonly injured in rhytidectomy.[1] Its deliberate sacrifice because of tumour involvement or to improve surgical access may be appropriate, but accidental iatrogenic injury is undesirable and seriously affects a patient's quality of life.[2]

The GAN leaves the cervical plexus at the posterior border of the sternocleidomastoid muscle (Erb's point) and courses anteriorly over the lateral surface of the muscle.[3] It then courses superiorly and divides into anterior and posterior branches which supply sensation to the skin overlying the parotid gland and lower pole of the ear.[4] Where possible, preservation of the posterior branch is recommended to retain sensation to the ear and neck.[5] Brown and Ord recommended its preservation during routine parotid surgery, as it is associated with less postoperative sensory morbidity.[6]

During many parotidectomies, when formal identification of the main trunk of the facial nerve has been required (as opposed to extracapsular dissection), we have thought that there might be a relation between the width of the GAN and that of the main trunk of the facial nerve when it is subsequently identified. This has been particularly relevant in

* Corresponding author. Tel.: +44 7894743416.
E-mail addresses: serryth@yahoo.com (S. Colbert), B.Hale@chi.ac.uk (B. Hale), jamesdaviesradc@gmail.com (J. Davies), peter.brennan@porthosp.nhs.uk (P.A. Brennan).
[1] Joint first authors.

0266-4356/$ – see front matter © 2013 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.bjoms.2013.12.001

patients who were found to have a narrow GAN and a narrow facial nerve trunk. Others have reported similar findings although they are anecdotal.[7,8]

Clinical studies on the GAN have primarily focused on its injury and associated postoperative sequelae, but to our knowledge no anatomical studies have investigated whether there is a relation between its width and that of the main trunk of the facial nerve. Papers published to help surgeons with dissection of the main trunk of the facial nerve during parotid surgery do not refer to any anatomical relation.[9]

We did a clinical and anatomical study to assess the relation between the GAN at its widest point as it crosses the sternomastoid muscle before bifurcating, and the main trunk of the facial nerve.

Method

This was a collaborative study between the Department of Oral and Maxillofacial Surgery, Queen Alexandra Hospital, Portsmouth; the Department of Histopathology at Salisbury District Hospital; and the Department of Anatomy and Human Sciences at Guy's Campus, Guys, King's and St Thomas' Medical School.

We studied 16 patients undergoing parotid surgery who required formal identification of the main trunk of the facial nerve, and 21 cadavers (16 formalin-fixed and 5 fresh frozen) in which both sides were dissected. The GAN was exposed, and its widest point was measured as it crossed the sternomastoid muscle using callipers in the dissection room or a small piece of cut millimetre rule in theatre (as callipers could not be sterilised). At operation, the widths of the nerves were recorded to the nearest 0.5 mm (Fig. 1A and B). In the dissection room callipers enabled a much more accurate measurement to the nearest 0.1 mm (Fig. 2A and B).

The main trunk of the facial nerve was then identified using standard surgical techniques and its width was measured before it bifurcated. The anatomical side and age of the patient or cadaver were also recorded. Statistical analysis was done with the help of IBM SPSS Statistics (version 20.0, IBM Corp).

Results

Data on 19 men and 18 women were included in the study. Sixteen formal parotidectomies (7 men, 9 women) were included and both sides of 21 cadavers were dissected (42 sides). The formalin-fixed group included 7 men and 9 women. All except one of the fresh frozen cadavers ($n = 5$) were male.

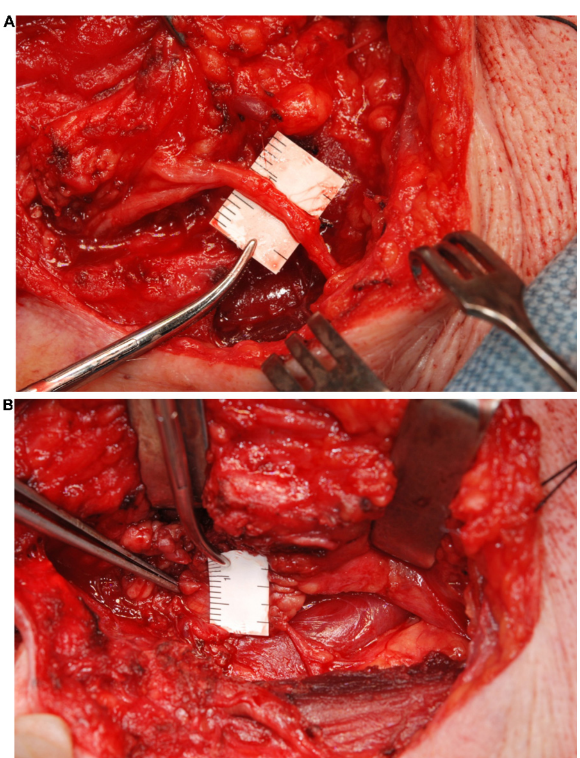

Fig. 1. Great auricular nerve (A) and facial nerve (B) measured at operation using a rule.

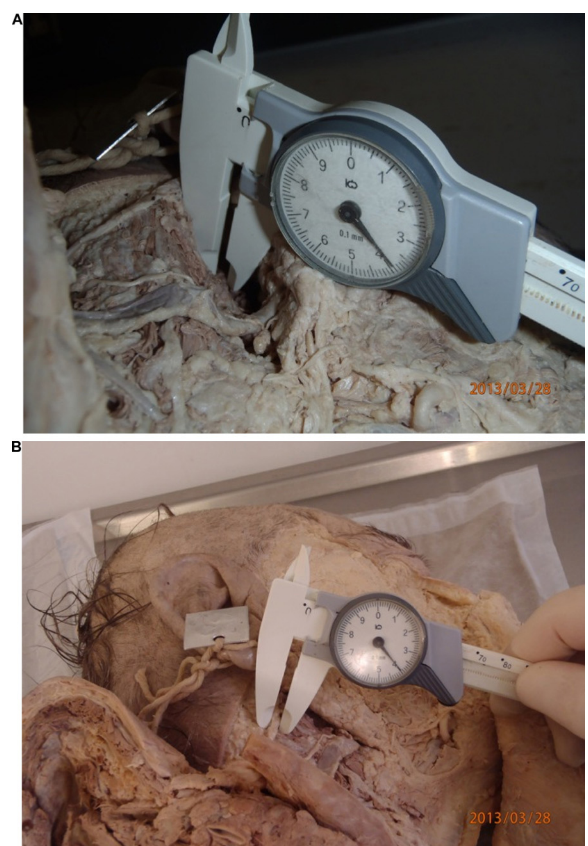

Fig. 2. Widest dimensions of the facial nerve trunk (A) and great auricular nerve (B) measured with callipers.