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Tympanic neurectomy in the management of parotid sialectasis

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Abstract

The term sialectasis refers to dilatation of the salivary ducts. Parotid sialectasis presents itself as recurrent painful swellings during mastication and/or swallowing. Our results with 10 cases treated by tympanic neurectomy over a period of nine years, from 1983 to 1992, were encouraging as seven cases had improvement of their symptoms.

Anatomy of the tympanic plexus and surgical procedure are discussed as well as a review of the literature.

We recommend extensive interruption of the secreto-motor nerve fibres by thoroughly drilling into the hypotympanum and below the basal turn of the cochlea. We also recommend that this be carried out by an experienced otologist to avoid possible complications.

Key words: Salivary gland diseases; Parotid gland; Ear, middle; Neurectomy, tympanic

Introduction

Sialectasis occurs in both adults and children and affects the parotid gland more than the submandibular gland. Hemenway (1971) classified sialectasis according to the sialogram findings into two main types, although both types can occur in the same patient:

(1) Large duct sialectasis due to obstruction leading to dilatation of the main duct and its branches.

(2) Small duct, punctate or terminal sialectasis in which there are multiple small round opacities at the termination of the smaller ducts. However, Hemenway stated that dilated ducts are seen only infrequently and that most of the ducts seem to be partially or completely filled with hyperplastic epithelial or myoepithelial cells. He stated also that, when the injected material reaches the occluded area, the pressure builds up rapidly leading to rupture of the already weakened duct wall allowing the dye to accumulate outside the duct lumen. This appears as round opacities.

Tympanic neurectomy is a procedure aimed at reducing, or eliminating, the secretion of the parotid gland by sectioning its parasympathetic secretomotor fibres at the tympanic plexus.

Anatomy of the tympanic plexus

The tympanic plexus is situated on the promontory and is formed by the tympanic branch of the glossopharyngeal nerve (Jacobson's nerve) and the carotico-tympanic branch of the internal carotid plexus. Jacobson's nerve carries the secretomotor parasympathetic pre-ganglionic fibres to the parotid gland (Figure 1). It arises from the inferior salivary nucleus in the medulla and travels with the glossopharyngeal nerve leaving it at the jugular foramen. It then enters the middle ear cavity through a canaliculus between the internal jugular vein and the internal carotid artery (in the carotico-jugular spine). In most instances, the nerve divides on the promontory and forms an anterior branch that

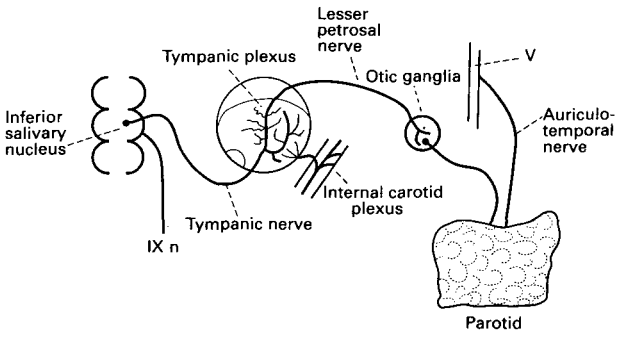

FIG. 1
Anatomy of tympanic nerve and connections.

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TABLE I
PATIENTS AND SIALOGRAM RESULTS

Patient no.	Sex	Age	Sialogram
1	M	41	Gross degree of sialectasis beading and stricture of proximal ducts
2	M	56	Normal duct and structure
3	M	35	Normal
4	M	39	Dilatation of distal duct
5	M	30	Narrow segments (4 mm) with proximal dilatation
6	F	44	Dilatation of main duct and beading of more proximal ducts
7	M	52	Beading of parotid small ducts
8	F	36	Tight stenosis in the main duct
9	F	33	Normal
10	F	46	Dilatation of central duct stone*

*No stone was found.

courses up towards the Eustachian tube and a posterior branch that skirts the rim of the round window (Townsend and Morimoto, 1973). These branches can either be covered by mucosa, run in a bony semi-canal or invisibly in an actual bony canal and are usually marked by a small blood vessel.

In 40 per cent of cases a hypotympanicum branch arises from the main trunk while it is still in the hypotympanic cells, and runs anteriorly below the promontory to reach the Eustachian tube recess (Allam, 1975).

Over the promontory it receives the caroticotympanic nerve, which arises from the sympathetic plexus of the internal carotid artery, and sends

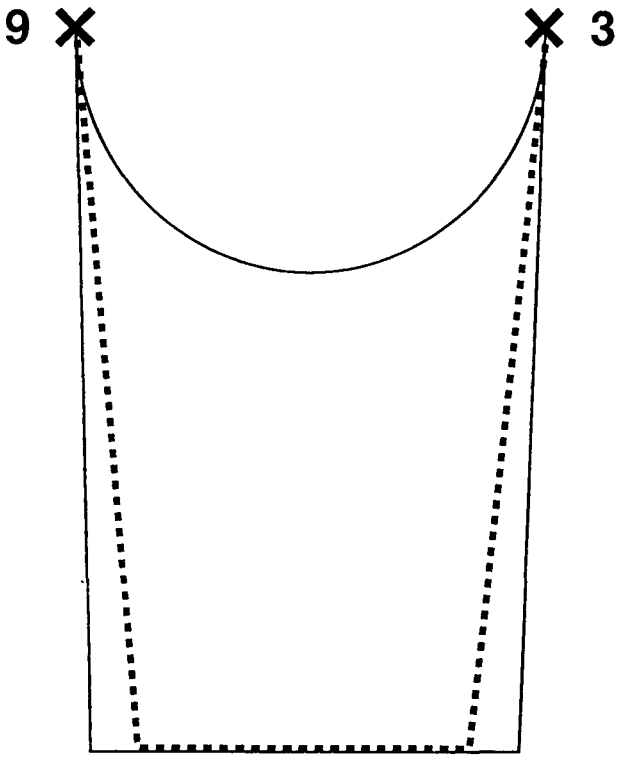

FIG. 2
Tympanotomy incisions.

sensory fibres to the mucosa of the mesotympanum, mastoid air cells and Eustachian tube. The distribution of the plexus shows no bilateral symmetry and the arborization of each tympanic plexus is individual and unique (Rosen, 1950). Jacobson's nerve then continues as the lesser superficial petrosal nerve which passes superiorly for a short distance where it lies medial to the cochleariform process, and runs anteriorly to travel either within its own canal or within the semi-canal for the tensor tympani muscle (Schuknecht, 1993).

It then reaches the anterior surface of the temporal bone and leaves the middle cranial fossa through the foramen ovale or the emissary sphenoidal foramen (Friedman *et al.*, 1974) to join the otic ganglion where pre-ganglionic fibres synapse with post-ganglionic fibres and leave the ganglion to travel with the auriculo-temporal nerve where they are carried to the parotid gland. Sympathetic fibres from the superior cervical ganglia travel with the auriculo-temporal nerve to supply the blood vessels of the parotid.

Patients and methods

Patients

Ten patients (six males and four females, with the age range of 30 to 56 years), were seen at Sandwell District General Hospital and Dudley Road Hospital from 1983 to 1992. Eight patients were referred by their general practitioner and two by general surgical colleagues.

The duration of symptoms at presentation varied from one to four years. The presenting symptoms were mainly recurrent painful swellings of the parotid glands, especially noticed at meal-times. Symptoms were severe enough to warrant surgical treatment after full discussion with the patients mentioning all possible complications. Most patients had already received multiple courses of painkillers and/or various antibiotics to no avail. All patients had sialograms, one had a CT which was normal, and one had a full blood count, ESR and immunoglobulin

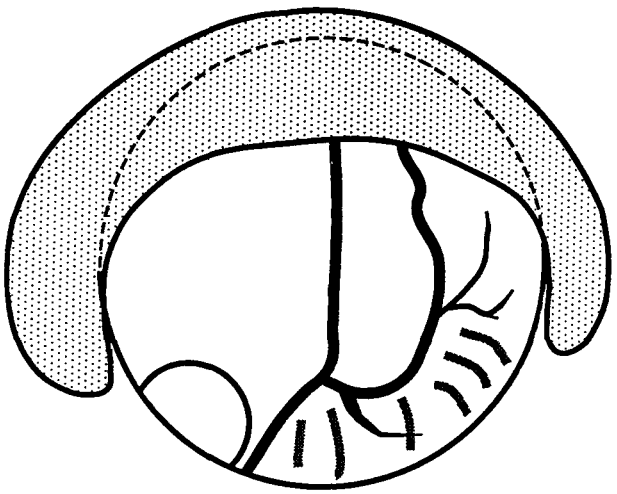

FIG. 3
Elevation of the tympanomeatal flap to expose the promontory and hypotympanum.

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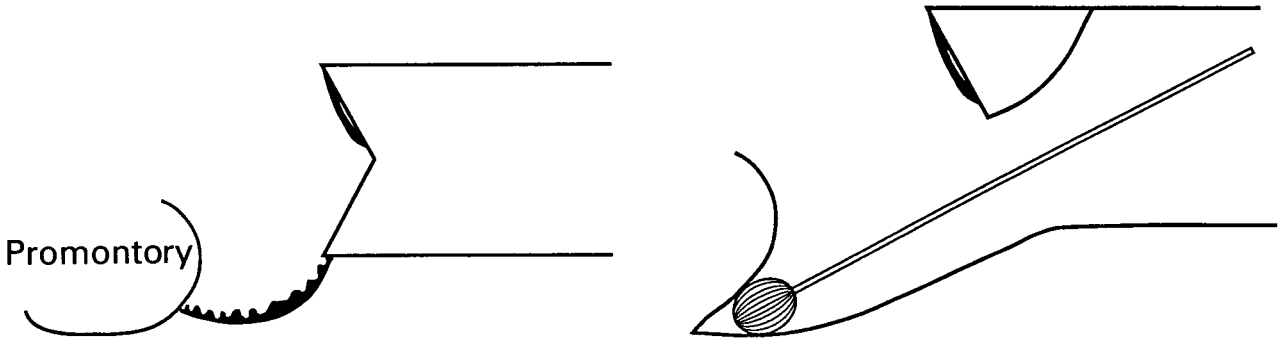

FIG. 4 AND 5

Drilling of the bony annulus inferiorly until the floor of the meatus is flush with the hypotympanum.

study as Sjögren's disease was suspected. All blood results were normal.

The sialogram results varied from normal to dilatation of the main duct, stenosis of the main duct, or beading of the proximal ducts (Table I).

Surgical procedure

The procedure was carried out under general anaesthetic with hypotension (if possible).

A tympanotomy incision was made consisting of two converging longitudinal incisions in the ear canal, from positions three o'clock and nine o'clock at the annulus and running towards the junction of bony and cartilaginous part of the meatus (Figure 2). The tympanomeatal flap was elevated upwards to expose the promontory and the hypotympanum (Figure 3). The bony annulus was drilled inferiorly until the floor of the meatus was flush with the hypotympanum (Figures 4 and 5).

The mucoperiosteum was lifted off the promontory to expose the tympanic nerve. The nerve was sectioned if it was bare, but if it lay in a bony canal then the latter was opened using a pick and/or curette. The cells in the hypotympanum were drilled to sever all the filaments of the tympanic nerve using a diamond burr. Drilling was carried forward and backwards as far as possible and medially below the basal turn of the cochlea (Figure 5). The hypotympanum cell system varied widely from a minimal air cell to involvement of most of the infralabyrinthine area of the temporal bone extending from the floor of the hypotympanum to the region of the jugular bulb (Allam, 1969). The tympanomeatal flap was then replaced and the external canal was packed with a BIPP dressing which was removed after three weeks.

Alternative procedures were considered, e.g. low dose radiotherapy to the parotid and/or ligating the parotid ducts. Both methods were discarded owing to the possibility of long-term effects of the former and short-term effects of the latter.

Results

Seven patients had a marked improvement of their symptoms with fewer episodes of swelling and only slight and infrequent discomfort during mastication. These patients were discharged twelve months later and were asked to come back if symptoms recurred. None have done so to date.

Two patients had a recurrence of their symptoms, one, three months later and the other two years later. One patient had no improvement post-operatively. All three patients thereafter underwent superficial parotidectomy. The results are shown in Table II.

Complications

One case developed an epidermoid cyst in the hypotympanum post-operatively which was removed later.

Discussion

Tympanic neurectomy was first described by Lempert in 1946 as a procedure for the relief of tinnitus. In parotid sialectasis the purpose of the neurectomy is to destroy secretomotor fibres to the

TABLE II

RESULTS OF TYMPANIC NEURECTOMY

Patient	Sex	Age	Date of operation	Post-operative result	Further management
1	M	41	April 1983	Improved	
2	M	56	May 1983	Improved	
3	M	35	July 1983	3 month improvement	Superficial parotidectomy
4	M	39	September 1983	2 year improvement	Superficial parotidectomy
5	M	30	August 1985	Improved	
6	F	44	August 1987	Improved	
7	M	52	November 1987	Improved	
8	F	36	April 1988	No improvement	Superficial parotidectomy
9	F	33	November 1990	Improved	
10	F	46	October 1992	Improved	

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TABLE III
REPORTED RESULTS

Author	Cases	Short term improvements	Long term improvements
Golding-Wood (1962)	3	3	Not reported
Resouly (1973)	3	1	1
Friedman *et al.* (1974)	4	3	3 (2–8 months) Post-operatively
Allam (1975)	5	5	5 (20–36 months) Post-operatively
Benedek-Spät and Szëkely (1985)	13	13	7 (3 years) Post-operatively
Present paper	10	9	7 (1–10 years) Post-operatively

parotid thus abolishing or reducing its secretion. Wallenborn (1968) reported atrophy of the parotid glands in rabbits 29 weeks after resection of the tympanic plexus. However, nerve regeneration and/or incomplete sectioning of the nerve are possible reasons for failure (Resouly, 1973). Friedman *et al.* (1974) reported excellent results in three out of four patients, two to eight months post-operatively and the fourth patient had a fair result in that she continued to have moderate swelling. Resouly (1973) reported improvement in one case and no improvement in two cases. Benedek-Spät and Szëkely (1985) presented thirteen cases, all did well during the first year, but three years later no improvement was monitored in seven cases. Golding-Wood (1962) reported success in his three cases though no long-term follow-up was mentioned (see Table II).

Allam, 1975 reported long-term improvement ranging from 20 to 36 months in five patients with no failures. He adopted a surgical procedure similar to the one we describe.

In our cases presented in this paper seven out of 10 patients had improvement which was enough to alleviate their symptoms. We feel that severing all the fibres in the hypotympanum through drilling is necessary to achieve better long-term results. It is to be emphasized that this procedure should be carried out by an experienced otologist.

We therefore recommend tympanic neurectomy to be the first surgical procedure in the management of parotid sialectasis.

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