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Main Article

Surgical treatment of chronic parotid sialadenitis

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Abstract

Objective: To review the results of surgical management of chronic parotid sialadenitis refractory to medical therapy, with particular respect to long-term symptom resolution and development of post-operative complications.

Methods: A retrospective review of parotidectomies performed for chronic intractable parotid sialadenitis. Information was collected about presentation, pre-operative investigations, surgical treatment, post-operative complications and outcome.

Results: 36 parotidectomies were performed for chronic sialadenitis between 1991 and 2002. Age at presentation was 56 ± 9.6 years, with median symptom duration of 2.3 years. For patients with non-specific presentations, magnetic resonance imaging (MRI) was the most useful pre-operative investigation. Superficial parotidectomy with duct preservation was the main treatment with a 94 per cent success rate, and near-total parotidectomy was reserved for patients with extensive deep-lobe involvement. Duct ligation significantly increased the risk of transient facial palsy. There was a 56 per cent and 22 per cent incidence of temporary facial paresis and Frey's syndrome, respectively.

Conclusions: Controversies exist regarding the optimal pre-operative investigation and surgical treatment of chronic parotid sialadenitis. We advocate magnetic resonance image (MRI) scanning for patients with non-specific symptoms of sialadenitis, and sialography in the presence of reasonable clinical suspicion. We propose superficial parotidectomy without parotid duct ligation as the standard of care, with near-total parotidectomy reserved for extensive deep-lobe disease.

Key words: Parotid Gland; Sialadenitis; Parotidectomy; Magnetic Resonance Imaging

Introduction

Chronic parotid sialadenitis is an inflammatory condition characterised by intermittent bouts of parotid pain and swelling, reduced salivary flow and mucopurulent secretion.[1] The primary pathological event is believed to be a reduction in parotid salivary secretion, which allows ascending bacterial colonisation of the ductal system leading to infection, with subsequent destruction and fibrosis of the acinar elements and duct ectasia.[2] Most cases are idiopathic, otherwise known as chronic non-specific sialadenitis, but some can be secondary to obstructive intraductal pathology such as stones, duct strictures or external pressure on the main duct, or non-obstructive pathology such as radiation damage or immune disorders.[1,3,4]

Around half the patients with this condition can be successfully managed with conservative therapy, which includes antibiotics, analgesia, mouthwashes, sialogogues, and gland massage.[5] However, recurrent episodes lead to progressive damage to the salivary duct system and cause parenchymal fibrosis, predisposing the patient to develop further and more prolonged inflammatory episodes and ascending infections. This leads to the development of a vicious circle with irreversible ductal and parenchymal damage.[1,3,6] These patients with recalcitrant disease need to be managed surgically, but controversy remains regarding the optimal treatment, both in respect of the amount of parenchymal resection (both superficial and near-total parotidectomy have been advocated),[7,8] and whether or not ligation of the parotid duct confers any additional therapeutic advantage.

The purpose of this study was to review our experience in the surgical management of chronic parotid sialadenitis to attempt to address some of these issues.

Patients and methods

The records of all patients presenting in the North East of England with a diagnosis of chronic parotid sialadenitis, who were treated at the departments of otolaryngology, plastic surgery and maxillofacial

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surgery by the senior authors from 1991 to 2002 were retrospectively reviewed. The present study incorporates the long-term follow up of 17 previously reported cases that were originally described as a descriptive series.[9] Data were obtained about clinical presentation, pre-operative investigations, surgical management and outcome. Data were expressed as means ± standard deviation (SD) or binomial percentages where appropriate. The influence of clinical presentation on the selection of pre-operative investigations and the impact of different potential prognostic variables, such as type of surgery or duct ligation, on symptom resolution and post-operative complications were determined with Fisher's exact test and binary logistic regression analysis. The additive effect of the presence of multiple presenting features on the choice of pre-operative investigation was evaluated using chi-square test for independence and trend.

Results

General

In the study period, 34 patients with a histological diagnosis of chronic parotid sialadenitis whose disease proved refractory to medical therapy were treated surgically. There were equal numbers of males and females and the mean age at presentation was 56 ± 9.6 years (range 4 to 87). There were two bilateral parotidectomies, with 14 and 17 unilateral left and right-sided cases, respectively.

Clinical presentation

The median duration of symptoms was 2.3 years (range two months to 10 years) and the most frequently reported symptom was a parotid mass (79 per cent). Pain was present in 53 per cent of cases and the disease followed a chronic relapsing and remitting course in 64 per cent of patients. The nature and frequency of the presenting features are given in Table I.

Pre-operative evaluation

Sialography was the most commonly used ($n = 17$) and the most useful investigation, leading to diagnostic information in all cases. Selection of sialography as the first-line investigation was determined by the presence of pain and a relapsing–remitting disease course. Of these, a history of relapsing–remitting disease had the greatest singular influence on the decision to perform sialography (likelihood ratio 15.9; $p < 0.0001$–Fisher's exact test). Pain was also significantly associated with the selection of sialography (likelihood ratio 9.7; $p < 0.005$–Fisher's exact test). No patient without these two features underwent pre-operative sialography and there was a highly significant trend toward selection of sialography in the presence of either or both these symptoms ($p < 0.0003$–chi-squared test for trend). There were no significant associations between clinical presentation and the selection of other modes of investigation.

MRI ($n = 10$) was the second most useful investigation, yielding diagnostic information in seven cases. Computed tomography (CT) and fine needle aspiration cytology (FNAC) had the lowest diagnostic yields in this series. Table II summarises the pre-operative investigations used.

TABLE I

PRESENTING FEATURES OF CHRONIC PAROTID SIALADENITIS

Presenting symptom	*n* (%)
Parotid mass	27 (79)
Pain	8 (53)
Generalised swelling	5 (15)
Intraoral pus/bad taste	5 (15)
Pre-operative facial nerve palsy	0 (0)
Course of the disease:	
Progressive	12 (35)
Relapsing–remitting	22 (65)
Duration of symptoms	months ± SD 27 ± 30 (range 2–120 months)

SD = standard deviation

Operative treatment

There were 19 and 17 right and left-sided operations, respectively, including two bilateral cases. There were 32 superficial and four near-total parotidectomies, the latter being reserved for patients with widespread end-stage disease affecting the deep lobe at presentation. The choice of the exact amount of tissue resected was influenced both by pre-operative investigations and planning, as well as intra-operative findings. The parotid duct was ligated in eight cases based on surgeon preference. Six patients had intra-operative facial nerve stimulation.

Pathology findings

Within the parotidectomy specimens examined, there were 30 cases of chronic nonspecific sialadenitis, two cases of chronic sclerosing sialadentis and four diagnoses of chronic obstructive sialadenitis. Seven secondary diagnoses were made, the most common being benign cysts and sialadenosis. The pathological findings are summarised in Table III.

Post-operative complications

There were 20 cases of post-operative facial nerve palsy (56 per cent), all but one of which resolved, with the majority of patients having normal facial nerve function (House and Brackmann score of I or II), within 12 months of the operation (Figure 1). There were no significant differences between the different operating surgeons in respect of the incidence of post-operative facial palsy. In one patient, post-operative facial palsy did not significantly recover after 23 months of follow up. This patient had undergone a superficial parotidectomy, and the nerve had been judged anatomically intact at the end of the procedure. There were no specific patient or operative factors associated with this case.

There were eight cases of Frey's syndrome, starting on average six months after surgery, lasting an

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TABLE II

PRE-OPERATIVE INVESTIGATIONS

Investigation (*n*)	Diagnostic (*n*)	Non-diagnostic (*n*)
Sialography* (17)	Calculus (6) Sialadenitis (5) Sialactasia (6) Duct stenosis/dilatation (4)	0
FNAC (13)	Sialadenitis (3) Cyst (3)	Inconclusive (5) NAD (2)
MRI (10)	Gland inflammation (5) Duct pathology (2)	Nonspecific mass (3)
CT (7)	Calculus (1)	Nonspecific mass (6)
Ultrasound (6)	Inflammation ± nodes (2) Calculus (1)	Nonspecific mass (2) Nonspecific cyst (1)

FNAC = fine needle aspiration cytology; MRI = magnetic resonance imaging; CT = computed tomography; NAD = no anomalies detected

average of 22 ± 6.7 months. All cases were successfully managed conservatively. There were three salivary fistulas which were managed conservatively, and three wound infections which settled with oral antibiotics. Table IV provides details of post-operative complications.

Logistic regression analysis could not identify any pre- or intra-operative factors associated with the development of Frey's syndrome. Parotid duct ligation was however associated with a significantly higher incidence of temporary facial nerve dysfunction post-operatively ($p < 0.05$; chi-square test), predominantly affecting the zygomatic and buccal branches. The type of operation (superficial versus near-total parotidectomy) and whether or not intra-operative facial nerve stimulation had been used were not ($p > 0.3$), although these finding needs to be interpreted with caution given the relatively small sample size. On logistic regression analysis, ligation of the parotid duct was the only independent predictor of post-operative facial nerve paresis ($p < 0.05$).

Outcome

Patients were followed up for an average of 35 months (range 26–48 months). Eighty-five per cent of patients with a superficial parotidectomy reported complete resolution of symptoms and a further 9 per cent reported minimal residual symptoms for which they required no further treatment. There were two cases of operative failure with superficial parotidectomy. There was one recurrence, which resolved after surgical re-exploration and further tissue excision, and in another patient deep-lobe symptoms persisted which were successfully managed with ultrasound-guided drainage.

Near-total parotidectomy led to full resolution of symptoms in three patients (75 per cent) and one patient reported residual symptoms, which did not require further operative intervention.

No factor with a statistically significant influence on the likelihood of achieving symptom resolution could be identified from logistic regression analysis and in particular, the type of operation and whether or not the parotid duct had been ligated did not significantly influence the likelihood of achieving symptom resolution ($p > 0.2$).

TABLE III

PATHOLOGIC FINDINGS

Pathological findings	*n*
Primary diagnosis	
Chronic nonspecific sialadenitis	30
Chronic sclerosing sialadenitis	2
Chronic obstructive sialadenitis	4
Associated pathologies	
Sialadenosis	2
Cysts	2
Sialactasia	1
Sialolithiasis	1
Lymphadenopathy	1

Discussion

In this study we reviewed our experience with the surgical management of histologically-diagnosed chronic parotid sialadenitis. This showed that the

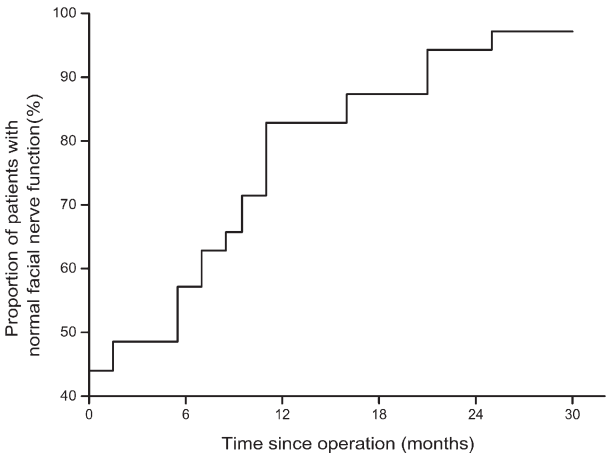

FIG. 1

Time course of recovery of facial nerve function following surgical treatment of chronic parotid sialadenitis.

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TABLE IV

POST-OPERATIVE COMPLICATIONS

Post-operative complications	*n* (%)	Recovery time in months Mean ± SEM
Facial nerve palsy		
Temporary	19 (53)	14.1 ± 2.6
Permanent	1 (3)	
Frey's syndrome	8 (22)	22 ± 6.7
Salivary fistula	3 (8)	
Wound infection	3 (8)	
Haematoma	2 (6)	
Greater auricular neuroma	1 (3) excised	
Scar hypertrophy	1 (3)	

SEM = standard error of the mean

classical clinical picture of chronic sialadenitis as a relapsing–remitting disease with intermittent bouts of parotid swelling is not seen in every patient with an eventual histological diagnosis of chronic sialadenitis. The presence of 'classical' symptoms strongly influenced the choice of sialography as the first-line investigation but an array of investigations, including CT, FNAC, ultrasound and MRI was used to investigate patients with less specific presentations. Among them, MRI was the most useful investigation and FNAC and CT provided the least diagnostic information. MRI has also been shown to be the investigation of choice for the initial evaluation of facial swellings, presumed secondary to salivary gland disease,[10] and in cases of primary parotid malignancy, for the definitive planning of surgical strategy.[11,12] We use sialography as the first-line investigation of choice when history and examination suggest the diagnosis of parotid sialadenitis, and MRI in other, less clear-cut cases. Magnetic resonance sialography has shown early promise as a non-invasive alternative to sialography, and its role in the evaluation of suspected chronic parotid sialadenitis remains to be established.[13]

The multitude of treatment options described for the management of chronic sialadenitis broadly fall into those aimed at inducing gland atrophy in situ, and those involving excision of diseased parotid tissue. Examples in the former group include parotid radiotherapy,[14] tympanic neurectomy,[15,16] ligation of the parotid duct,[6,17] and intraductal injection of sclerosing agents.[18] These treatments have not hitherto gained widespread acceptance due to a high incidence of treatment failure, and parotidectomy remains the treatment of choice for intractable chronic parotid sialadenitis. Controversy remains however about the optimal extent of tissue that needs to be resected to achieve a cure. Some authors advocate universal near-total parotidectomy, defined as a superficial parotidectomy followed by piecemeal removal of the deep lobe from between the branches of the facial nerve, based on the observation that symptoms persisted in a minority of patients following superficial parotidectomy. Casterline and Jacques compared 17 near-total with 11 superficial parotidectomies and advocated near-total parotidectomy on the basis of recurrence of symptoms in one patient in the latter group.[19] More recently, Moody *et al.* advocated a policy of routine near-total parotidectomy on the basis of an 11 per cent incidence of salvage near-total parotidectomy following failure of superficial parotidectomy in their series.[7] The incidence of treatment failure requiring reintervention following superficial parotidectomy in our series was lower at around 5 per cent and those patients did not require a salvage near-total parotidectomy to achieve successful symptom resolution. In this respect our results are more in agreement with the findings of Amin *et al.*, who reported their experience of 23 superficial parotidectomies for chronic parotid sialadenitis.[8]

Superficial parotidectomy is aesthetically preferable to more radical surgery and there is evidence that it may also allow preservation of residual function.[8] We favour a policy of superficial parotidectomy as the mainstay of surgical treatment, with near-total parotidectomy reserved only for patients with evidence of extensive deep-lobe involvement at surgery. Our data do not show a statististical difference between the two operations in respect of the likelihood of symptom resolution, but this finding needs to be interpreted with caution because the two operations were offered to patients with quite different diseases, and the small number of near-total parotidectomies in this series. It is, however, possible that with a policy of universal superficial parotidectomy, some of the patients who did undergo near-total parotidectomy may have been left with significant residual symptoms.

- **This paper reports a retrospective review of parotidectomies performed for chronic intractable parotid sialadenitis in 36 patients**
- **Controversies exist regarding the optimal pre-operative investigation, and surgical treatment of chronic parotid sialadenitis. MRI scanning is advocated for patients with non-specific symptoms of sialadenitis and sialography in the presence of reasonable clinical suspicion**
- **Superficial parotidectomy without parotid duct ligation is proposed as the standard of care, with near-total parotidectomy reserved for extensive deep-lobe disease**

What emerges from our study and the findings of others is that superficial parotidectomy for chronic parotid sialadenitis is associated with a small incidence of incomplete symptom resolution and the need for further intervention in a minority of patients.[20] This is, however, set against avoiding more risky and radical surgery for benign disease in the vast majority of patients, with satisfactory outcomes. It is important therefore that the patients are adequately counselled about the treatment options available to them and are made aware of the relative merits of each surgical approach.

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In our series, Frey's syndrome developed in eight patients post-operatively (22 per cent), all eventually resolving after conservative treatment. Other complications also settled with conservative measures (Table IV). The incidence of temporary facial nerve palsy in our series was comparable to most published accounts,[20] and we have identified parotid duct ligation as an independent predictor of post-operative facial nerve dysfunction. This procedure does not, furthermore, appear to confer any additional therapeutic benefit, and, in our view, is best avoided.

In conclusion, we recommend MRI as the investigation of choice in cases where the diagnosis of chronic sialadenitis is in doubt, and sialography in the presence of reasonable clinical suspicions. We recommend against routine parotid duct ligation and advocate a selective operative policy, with a preference toward offering superficial parotidectomy, except when there is strong evidence of end-stage parotid disease affecting the deep lobe, in which case near-total parotidectomy is preferred.

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