An audit of surgery of the parotid gland

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The management of patients undergoing 50 surgical procedures to the parotid gland was reviewed. The overall accuracy of fine needle aspiration cytology was 87%, false-positive and false-negative rates for malignant disease both being 4%. The sensitivity, specificity and accuracy of fine needle cytology for malignant parotid tumours was 66%, 95%, and 91%, respectively, that of benign tumours (pleomorphic adenoma or Warthin's tumour) being 88%, 83% and 87%, respectively. Sensitivity, specificity and accuracy for the remaining (principal inflammatory) parotid diseases was 100%, 95% and 96%, respectively. The predictive value of a positive test for malignant tumours, benign tumours and inflammatory conditions was 66%, 94% and 75%, respectively. The negative predictive value for these conditions was 95%, 71% and 100%, respectively.

Facial nerve weakness after parotidectomy occurred in three patients (8.8%), being permanent in two cases (both malignant). Although Frey's syndrome was not recorded in any of the notes, careful follow-up revealed two cases (6%). To date there have been no local recurrences after excision of either benign or primary malignant parotid masses. One patient with squamous cell carcinoma metastatic to the parotid gland died, despite block dissection of the neck and radiotherapy.

This small series with a limited follow-up suggests that diseases of the parotid gland can be managed by general surgeons with an interest in this field. Although fine needle aspiration and ultrasonic scan may be helpful, the decision to operate should be made on clinical grounds.

Recent advances in the management of major salivary gland diseases have potential implications for their surgical treatment. The benefit of fine needle aspiration cytology in parotid diseases is debated, some claiming it alters clinical decision making in over one-third of cases (1,2). Improvements in radiological assessment have occurred with the use of ultrasound and CT scanning, nuclear magnetic resonance imaging and digital subtraction sialography (2-9). The traditional treatment of parotid gland tumours has been superficial or total parotidectomy. However, facial nerve damage can occur after 10% of parotidectomies; Frey's syndrome and local recurrence being reported in up to 40% and 2.5% of cases, respectively (10-16). In an attempt to reduce such complications, less aggressive procedures such as local capsular resection or radiotherapy, have been advocated (17-20). We reviewed our experience to determine if, in the light of these developments, diseases of the parotid gland can be managed satisfactorily in a general surgical unit.

Patients and methods

A series of 50 patients in a single general surgical firm undergoing surgery to the parotid gland between January 1989 and January 1993 were reviewed. These cases represented 92% of all surgical intervention to the parotid gland during the 4-year period. Median age at presentation was 47 years (range 17-78 years). The female to male ratio was 1.4:1. Patients were reviewed with respect to presentation, investigation, treatment and complications.

Results

Presentation

The principal symptoms were glandular swelling or pain (35 and 10 patients, respectively), only five patients being asymptomatic. Delay in presentation was common, 68%
Table I. Analysis of fine needle aspiration cytology in diagnosing malignant tumours, benign tumours and other conditions of the parotid gland

<table>
<thead>
<tr>
<th></th>
<th>True-positive (number)</th>
<th>False-negative (number)</th>
<th>False-positive (number)</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Accuracy (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malignant tumour</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>66</td>
<td>95</td>
<td>91</td>
<td>66</td>
<td>95</td>
</tr>
<tr>
<td>Benign tumour</td>
<td>15</td>
<td>5</td>
<td>1</td>
<td>88</td>
<td>83</td>
<td>87</td>
<td>94</td>
<td>71</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>19</td>
<td>1</td>
<td>100</td>
<td>95</td>
<td>96</td>
<td>75</td>
<td>100</td>
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</tbody>
</table>

PPV, Positive predictive value
NPV, Negative predictive value

of patients having had symptoms for longer than 6 months. Clinical examination revealed a mass, ductal problems (stenosis or pus) and no abnormality in 38, 4 and 8 cases, respectively. Two patients had bilateral gland enlargement at presentation.

Investigations

Fine needle aspiration cytology was performed on 25 patients with a parotid mass. In two cases there were insufficient cells for diagnosis, leaving correlation with pathology available in 23 cases (92%). One case each of suspected adenocystic carcinoma, pleomorphic adenoma and sialectasis on fine needle cytology were subsequently found to be a benign pleomorphic adenoma, low grade carcinoma, and Warthin's tumour, respectively (Table I). The false-positive and false-negative rates of fine needle cytology for malignant parotid disease were both 4%. The sensitivity, specificity and accuracy of fine needle cytology for malignant parotid tumours was 66%, 95%, and 91%, respectively, that of benign tumours (pleomorphic adenoma or Warthin's tumour) being 88%, 83% and 87%, respectively (Table I). Sensitivity, specificity and accuracy for the remaining (principally inflammatory) parotid diseases was 100%, 95% and 96%, respectively. The predictive value of a positive test for malignant tumours, benign tumours and inflammatory conditions was 66%, 94% and 75%, respectively, that of a negative test, 95%, 71% and 100%, respectively. During the period of the study, 21 patients underwent combined fine needle aspiration and ultrasonic examination of the parotid glands. As a result of these suggesting benign conditions, all but one patient has avoided surgery. Needle tract implantation has not as yet been noted in any case undergoing fine needle aspiration.

Parotid operations consisted of superficial parotidectomy (50%), total parotidectomy (18%) and ductoplasty (20%). Six patients (12%) had enucleation of small tumours, lipomas or cysts. A consultant was present during surgery in 88% of parotid procedures, including all parotidectomies. The median operating time for parotid excisions was 66 min (range 35–165 min). Median hospital stay was 5 days (range 2–16 days), prolonged stay being related to medical complications or social reasons.

Complications

Facial nerve weakness occurred in three of the 34 parotid patients undergoing parotidectomy (8.8%). Permanent weakness occurred in the two cases (6%) with secondary malignancy in which the nerve was deliberately sacrificed. Although no instances of Frey's syndrome were recorded in the notes, subsequent questioning has identified 2 (6%) possible cases of this complication. There were no recurrences after excision of either benign or primary malignant parotid masses.

Three patients have required further surgery. Of the ten patients who initially underwent parotid ductoplasty, eight remained asymptomatic over a mean follow-up of 15 months, two requiring superficial parotidectomy for continuing inflammation. One parotidectomy patient subsequently required a submandibular gland excision for sialolithiasis. The only death was a patient with squamous cell carcinoma metastatic to the parotid gland, who died despite radical parotidectomy, block dissection of the neck and radiotherapy.

Discussion

Fine needle aspiration cytology had been performed on parotid swellings in our hospital for the year before the commencement of this study. Nevertheless, in cases of clinical suspicion or doubt, it was agreed that surgery should be performed at the surgeon's discretion, irrespective of the cytological diagnosis. One case therefore underwent surgery for a discrete lump despite the cytological diagnosis of sialectasis. However, this study generally supports previous reports that fine needle aspiration cytology can help in the diagnosis of parotid conditions (1,2). The false-positive and false-negative
rates for malignancy (both 4%) correspond well with ranges reported from specialised centres of 0-10% and 2-9%, respectively (21-26). The overall accuracy of aspiration cytology (87%) is also similar to previous reports (1,23).

Fine needle aspiration cytology is reportedly better at identifying benign (sensitivity 86%, specificity 97%, accuracy 96%) than malignant parotid lesions (sensitivity 60-73%, specificity 78-96%), distinction between benign and malignant conditions being possible in 87% (1,23-26). The sensitivity and specificity for benign parotid tumours in this study were 89% and 83%, respectively; the corresponding figures for malignant conditions being 66% and 95%, respectively. Of malignant conditions, fine needle aspiration is most accurate at detecting mucoepidermoid carcinoma, while the accuracy of aspiration cytology for inflammatory conditions is only 35% (23).

In one study, fine needle aspiration cytology resulted in a change in clinical direction in 35% of cases (2), suggesting that it may aid clinical decision making in diseases of the parotid gland. The current study was intended to determine the value of fine needle aspiration in our institution. In such circumstances, the final arbiter is the pathology of the excised specimen. Cases of clinical doubt therefore underwent surgery, rather than a 'wait and see' policy. Consequently, it is difficult to accurately ascertain the proportion of patients in whom cytology would have altered clinical management. However, during the period of the study, a further 21 patients had fine needle cytology and ultrasound scan performed, with only one patient subsequently undergoing surgery. This operation rate is less than our previous experience, implying that, at least combined with ultrasound scan, fine needle cytology may affect clinical decision making in our unit.

Ultrasound scan has been advocated as the radiological investigation of choice for salivary gland lesions, with a sensitivity approaching 100% (5,8,22). In our limited experience, ultrasound scan was a useful adjuvant to fine needle aspiration. Ultrasound is reportedly of value in detecting malignancy, when it can accurately assess the extent of invasion or presence of nodal metastases (5,8,22). CT scanning or nuclear magnetic resonance imaging can also assess malignant lesions, but appear to offer little advantage over ultrasound, except in lesions of the deep lobe, which can be difficult to visualise ultrasonically (27).

Two-thirds of our patients with inflammatory swelling of the parotid gland were treated satisfactorily by ductoplasty. This simple, safe and rapid procedure should be considered in those selected cases of parotid inflammation with a stricture located only at the duct orifice, as it often relieves symptoms with no significant complications. Most of our patients with parotid lesions underwent superficial or total parotidectomy. Some degree of facial nerve dysfunction is common immediately after parotidectomy, being reported in 46% of the Cleveland Clinic's experience (14). Other, often specialised centres, report a clinically detectable but transient facial weakness in up to 25% of cases (10,15,28,29). The majority resolve, palsy present for longer than 3 months occurring in 0.7-7% of cases (10-12,14,28-30). Facial nerve palsy was noted in 8.8% of our patients undergoing parotidectomy, being permanent in two malignant cases (6%). Multivariate analysis identifies age as the only factor that increases the risk of facial nerve weakness, the type and duration of surgery being unimportant (28).

The incidence of Frey's syndrome after superficial parotidectomy varies widely from 2-43% (10-13,15,18). This is at least partly related to the enthusiasm with which the condition is sought and the time interval after surgery. Examination of the notes failed to reveal any instances of this complication in our patients, yet careful questioning identified 2 (6%) possible cases. As symptoms become manifest about 2 years after surgery, more of our patients may subsequently present with Frey's syndrome.

It has recently been claimed that extracapsular lumpectomy almost eliminates facial nerve damage and Frey's syndrome with an acceptable recurrence rate of 6% (18,19). Superficial parotidectomy in these reports was associated with facial nerve damage in 2.5%, Frey's syndrome in 40% and local recurrence in 2.5% of cases; the authors suggesting that, in selected cases, extracapsular excision is preferable to superficial parotidectomy (18). Most other authors, however, have reported recurrence after 13% of local excisions (10,13), superficial parotidectomy being associated with the lowest recurrence rate for benign disease (0-2.5%) (10-13,15,18). It is therefore suggested that superficial parotidectomy is the appropriate operation for most benign and some malignant tumours confined to the superficial lobe (10,11,13,30). In selected cases of small, very superficial lesions, extracapsular resection may be considered (18,19). Six of our patients underwent enucleation for small tumours, lipomas or cysts. We accept that a significant proportion of cysts turn out to be neoplasms, so that there is a theoretical risk of recurrence. However, this has not occurred to date in our limited experience.

In this series, adjuvant radiotherapy was restricted to malignant cases. Adjuvant radiotherapy has been advocated to reduce recurrence in both benign and malignant disease, as it avoids the complications of 're-do' surgery. Immediate radiotherapy has been recommended for benign conditions if spillage occurs or surgery has been inadequate (18). However, Watkin and Hobsley (31) have shown that radiotherapy has no significant advantage in terms of recurrence-free interval or in limiting the ultimate surgery required. Radiotherapy is not without complications, being associated with fistulation in 0.5% and radionecrosis in 1.5% (17). Routine postoperative radiotherapy for malignancy is associated with 5-year survival of 55-95% (16,20,32,33), but only 25% in the presence of clinically apparent residual disease (16). Others believe that radiotherapy should be reserved for recurrence (16,20,32,33). However, radiotherapy alone is not recommended in most malignant cases as it is associated with a recurrence rate of 60% and 5-year survival of only 26% (20).

Currently, the three patients with primary malignant
disease in this study are alive and disease-free. Reports suggest that nodal or distant metastases are identified at presentation in 15% and 25–45%, respectively, of malignant cases (33,34). Prognosis is related to tumour grade, the TNM classification and the presence of preoperative facial nerve involvement (32,34–36). Multivariate analysis reveals other prognostic factors to be age >60 years, residual disease, nodal involvement and poor tumour differentiation (32). In future, DNA ploidy may be of some benefit (37).

In conclusion, this small series with a limited follow-up suggests that diseases of the parotid gland can be managed by general surgeons with an interest in this field. Fine needle aspiration and ultrasonic scan are useful preoperative investigations, but the final decision to operate should be made on clinical grounds. Superficial parotidectomy is advised for most benign lesions confined to the superficial lobe, although enucleation may be considered in selected cases with small, mobile lesions.

References


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