Chapter 5

Treatment of benign parotid tumours

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Introduction

About 80% of parotid tumours are benign. Of these, the most common histological subtype is pleomorphic adenoma (65%,) followed by adenolymphoma or Warthin's tumour (25%). Other adenomas, e.g. basal cell adenomas and oncocytomas, are far less common (Spiro 1986, Sungur *et al.* 2002).

The only adequate therapy of parotid benignomas is a complete surgical removal of the lump. However, for benign disease the exact extent of the surgical procedure remains controversial: superficial or total parotidectomy is still regarded as the gold standard procedure by many surgeons (Guntinas-Lichius *et al.* 2006a), while less invasive techniques have been developed and practised by an increasing number of groups during the last two decades (McGurk *et al.* 1996).

Historical development

In the first half of the 20th century benign parotid tumours were often treated by (intracapsular) enucleation, i.e. the tumour was exposed, the capsule opened and the contents removed leaving the capsule *in situ* (Benedict 1930, Rawson *et al.* 1950). The rate of tumour recurrence with this technique was relatively high (20–45%) (McFarland 1936, Patey and Thackray 1958, Owen *et al.* 1989, Natvig and Soberg 1994, McGurk *et al.* 1996, McGurk *et al.* 2003, O'Brien 2003, Papadogeorgakis *et al.* 2004). Over the following decades the technique of parotidectomy was refined, first in the sense that the tumour was removed *in toto* with surrounding glandular tissue and secondly that the facial nerve was fully dissected using an anterograde or retrograde approach (Janes 1940, Patey and Thackray 1958). The term 'superficial parotidectomy' was used if only the outer part of the gland, i.e. the part lateral to the facial nerve, was removed, or 'total parotidectomy' if the tissues deep to the nerve were also removed. The adoption of these two techniques in the 1950s coincided with the reduction of recurrence in pleomorphic adenomas to 0–5%, which is regarded as acceptable (Laccourreye *et al.* 1994, Guntinas-Lichius *et al.* 2006a). However, the dissection of the facial nerve and its branches together with the removal of large parts of the parotid gland can lead to significant postoperative complications. These cannot be ignored, taking into account that a benign lesion is being treated. The rates of temporary and permanent facial nerve paresis are reported to be 15–25% and 5–8% respectively after superficial parotidectomy and as high as 20–50% and 5–10% respectively after total parotidectomy (Rehberg *et al.* 1998, Roh *et al.* 2007, Zernial *et al.* 2007). There is also a risk of clinically obvious Frey's syndrome, the incidence of which has been reported by some authors to be over 10% after superficial parotidectomy and over 30% after total parotidectomy (Prichard *et al.* 1992, Hancock 1999, Guntinas-Lichius *et al.* 2006a).

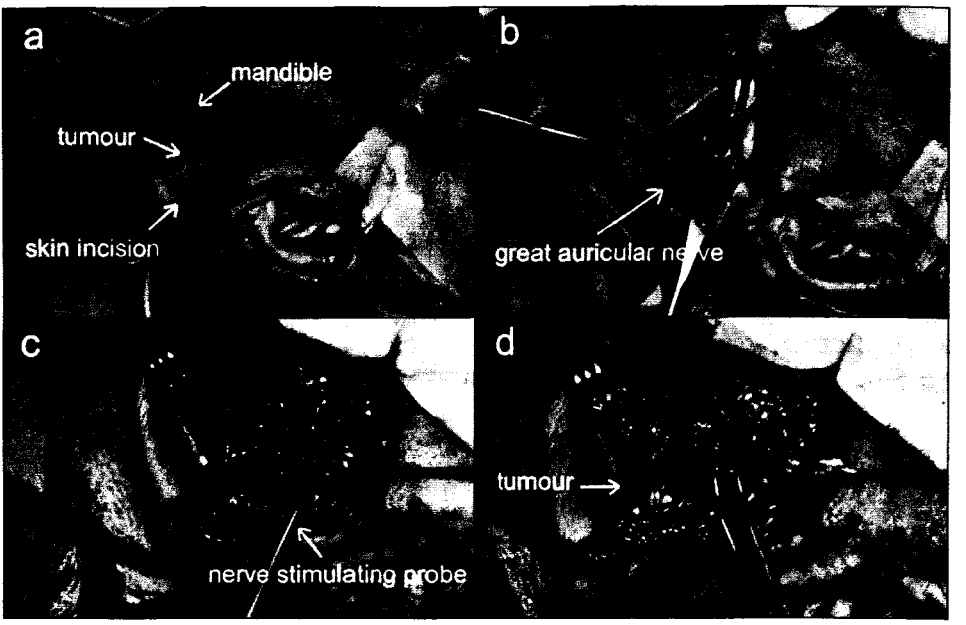

Fig. 5.1 Extracapsular dissection of a pleomorphic adenoma of the parotid gland: (a) Marking of tumour and mandible before skin incision around the earlobe. (b) Preparation of skin flap and subcutaneous tissue with preservation of the great auricular nerve. (c) Use of facial nerve monitoring (stimulation probe) during dissection of glandular tissue. (d) Direction of preparation is always off the tumour when separating it from the gland.

In view of these and other complications, over the past 20 years more conservative techniques have been described (Fig. 5.1). These include partial resection of the parotid gland where less than the entire superficial part of the gland is removed and the facial nerve is dissected only in part or not at all (Gleave *et al.* 1979, Hancock 1999, McGurk *et al.* 1996). The introduction of more conservative procedures has resulted in markedly lower rates of facial nerve paresis and also Frey's syndrome. At the same time, the first published long-term observations show no increase in recurrence after circumscribed (extracapsular) resections of this type (McGurk *et al.* 1996, Hancock 1999, Witt 2002).

Regrettably, the descriptions of the surgical technique used for partial resection of the parotid gland vary greatly and consequently are confusing. A classification of parotid surgical techniques is proposed based on the extent of dissection of the facial nerve and amount of parotid tissue removed (see Chapter 1).

Facial nerve paresis

Surgery for a benign parotid tumour should ensure a complete removal of the tumour but at the same time limited the impact on the patient's quality of life. This means predominantly that the function of the facial nerve should not be impaired.

Reviewing the current literature, a conservative estimate of temporary paresis following superficial parotidectomy is 15–25% and 20–50% after total parotidectomy. Permanent facial nerve paresis varies between 0 and 10% (McGurk *et al.* 1996, Rehberg *et al.* 1998, Witt 2002,

Table 5.1 Occurrence of facial nerve paresis (FNP) after superficial and total parotidectomies of a benign tumour

Study	No. of patients	Temporary FNP		Permanent FNP	
Superficial parotidectomy					
Owen *et al.* (1989)	96	43	44.8%	10	10.4%
Prichard *et al.* (1992)	15	2	13.3%	1	6.7%
McGurk *et al.* (1996)	95	30	31.6%	1	1.1%
Rehberg *et al.* (1998)	50	11	22.0%	1	2.0%
Witt (1998)	53	9	17.0%	0	0.0%
Guntinas-Lichius *et al.* (2006a)	587	129	22.0%	35	6.0%
Zernial *et al.* (2007)	28	5	17.9%	0	0.0%
Koch *et al.* (2010)	134	34	25.6%	1	0.7%
Total parotidectomy					
Laccourreye *et al.* (1994)	229	160	70.0%	9	3.9%
Rehberg *et al.* (1998)	30	16	46.7%	3	10.0%
Guntinas-Lichius *et al.* (2006a)	376	113	30.0%	23	6.0%
Zernial *et al.* (2007)	16	7	43.8%	0	0.0%
Koch *et al.* (2010)	324	124	38.4%	10	3.1%

Guntinas-Lichius *et al.* 2006a,Zernial *et al.* 2007) (Table 5.1) depending on which papers are selected, but total parotidectomy carries the most risk with an incidence of 4–6% compared to 1–2% for superficial parotidectomy.

Guntinas-Lichius *et al.* (2006a) published a large study on the treatment of benign parotid tumours. They reported on 963 operations, of which 61% were superficial and 39% total parotidectomies with temporary facial nerve paresis in 22% and 30% respectively. In 17% of these patients the degree of paresis was House grade II, in 5% House grade III/IV, and in 4% House grade V/VI, i.e. complete paralysis. Permanent facial nerve paresis developed in 6% of all patients who underwent surgery without distinction between the various surgical techniques. Permanent House grade II paresis developed in 3.6%, House grade III in 1.7%, House grade IV in 0.6%, and House grade V in 0.2% of all patients.

The literature contains many reports with similar results. Temporary facial nerve paresis is therefore to be expected in about a fifth of patients after superficial parotidectomy and in a third to a half of patients after total parotidectomy.

Evidence suggests that the risk of temporary or permanent facial nerve paresis is significantly less after more conservative procedures such as extracapsular dissection and partial superficial parotidectomy; see Table 5.2.

McGurk *et al.* (1996) reported on 475 patients who had undergone surgery for pleomorphic adenoma. After extracapsular dissection (n = 380) 11% of patients showed temporary, and 2% permanent, facial nerve paresis, whereas after superficial parotidectomy (n = 95) the corresponding figures were 32% and 1% respectively. It is important to note that no facial nerve monitoring was performed intraoperatively in either of these patient groups. In this study the risk of temporary facial nerve dysfunction was almost three times higher after the more invasive procedure than after circumscribed resection. A similar result was obtained in a study by

Table 5.2 Occurrence of facial nerve paresis (FNP) after extracapsular dissection and partial parotidectomy of a benign tumour

Study	No. of patients	Temporary FNP		Permanent FNP	
Extracapsular dissection					
Prichard *et al.* (2992)	31	1	3.2%	0	0.0%
McGurk *et al.* (1996)	380	41	10.8%	7	1.8%
Hancock (1999)	28	2	7.0%	0	0.0%
Papadogeorgakis *et al.* (2004)	3	0	0.0%	0	0.0%
Klintworth *et al.* (2010)	377	23	6.1%	8	2.1%
Partial parotidectomy					
Rehberg *et al.* (1998)	270	5	1.9%	2	0.7%
Papadogeorgakis *et al.* (2004)	42	3	7.1%	0	0.0%
Iwai and Yamashita (2005)	49	7	14.3%	0	0.0%
Witt (2005)	30	5	16.7%	0	0.0%
Roh *et al.* (2007)	52	6	11.5%	0	0.0%

Roh *et al.* (2007): temporary facial nerve paresis occurred in 34.7% of patients after superficial or total parotidectomy but only in 11.5% of patients after partial parotidectomy. Permanent paresis occurred only after a 'conventional' parotidectomy (2%).

In 2010 we analysed own department's data for all patients who underwent an extracapsular dissection of a benign parotid tumour as a primary intervention between 2000 and 2008. From a total number of 377 patients, the facial nerve function remained unimpaired in 346 patients (91.8%), however 31 patients (8.2%) showed some degree of facial nerve weakness immediately after the operation. Most cases of paresis (87.1%) were of House–Brackmann grade II and a few (12.9%) of House–Brackmann grade III. No higher-grade functional impairment was observed. In 23 of the affected patients the facial nerve paresis resolved completely between 2–12 weeks, so the proportion of patients in this series who developed temporary facial nerve paresis was just 6.1%. The other eight patients showed persistent impairment of facial nerve function, giving an incidence of 2.1%. Seven of these patients had weakness only of the marginal branch of the facial nerve, corresponding to House–Brackmann grade II paresis, while one patient had House–Brackmann grade III paresis.

Frey's syndrome

Like facial nerve paresis, Frey's syndrome also occurs far less commonly after extracapsular dissection than after superficial or total parotidectomy; see Tables 5.3 and 5.4. Thus, in the study referred to above McGurk *et al.* (1996) found an incidence of Frey's syndrome of 38% after superficial parotidectomy compared to only 5% after extracapsular dissection. Hancock (1999) reported an incidence of Frey's syndrome of 25% after superficial parotidectomy, while Prichard *et al.* (1992) found an incidence as high as 40%, whereas neither of these authors observed any cases of Frey's syndrome after extracapsular dissection. The lower incidence of gustatory sweating after extracapsular dissection is presumably due to the fact that with this technique less glandular tissue is disrupted (McGurk *et al.* 2003, Smith and Komisar 2007) and in addition the parotid fascia can be closed over the parotid gland at the completion of the procedure.

Table 5.3 Incidence of Frey's syndrome after superficial and total parotidectomies of a benign tumour

Study	No. of patients	Frey's syndrome	
Superficial parotidectomy			
Prichard *et al.* (1992)	15	6	40.0%
Laskawi *et al.* (1996)	139	20	14.4%
McGurk *et al.* (1996)	95	36	37.9%
Rehberg *et al.* (1998)	59	5	9.1%
Hancock (1999)	73	18	25.0%
Kuttner *et al.* (2001)	69	43	62.0%
Guntinas-Lichius *et al.* (2006b)	376	13	3.5%
Koch *et al.* (2010)	134	73	54.5%
Total parotidectomy			
von Glass *et al.* (1989)	85	67	78.8%
Laccourreye *et al.* (1994)	229	151	65.9%
Laskawi *et al.* (1996)	60	10	16.7%
Rehberg *et al.* (1998)	41	15	36.7%
Guntinas-Lichius *et al.* (2006a)	234	12	5.1%
Koch *et al.* (2010)	324	226	69.7%

Table 5.4 Incidence of Frey's syndrome after extracapsular dissection and partial parotidectomy of a benign tumour

Study	No. of patients	Frey's syndrome	
Extracapsular dissection			
Prichard *et al.* (1992)	31	0	0.0%
McGurk *et al.* (1996)	380	18	4.7%
Hancock (1999)	28	0	0.0%
Smith and Komisar (2007)	27	0	0.0%
Partial parotidectomy			
Helmus (1997)	146	2	1.4%
Leverstein *et al.* (1997)	131	9	6.9%
Witt (2005)	30	2	6.7%
Roh *et al.* (2007)	52	3	5.8%
Giannone *et al.* (2008)	34	0	0.0%

Recurrence of pleomorphic adenomas

The main argument raised against techniques of circumscribed partial resection such as extracapsular dissection and partial parotidectomy is supposedly the increased risk of recurrence postulated to occur with these procedures (Patey and Thackray 1958, Guntinas-Lichius *et al.* 2006a). In this context a clear distinction must be made between the modern technique of extracapsular dissection and the historical technique of enucleation, which led to recurrence rates of 20–40% (McGurk *et al.* 1996, Smith and Komisar 2007).

A number of studies have already shown that the recurrence rate of pleomorphic adenomas is no higher with extracapsular dissection than with superficial or total parotidectomy (McGurk *et al.* 1996, Rehberg *et al.* 1998, Hancock 1999, Witt 2002). For example, after a mean follow-up period of 12.5 years McGurk *et al.* (1996) found a recurrence rate of 2% both with extracapsular dissection (n = 380) and with superficial parotidectomy (n = 95). Rehberg *et al.* (1998) reported recurrence rates of 2.3% after extracapsular dissection, 0% after superficial parotidectomy, and 15.4% after total parotidectomy. Neither Hancock (1999) nor Smith and Komisar (2007) observed any recurrences after extracapsular dissection in 42 and 27 patients respectively. The recurrence rate reported with extracapsular dissection is thus similar to that reported with superficial and total parotidectomy, namely 0–5% (Laccourreye *et al.* 1994, McGurk *et al.* 1996, Rehberg *et al.* 1998, Guntinas-Lichius *et al.* 2006a); see Tables 5.5 and 5.6.

Table 5.5 Recurrence of pleomorphic adenoma (PA) after superficial and total parotidectomies

Study	No. of patients	Follow-up (years)	Recurrent PA	
Superficial parotidectomy				
Gleave *et al.* (1979)	188	n.s.	12	6.4%
Prichard *et al.* (1992)	15	3–13	1	6.7%
Federspil *et al.* (1994)	130	3–26	6	4.6%
McGurk *et al.* (1996)	95	12.5	2	2.1%
Rehberg *et al.* (1998)	26	1–24	0	0.0%
Hancock (1999)	73	8.3	0	0.0%
Ferreira *et al.* (2005)	69	3–15	4	5.5%
Roh *et al.* (2007)	45	2–5	0	0.0%
Zernial *et al.* (2007)	28	2–20	0	0.0%
Total parotidectomy				
Federspil *et al.* (1994)	46	3–26	5	10.7%
Laccourreye *et al.* (194)	229	20	1	0.4%
Natvig and Soberg (1994)	40	7–18	1	2.5%
Leverstein *et al.* (1997)	54	7.9	2	3.7%
Rehberg *et al.* (1998)	13	1–24	2	15.4%
Roh *et al.*(2007)	4	2–5	0	0.0%
Zernial *et al.* (2007)	16	2–20	0	0.0%

n.s., not specified.

Table 5.6 Recurrence of pleomorphic adenoma (PA) after extracapsular dissection and partial parotidectomy

Study	No. of patients	Follow-up (years)	Recurrent PA	
Extracapsular dissection				
McGurk *et al.* (1996)	380	12.5	7	1.8%
Hancock (1999)	28	10.3	0	0.0%
Ghosh *et al.* (2003)	30	12.5	1	3.3%
Smith and Komisar (2007)	27	0.5–6	0	0.0%
Partial parotidectomy				
O'Brien (2003)	254	6	0	0.0%
Witt (2005)	30	10	0	0.0%
Roh *et al.* (2007)	52	2–5	0	0.0%

The theoretical argument put forward for increased recurrence, especially in the case of pleomorphic adenomas, is an incomplete tumour capsule and/or the presence of pseudopodia or satellite nodules pushing through the capsule. Consequently it seems axiomatic that there is a risk of tumour recurrence if the dissection takes place on or close to the tumour, in contrast to the *en bloc* removal achieved in superficial parotidectomy (Guntinas-Lichius *et al.* 2006a, Zbaren and Stauffer 2007). A number of studies have challenged the theory that the incomplete capsule is the main source of recurrence. Donovan and Conley (1984) found that in 60% of supposedly *en bloc* resections performed as part of superficial parotidectomy the tumour capsule was partially exposed when the facial nerve was dissected off its surface. Moreover, in 21% of cases the tumour extended to the edge of the histological specimen and in a further 40% of cases only an extremely narrow resection margin was present. Despite this, no increase in recurrence rate could be demonstrated in the patients concerned.

Ghosh *et al.* (2003) analysed a series of 83 pleomorphic adenomas, re-evaluating the histological slides in order to define risk factors for recurrence. After a mean follow-up of 12.5 years, they found a recurrence rate of 17.6% in cases where tumour cells were present at the margin, but only of 1.8% if they were found within 1 mm of the margin but not directly at it. Therefore, they conclude that a layer of connective tissue just one or two cells thick is sufficient to prevent recurrence.

In a retrospective analysis of histological specimens, Witt (2002) found that both extracapsular dissection and superficial and total parotidectomy almost always resulted in focal capsular exposure and that the recurrence rate did not differ between the various techniques.

Indications for the various surgical techniques

In benign tumours of the parotid gland, extracapsular dissection represents a realistic and safe surgical alternative to superficial or total parotidectomy. The ideal candidate is a well-defined lump (>2 cm) that appears mobile and is located in the superficial lobe of the gland. Every attempt should be made to confirm the benign nature of the lesion by fine needle aspiration cytology (FNAC) aided and abetted by ultrasound (US) evaluation. Facial nerve monitoring is a highly desirable modern adjunct to surgery that forewarns of facial nerve branches in the vicinity

of the tumour. History shows that as the surgical team become more familiar and confident with the extracapsular technique, approximately 60–70% of benign tumours are electively treated by extracapsular dissection. A series of 150 consecutive benign parotid tumours has recently been published, all of which were treated by extracapsular dissection, showing the versatility of the technique (George and McGurk 2011). It is clearly established that morbidity is significantly reduced with this conservative approach—in particular, facial nerve dysfunction. At the same time, contrary to expectation, the techniques of circumscribed partial resection of the parotid gland such as extracapsular dissection have not demonstrated increased risk of recurrence. The published data suggest low recurrence.

It should also be borne in mind that if a revision operation becomes necessary, better conditions, especially for dissection of the facial nerve, are present after extracapsular dissection than after superficial or total parotidectomy. This is because the nerve is not exposed in the course of the primary operation and consequently it is not bound up in scar tissue. Care should be taken when encountering small lumps <1 cm. Extracapsular dissection is not the technique of choice for malignant tumours. About 40% of salivary cancers are indolent in nature and initially masquerade as a benign lump. Small indolent tumours have not had time to declare their true clinical features, and attempts at FNAC frequently sample normal parotid, giving the surgeon a false sense of security. Small tumours should be managed with care.

We recommend a new approach to the surgery of benign parotid tumours which is individual and non-standardized, thus offering the possibility to apply less radical techniques such as partial parotidectomy and extracapsular dissection beside the classical lateral and total parotidectomy; see Table 5.7.

- The treatment of choice for a single and mobile benign tumour (>2 cm) located superficially within the lateral lobe should be an extracapsular dissection. It is strongly advised that facial nerve monitoring should be used in conjunction with the technique so that dissecting the facial nerve's main trunk together with all its branches can be safely avoided.
- If the tumour lies superficially, but during surgery is found to be fixed to the facial nerve, then the conservative technique can be abandoned and the surgeon reverts to a partial or lateral parotidectomy.
- For multiple tumours and tumours lying within the deep lobe of the gland, total parotidectomy or a variation thereof can be employed.

Extracapsular dissection

The extracapsular dissection technique involves a standard preauricular incision. The size and exact form of the incision can be adapted to the position of the tumour (short preauricular

Table 5.7 Non-standardized approach to surgery of benign parotid tumours: appropriate surgical techniques depend on tumour characteristics

Number of lesions	Single	Single	Single	Multiple
Localization of tumour	Superficial	Superficial	Deep	Irrelevant
Mobility of tumour	Mobile	Fixed	Irrelevant	Irrelevant
Surgery of choice	Extracapsular dissection	Partial/lateral parotidectomy	Total parotidectomy	Total parotidectomy

incision for lumps directly in front of the ear and large standard incision for peripheral lesions in the accessory parotid gland) or the fancy of the surgeon (face lift, incision in hairline). It is advantageous to inject the tissues with a solution of 1:200 000 adrenaline (epinephrine) prior to towelling the patient, as this provides an excellent bloodless field of dissection. The preauricular skin is raised in a plane just above the 'shining' parotid fascia. The flap must be freed to a minimum of 1 cm past the circumference of the lump. The cruciate incision now made over the lump must extend at least 1 cm past the edge of the tumour. This is an important point, for it facilitates subsequent dissection and allows the tumour to erupt out of the parotid tissue. Four artery clips are placed, one at each corner of the cruciate incision. Upward tension on these clips lifts the fascia away from the gland and allows it to be incised safely away from the underlying lump. The clips are retained on the parotid fascia and traction produces space in the parotid gland that permits blunt dissection around the lump. The rule is that tissue cannot be divided unless the blades of the scissors can be seen through the tissues. A second rule is that the tumour should not be retracted by instruments. The surgeon may hold the adjacent fascia with artery forceps, but ideally by finger traction. This stops inadvertent rough handling of the tumour by an overenthusiastic assistant who tries to help the surgeon by completing the operation with a Langenbeck's retractor. If branches of the facial nerve are encountered they are freed from the tissues to allow them to be removed from the immediate vicinity of the tumour. The nerve monitor gives warning of their presence. If these rules are followed, the facial nerve is surprisingly easy to find during the operation. The tumour is rolled from side to side as the surgeon moves around the lump. If the dissection becomes difficult at one side, attention is shifted to a different part of the tumour. So, slowly, the lump is mobilized. Once the lesion is removed, the defect is checked for bleeding and the sides of the cruciate incision approximated and sutured together. A suction drain is optional, depending on the size of the defect. Once the skin is repositioned and sealed, the skin flap is held firmly in position by a mastoid-like pressure dressing. This is another important adjunct to the operation, for without a pressure dressing, sialoceles can occur. The pressure dressing is maintained for about 48 hours.

Audience discussion

Professor P. Bradley (Nottingham, UK): The technique which Professor McGurk and Professor Iro are advocating is not wrong, but you need experienced surgeons with suitably selected patients. We have to train the future salivary surgeons in these techniques so you can select the appropriate procedure for the appropriate case.

Professor H. Maier (USA): It is interesting to see the evolution of the thinking about the surgery of the parotid gland. My own experience is that I was brought up in the comprehensive surgery school with Dr Connelly, I was his fellow. His technique was superficial parotidectomy with facial nerve dissection. The recurrence rate was quite low. When I went to the University of Pittsburgh we did sometimes two, three, four, or five in a day. It was a lot of surgery. On the other hand, why was I doing all the surgery for relatively small tumours? Luckily as it turns out for us, most of the tumours that we see are pleomorphic adenomas in the tail of the parotid. So we got good results. It took us quite a while to make the transition from a superficial parotidectomy as it has been described over the years to a partial parotidectomy. So we do partial parotidectomy mostly for the tumours of the tail of the parotid. The same transition occurred with my associate Dr Johnson. We never told each other that we were doing partial parotidectomy, but we resisted getting to a point where instead of doing partial parotidectomy we did extracapsular dissection, although it seemed to me a logical step. The reason is that we had trainees and in our experience, once taught a technique they stuck to it through their working life. Partial superficial

parotidectomy is a very reliable reproducible standardized technique that we could pass along and the results in general were quite good. ECD is certainly the next logical step.

Professor M. McGurk (London, UK): Professor Myers brought up the question of safety and the training of the next generation of surgeons. To my mind the pattern of practice will be dictated by the type of health system that prevails in each country. In America a lot of surgeons are in private practice, so their practice is broad, with only a few cases of each condition treated each year. In Europe the specialist work is directed into teaching hospitals where there is sufficient volume of cases to develop and train young surgeons. In such circumstances it is safe to develop ECD. A low-volume operator needs to stick to safe, reliable procedures such as superficial parotidectomy.

Professor Piekarski (Poland): We published a paper on ECD with high rates of recurrence. This article is important because it shows the importance of training in ECD. The paper summarized historical results covering 98 tumours resected over 23 years by 16 different surgeons. Personal experience was minimal. The results were poor, with 8% of facial nerve paralysis, 20% tumour spillage and over 8% recurrence. This was using a traditional approach by incising through the skin over the tumour. As a result access was restricted, with the aforementioned consequences. Since 2004, using wide exposure, I have removed 38 tumours in 36 patients by ECD and the results are excellent. There is no case of persistent or transient facial nerve paralysis, no Frey's syndrome, and no recurrences to date, but follow-up is too short. My patients rated the cosmetic outcome as excellent, very good, or surprisingly good. In my view the extracapsular technique is safe in trained hands.

Michael Fritsch (USA): In the 244 cases of pleomorphic adenoma analysed histologically, where did the pseudopodia extending out of the capsule go? Did they go laterally, medially? In which direction did these pseudopodia extend? Theoretically, the ECD may cut across the pseudopodia if they lie medially to the facial nerve.

Professor P. Zbaeren (Bern, Switzerland): Unfortunately I cannot answer this question because we did not analyse the exact location of the pseudopodia but what I can add to my comments is that in approximately 80% of all traditional parotid resections (superficial/total parotidectomy) there was a bare area, sometimes very big, due to the close approximation of the facial nerve which was dissected from the tumour capsule.

Professor Piekarski: I think especially with an inexperienced person the risk of nerve injury is relatively high and nerve monitoring should be used. Also, we have not discussed the use of a microscope.

Professor Iro: We use facial nerve monitoring routinely. I see no real advantage to using a microscope except in special situations where the nerve is stretched over a large tumour. There is no evidence to support its use, and the disadvantage is that the operative field is restricted and it slows the operation. It is not necessary to perform an ECD in every case: parotidectomy or complete total parotidectomy has its place. That is the message.

Michael Tuner (New York, USA): We have discussed this in house, and I agree with you. In my department we use facial nerve monitoring when performing limited parotid gland surgery. I do not think using a microscope makes any difference. In terms of evidence-based medicine there is no evidence that a microscope gives better results.

Professor Iro: The message from the meta-analysis was that there was no difference in the incidence of complication using different operating techniques. So it is justified to use a non-standard approach (ECD) but it is not necessary to do it in every case. There is a place for at least superficial parotidectomy or on occasion total parotidectomy. The message is not that that ECD has to be dome in every case but that it is justifiable to use a non-standard approach depending on the location, or the mobility of the tumour.

Professor N. Papadogeorgakis (Athens, Greece): I would like to ask Professor Iro and Professor McGurk a question: if you decide to perform an ECD then find out the tumour has a very close relationship with the branches of the nerve, does this not turn the operation into a compulsory enucleation? How can you be sure the procedure is safe?
Professor McGurk: The juxtaposition of the words ECD and enucleation lead to confusion as the inference is that they are the same procedure and that is not the case. If at the time of ECD, as the tissues (cruciate incision) are reflected, the nerve is seen running over the lump (i.e. deep lobe tumour) then the situation is exactly the same as if you were doing a superficial parotidectomy. You lift the nerves off the tumour, move them sideways and continue with the dissection around the tumour.
Professor Iro: I fully agree with you.
Professor McGurk: One last point, when people start to practise ECD, they intuitively want to begin with a nice small tumour. Paradoxically it is the worst choice, for there is a risk of encountering a malignant tumour. A small low-grade cancer has not had time to exhibit its malignant features. Secondly, a small tumour is difficult to target by FNA and so you get a negative FNA report. It is the bigger tumours (2–4 cm) that are much easier and safer to treat.
Professor Zbaeren: If you routinely use FNAC then the specificity and sensitivity is very high for pleomorphic adenoma.
Profesor Iro: In the *Journal of Pathology* in 2005 you published a retrospective study of the routine use (general hospital) of FNAC (non-specialist) in about 6000 patients of whom about 4600 patients had benign tumours and 1600 malignant tumours. The findings were that 73% of malignant tumours and 68% of benign ones were reported incorrectly! So if one is to use FNAC in salivary gland disease one has to make the distinction between a routine non-specialist FNAC service and an experienced team working with a salivary gland team. The latter is helpful.
Professor McGurk: Question to audience: in the next 10 years, do you think there will be a move towards more minimally invasive parotid surgery, not just ECD?
General agreement.

Editorial comment

The head and neck surgical community has been held transfixed by the pleomorphic adenoma. The combination of histological evidence that the capsule is incomplete, together with the occasional unexplained tumour recurrence, has meant that surgeons are reluctant to give up the traditional parotidectomy for benign disease. Professor Iro and colleagues have changed this situation. The tumour capsule may be incomplete, but clinically this does not seem to matter. There are numerous examples, even with superficial parotidectomy, where the surgeon works in close proximity to the tumour capsule without any repercussions. The Erlangen team have taken this observation to its logical conclusion. They operate within 2–3 mm of the tumour with impunity. Another perception that has been challenged is that the facial nerve has to be identified and traced to save it from injury. Paradoxically, the opposite pertains. The risk to the facial nerve is minimal if intraoperative facial nerve monitoring is used and careful techniques are employed. The only thing they cannot prove is that recurrence rates remain low (at present 0 follow-up at 5 or 6 years). It will take two surgical lifetimes to follow up the patients for a median of 10 years or more. We have to rely on the Christie data, where the incidence of recurrence was approximately 2% at median 15 years follow-up. Sporadic recurrence still happens, but in equal number within the extracapsular and the superficial parotidectomy groups.

Professor Iro and colleagues have started what should be a new era of minimal surgery for benign parotid disease. Will long-held views stand in the way of scientific method and careful analysis?

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