The Journal of Laryngology and Otology
November 1993, Vol. **107**, pp. 1025–1028

Fine needle aspiration cytology of salivary gland lesions reported immediately in a head and neck clinic

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Abstract

This paper describes the application of fine needle aspiration cytology (FNAC) performed on 92 patients with salivary gland lesions in a Head and Neck Surgery Clinic. The aspirates were immediately reported by a cytopathologist and the reports conveyed to the surgeon during the same clinic visit. FNAC results were then compared with histology in those patients who underwent surgery and with the clinical course of the disease at subsequent clinic visits in patients where surgery was not performed. The cytological diagnosis was incorrect in five cases, one of which was a false negative result. There were no false positive results. The sensitivity was 90.9 per cent and the specificity 100 per cent. This rapid report system of fine needle aspiration cytology has been found to be safe, free of complications, and helpful in the planning of treatment.

Key words: Biopsy, needle; Salivary gland neoplasms; Office visits

Introduction

The presence of a mass in the region of the major salivary glands poses a number of diagnostic problems. To make the correct therapeutic plans the surgeon ideally needs to know if the mass is inflammatory or neoplastic, and if neoplastic whether the mass is benign or malignant. Clinical assessment of such lesions by history, physical examination and radiology are of paramount importance. However, clinical evaluation may be difficult and biopsy, whether open or Tru-cut, is unpopular due to the fear of haemorrhage and seeding of the tumour (Olsen, 1987).

Fine needle aspiration was reintroduced in 1930 by Martin and Ellis (1930). The procedure was endorsed in 1933 by Stewart (1933) who emphasized close correlation of clinical information with the results of aspiration biopsy. During the last 30 years, extensive experience has been gained in the diagnosis of salivary gland tumours with the technique of fine needle aspiration, particularly in the Scandinavian countries. A high degree of accuracy in diagnosis of such lesions has been achieved (Mavec *et al.*, 1964; Eneroth and Zajicek, 1965, 1966; Eneroth *et al.*, 1967; Eneroth and Zajicek, 1969; Eneroth *et al.*, 1971; Persson and Zettergren, 1973; Webb, 1973; Lindberg and Akerman, 1976). However, although there are obvious advantages for the surgeon to have a diagnosis pre-operatively, there is controversy amongst both surgeons and histopathologists as to the value and place of fine needle aspiration cytology (FNAC) as a diagnostic tool, bearing in mind that most salivary gland swellings are eventually excised (Illes and Brian, 1986).

The purpose of this paper is to investigate the relationship between the cytological findings of aspirates performed and reported in a specialist Head and Neck Oncology Clinic with the clinical and histological findings. The cytology reports were conveyed immediately to the surgeon during the same clinic visit. The surgeon thus had a diagnosis within minutes of examining the patient. To the best of our knowledge this is the first description of such a rapid report service. The clinical usefulness, validity, safety and possible complications of this technique are discussed.

Materials and methods

The present study includes 92 patients with a salivary gland mass who presented to the Head and Neck Clinic at the Royal Liverpool University Hospital between 1989 and 1992. The anatomical distribution of the lesions and the number of aspirations from each site are shown in Table I. Forty-nine of the patients were female and 43 were male. The age range was 18 to 90 years with a mean of 56 years.

Aspirations were performed on all 92 patients after a careful history and examination by a surgeon (A.S.J.). The aspirates were taken in the clinic by an experienced cytopathologist (L.S.T. or P.A.S.) after discussing the clinical details with the surgeon.

The technique of fine needle aspiration has been thoroughly reviewed elsewhere in the head and neck literature (Frable and Frable, 1982; Frable, 1983). In the majority of cases the FNAC procedure was carried out using a 21-gauge disposable syringe placed in a syringe holder. The aspirated material was smeared onto glass slides and rapidly air dried. The slides were stained with Quick III (Midland Biomedical, New Jersey). This is a rapid three-step stain which takes less than one minute to

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Accepted for publication: 11 June 1993.

TABLE I
ANATOMICAL SITE OF SALIVARY GLAND LESIONS

Site	No. of lesions	No. of aspirates
Parotid	54	57
Submandibular	36	38
Palate	1	1
Sublingual	1	1
Total	92	97

perform and produces staining characteristics similar to Wright's Giemsa. In patients in whom squamous cell carcinoma was suspected, residual material was fixed in 95 per cent ethyl alcohol and later stained by the Papanicolaou technique. In a small number of cases when a diagnosis of lymphoma was suspected air-dried slides were saved and the aspiration needle was washed out with buffer. The washout was then centrifuged and both the spread smears and cytocentrifuged preparations used for immunocytochemistry.

In addition to assessing the adequacy of the material and whether the lesion was benign or malignant, an attempt was made in each case to establish a precise diagnosis and to type all tumours. Thus the surgeon had diagnostic information on the nature of the salivary gland lesion within the same clinic. FNAC results were then compared with the histology in those patients who underwent surgery and with the clinical course of the disease at subsequent clinic visits in patients were surgery was not performed.

Results

The anatomical distribution of the lesions and number of aspirations from each site are shown in Table I. A total of 97 aspirates from 92 patients was examined. Five repeat aspirations were performed, either because the first attempt was unsatisfactory or because no specific diagnosis was possible. No significant complications were associated with any of the aspirations performed in this study.

The overall results expressed in terms of malignant, benign, and no positive diagnosis are shown in Table II. The no positive diagnosis group (n = 34 = 35 per cent) includes those aspirates which were considered inadequate (n = 14 = 14.4 per cent) and those in which only normal tissue was obtained (n = 20 = 20.16 per cent).

The lesions from which aspirates gave no positive diagnosis were eventually all diagnosed as benign, giving sensitivity (i.e. percentage of aspirates correctly diagnosed as malignant in the presence of malignancy) of 90.9 per cent and specificity (i.e. percentage of aspirates correctly diagnosed as benign in the absence of malignancy) of 100 per cent. The positive predictive value was 100 per cent and the negative predictive value 98.11 per cent.

The final diagnosis and the FNAC results for benign (neoplastic and nonneoplastic) cases are shown in Table III. Among the benign lesions the final diagnosis was nonspecific in 31. If these are excluded FNAC provided the correct diagnosis in 51 out of 56 (91.1 per cent) cases. The cytological diagnosis was incorrect in five cases, one of which was a false negative result. One FNAC initially considered to be normal was finally diagnosed as a lipoma. There were two inadequate specimens which were eventually diagnosed as a monomorphic adenoma and a cyst. Two cases diagnosed as pleomorphic adenoma eventually proved to be an adenolymphoma and Hodgkins lymphoma respectively.

The results of FNAC in comparison with the final diagnosis for malignant cases are shown in Table IV. There were no false positive reports. The histological tumour classification was predicted in all of the 10 malignant aspirates.

Discussion

In most studies on the use of FNAC the aspirations were performed by a surgeon and reported later by a cytopathologist who had often neither seen the patient nor the lesion. Furthermore, there had been no opportunity to discuss the suspected diagnosis with the surgeon. Aspirates performed and immediately reported by a cytopathologist in an outpatient clinic offer several advantages; both the surgeon and the pathologist can examine the patient, the suspected diagnosis can be discussed, and the provision of an immediate tissue diagnosis improves clinic efficiency and allows early therapeutic planning.

One of the precepts of salivary gland surgery is that preoperative diagnosis of tumour type is of value for patient management. Whereas superficial parotidectomy is often sufficient to provide diagnosis and cure in benign tumours, it is considered inadequate as an approach for adenoid cystic carcinoma and high grade malignant tumours. Similarly, surgical decisions in patients who are considered to be a poor surgical risk are better made with knowledge of tumour type. The need for a frozen section can also be anticipated. Unnecessary surgery with its short and long-term morbidity such as facial nerve palsy and Frey's syndrome can be reduced. Planning the extent of the procedure also allows better informed consent about the possible risk of permanent damage to the facial nerve.

The main objection to the aspiration of salivary gland tumours has been the danger of seeding neoplastic cells along the needle track. However, extensive clinical research confirms its safety. Frable (1976) searched the literature for reports on the spreading or seeding of tumour cells by the needle and found only two cases both of which

TABLE II
CORRELATION BETWEEN THE CYTOLOGICAL AND FINAL DIAGNOSIS OF BENIGN OR MALIGNANT SALIVARY GLAND LESIONS

FNAC diagnosis		Final diagnosis Benign	Final diagnosis Malignant	Sensitivity (percentage)	Specificity (percentage)
Malignant	10	0	10		
Benign	53	52	1	90.9	100
No positive diagnosis	34	34	0		
Total	97	86	11		

https://doi.org/10.1017/S0022215100125162 Published online by Cambridge University Press

TABLE III
RESULTS OF FNAC IN COMPARISON WITH FINAL DIAGNOSIS: BENIGN CASES

FNAC diagnosis		Final diagnosis	
No positive diagnosis	34	Non-specific benign	31
		Lipoma	1
		Monomorphic adenoma	1
		Cyst	1
Sialadenitis	12	Sialadenitis	12
Pleomorphic adenoma	33	Pleomorphic adenoma	31
		Adenolymphoma	1
		Hodgkins lymphoma	1
Adenolymphoma	8	Adenolymphoma	8
Total	87		87

followed Tru-cut biopsy. There have been no reported cases of seeding following FNAC of salivary gland tumours. Engzell *et al.* (1971) reported a 10–15 year follow-up of 157 patients with pleomorphic adenoma of the major salivary glands on whom FNAC had been performed. There was no evidence of recurrence or local extension of the tumour that could be attributed to the diagnostic procedure.

The overall results of sensitivity and specificity of FNAC of salivary glands in our series compares favourably with results from other series (Table V). Direct comparison between previous reports is difficult because of the disparity in methods of presenting and analysing the data. Often salivary gland tumours are reported in conjunction with those elsewhere in the head and neck region. Furthermore, the inconsistent inclusion or exclusion of unsatisfactory or suspicious results makes the data difficult to interpret.

In the series of 97 aspirates there were 14 (14.4 per cent) FNAC specimens which were inadequate for assessment due to the poor cellularity or quality of the material. This compares with results of other authors (O'Dwyer *et al.*, 1986; Kocjan *et al*, 1990). Like any limited biopsy, FNAC samples derive cells only from a small area. This is a disadvantage in salivary gland tumours which are often morphologically heterogeneous. They may also have cystic components which makes differential diagnosis more difficult (Zajicek *et al.* 1976). In interpreting cystic lesions particular attention has to be given to the epithelial cells lining the walls of the cyst (Mavec *et al.*, 1964; Eneroth and Zajicek, 1965; Droese, 1981). Despite these inherent inaccuracies the rate of inadequate samples can be minimized by improved technique and experience (Layfield *et al.*, 1987).

A substantial number of aspirates were reported as normal in this series (n = 20 = 20.2 per cent). This is relatively high in comparison with those of some authors

TABLE IV
RESULTS OF FNAC IN COMPARISON WITH FINAL DIAGNOSIS: MALIGNANT CASES

FNAC diagnosis		Final diagnosis	
Adenocarcinoma	3	Adenocarcinoma	3
Adenoid cystic carcinoma	2	Adenoid cystic carcinoma	2
Squamous cell carcinoma	3	Squamous cell carcinoma	3
Mucoepidermoid carcinoma	1	Mucoepidermoid carcinoma	1
Mucinous carcinoma	1	Mucinous carcinoma	1
Total	10		10

TABLE V
SENSITIVITY AND SPECIFICITY OF FNAC OF SALIVARY GLAND LESIONS

	No. of cases	Sensitivity (percentage)	Specificity (percentage)
Eneroth *et al.* (1971)	690	64	95
Persson and Zettergren (1973)	216	86	99
Webb (1973)	50	100	96
Lindberg and Akerman (1976)	461	67	85
Kline *et al.* (1981)	47	100	95
Sismanis *et al.* (1981)	51	85	96
Quizilbash *et al.* (1985)	101	88	100
O'Dwyer *et al.* (1986)	341	73	94
Layfield *et al.* (1987)	171	91	98
Kocjan *et al.* (1990)	29	89	94
Young *et al.* (1990)	79	84	98
Present series	97	91	100

(Young *et al.*, 1990). Normal tissue may be aspirated for two reasons; firstly it is possible that aspiration has missed the lesion and secondly, normal salivary gland tissue has been referred for the procedure. The ready availability of a rapid FNAC service in the outpatient clinic encourages the surgeon to refer patients for aspiration with suspected lesions which would otherwise have been left for further observation at subsequent visits. In comparison to our experience, Frable and Frable (1991) performed aspirations on 541 patients with salivary gland lesions. Of these 340 (62.8 per cent) exhibited no evidence of tumour cells and/or only the presence of some inflammatory cells. They do not state how many of these were normal tissue.

It is of paramount importance that a close cooperation between the surgeon and the pathologist is developed. When there is any doubt about the accuracy of an aspiration, the management of the patient should be based on clinical judgement. Stewart (1933) said that 'the diagnosis by aspiration is as reliable as the combined intelligence of the clinician and pathologist make it'. FNAC of salivary gland masses is rapid, safe and relatively painless. The rapid report of specimens gives prompt and comparatively accurate information. The method is sensitive and specific and we believe invaluable in the management of patients with salivary gland lesions.

Acknowledgement

The authors would like to thank Miss Tracey Evans for her technical assistance.

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