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ORIGINAL ARTICLE

Ultrasound-guided fine-needle capillary cytology of parotid gland masses coupled with a rapid-on-site evaluation improves results

La ponction cytologique écho-guidée de la glande parotide couplée à l'examen direct sur place améliore les résultats

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KEYWORDS
Ultrasound-guided fine-needle cytology;
Parotid gland;
Direct-on-site evaluation

Summary
Objective of the study. — To test whether a direct-on-site microscopic examination of fresh, unstained puncture slides by the radiologist decreases the rate of false-negative cases on ultrasound-guided fine-needle cytology of parotid gland masses.
Patients. — Thirty parotid gland masses from 28 patients were punctured under ultrasound guidance. The same group was used as its control group.
Methods. — After one or two passes, the material was spread on slides and air-dried (control group, without microscopic examination). For the study group, it was thus analyzed unstained under the microscope. A sample was considered adequate if at least six clusters of parotid cells were found per slide on at least two slides. For the study group, new punctures were obtained and slides prepared until this condition was fulfilled.

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Results. — Of the 30 evaluated masses, 100% benefited from a cytological diagnosis after microscopy. Twenty-four were adequate in the control group, while 30 were adequate in the study group. The maximum number of punctures to obtain an adequate sample was six. On-site direct microscopy significantly increased the number of adequate specimens by 20% ($P = 0.03$, CI [1.63—20%]).
Conclusion. — Direct and systematic examination of slides by a radiologist avoided the risk of false-negative results caused by having insufficient sample material.

Résumé
Objectif de l'étude. — Évaluer si l'examen microscopique direct à l'état frais par le radiologue de lames de cytoponctions écho-guidées parotidiennes diminue le taux de faux-négatifs.
Patients. — Trente tumeurs parotidiennes provenant de 28 patients ont fait l'objet d'une cytoponction écho-guidée. Le même groupe de patients a servi de témoin.
Méthodes. — Après un ou deux passages à l'aiguille, le matériel était étalé sur lames et séché à l'air (groupe témoin, sans examen microscopique direct). Pour le groupe expérimental, le matériel était examiné au microscope sans coloration. Un échantillon était considéré comme adéquat si au moins 6 amas cellulaires étaient présents par lame sur au moins deux lames. Dans le groupe expérimental, de nouvelles ponctions étaient réalisées si ce critère n'était pas rempli jusqu'à son obtention.
Résultats. — Sur les 30 tumeurs prélevées, 100 % ont bénéficié de l'examen microscopique direct. Vingt-quatre ponctions étaient satisfaisantes dans le groupe témoin et 30 dans le groupe expérimental. Le nombre maximal de ponctions pour obtenir du matériel satisfaisant était de six. L'examen direct sur place a augmenté de 20 % le nombre d'échantillons satisfaisants pour évaluation ($p = 0{,}03$, IC [1,63—20 %]).
Conclusion. — L'examen microscopique direct systématique des lames de cytoponction par le radiologue évite le risque de faux-négatifs liés à un matériel insuffisant.

Introduction

To date, MRI and fine-needle cytology (FNC) represent the best methods to evaluate parotid gland masses and to plan surgery [1]. FNC is a reliable diagnostic technique in the hands of an experienced cytopathologist [2,3], even for pediatric parotid tumors [4,5]. The sensitivity of diagnosis of malignant lesions is high: up to 93%, although the sensitivity of identification of tumor type is lower [6]. FNC enables a cytological diagnosis in most cases; the method is minimally invasive and is easy to perform. Preoperative FNC diagnosis improves the surgical outcomes of parotid masses [1,7]. However, the most significant problem with FNC is that the procedure frequently obtains inadequate material, thus making evaluation impossible [8,9].

Studies confirm the high overall accuracy of evaluating parotid masses using fine-needle aspiration ranging from 90—98% [10—12]; however, unsatisfactory aspirates (poorly cellular or blood-only aspirates) can occur in up to 18% of cases [13,14]. This occurs even if the adequacy of the sample itself is improved using an ultrasound (US)-guided biopsy [12,15,16].

Repeated FNCs may provide a cytological diagnosis in cases where the initial diagnosis is unclear [2], but delays in diagnosis represent an additional source of pain and anxiety for the patient. Moreover, evidence suggests that the first aspiration may modify the lesion, thus hampering further interpretation. Indeed, although a rare event, FNC can lead to hemorrhage or cellulitis at the needle-puncture site [17], and may transform a simple Warthin's tumor into a metaplastic variant [18]. Furthermore, difficulties in interpreting the great diversity of histologic subtypes of salivary-gland neoplasms, especially if they are malignant [11,19], may lead to errors in diagnosis in many cases because of limited sampling. Thus, there is great added value if the operator achieves successful aspiration and can send the cytologist adequate samples that have already been verified.

In our institution, 30% of parotid gland cytologies were inadequate when the puncture was performed without US guidance. We thus decided to use US guidance, and the rate decreased to 20% (unpublished data). However, as a rapid-on-site direct examination may improve results, we decided to train the radiologist himself to perform microscopic examination. We conducted a study to test whether, by estimating every slide microscopically without staining at the patient's bedside, and to repeat this process until the sample was adequate to obtain a cytological diagnosis, could decrease the number of non-significant samples. In our procedure, we combined the use of a US-guided non-aspiration technique and rapid-on-site evaluation of specimens by the radiologist.

Patients and methods

We conducted a prospective study. We included patients addressed form the ORL department, presenting with a parotid mass, especially when it was deeply located or when

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