

## Original Article

# Utility of cell block in the cytological preoperative diagnosis of keratocystic odontogenic tumor



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## ABSTRACT

In most cases involving jaw lesions, a biopsy and a histopathological analysis are necessary to establish the final diagnosis. However, biopsy may be a complex procedure at some maxillo-mandibular sites, and some systemic conditions could contraindicate the procedure. Thus, a search for new, less invasive techniques, which could eventually replace biopsy and simplify the diagnostic process, would benefit both professionals and patients. The aim of this study was to evaluate the cell block technique, prepared from the aspiration of luminal contents, in the preoperative diagnosis of keratocystic odontogenic tumors (KCOT). From 135 cases of lesions aspirated and processed by the cell block technique, we selected those containing keratin. In all cases selected, histological diagnosis was based on surgical biopsy. From 20 cases containing keratin in the cytological analyses, 19 were KCOTs and one was an orthokeratinized odontogenic cyst (OOC). In all KCOT cases, we observed the presence of parakeratin, even in those with intense inflammation. In the cytological analysis of the OOC, parakeratin was not observed. In conclusion, there is strong evidence that KCOT can be confidently diagnosed preoperatively by cytological analyses of lesions punctured and processed by the cell block technique.

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## Introduction

Since first described, the odontogenic keratocyst has been among the most controversial pathological entities of the maxillo-facial region [14]. The World Health Organization (WHO) recently reclassified it as a benign neoplasm, recommending the term “keratocystic odontogenic tumor” (KCOT) [3]. This change reflects the neoplastic nature of the lesion, due to its aggressive potential (infiltrating the medullary spaces of jaw bones), high recurrence rates, and, in some cases, association with nevoid basal cell carcinoma syndrome [4,5].

KCOT is defined as a benign uni- or multicystic intraosseous tumor of odontogenic epithelial origin [13]. Its typical histological features include a thin and regular stratified squamous epithelium with a corrugated parakeratin surface layer. The basal cells exhibit a characteristic palisaded pattern with uniform nuclei. The

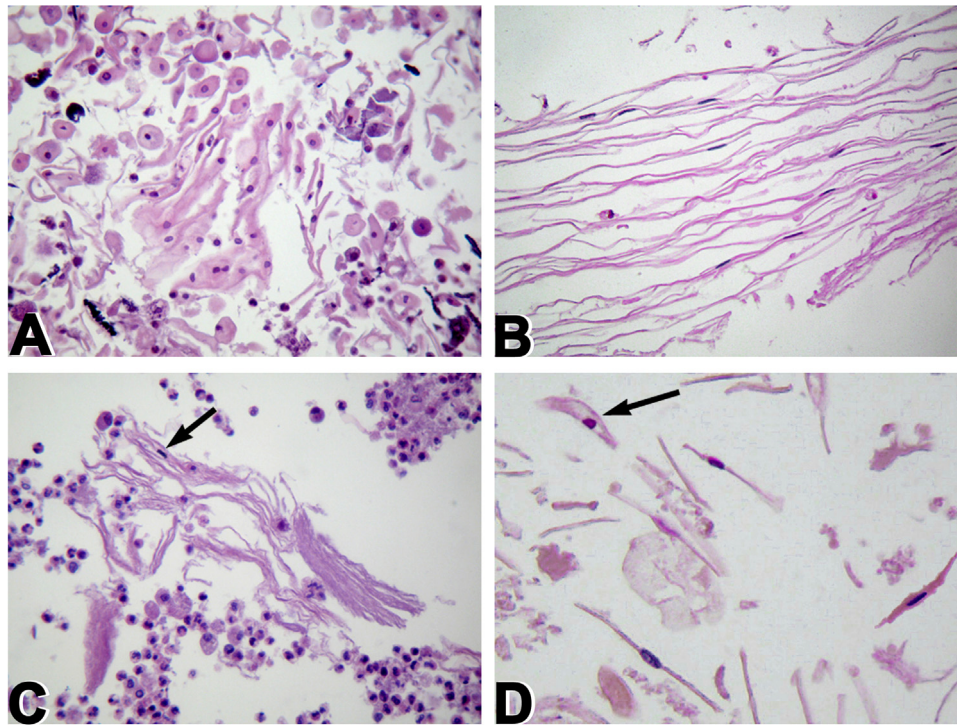
epithelium can show budding of the basal layer into underlying connective tissue, with formation of detached microcysts, called daughter cysts. The wall of the cystic capsule is relatively thin and usually without inflammatory infiltrate [13,10]. In the presence of intense inflammation, the epithelial lining loses its cellular characteristic and architectural features, making histopathological diagnosis difficult [13].

Aspiration puncture is a suitable technique to aid in the establishment of a clinical diagnosis of jaw lesions. A cystic lesion aspiration can provide additional information on its content, whether it is liquid, serous, or absent, supporting an initial clinical diagnosis. Cell blocks prepared from residual tissue fluids using fine-needle aspirations can be useful adjuncts for establishing a cytopathologic diagnosis [11]. The advantage of using cell blocks is that the cell dispersion characteristic of analyzed fluids is decreased, through centrifugation and embedding in paraffin blocks, which allows a better analysis of the content present in the collected liquid [6].

Although it is a simple, fast, and low-cost technique, the cell block has been rarely mentioned in the dental literature. In previous research, we demonstrated the cytological differentiation between KCOTs and inflammatory cysts of the jaw [12,15]. In the present

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**Fig. 1.** Cytological analysis (cell block) of KCOT (H&E 400 $\times$ ): (A) presence of several desquamated keratinocytes, with different degrees of maturity, as well as short parakeratin strips; (B) parakeratin strips; (C) several inflammatory cells with presence of keratin, and parakeratin (arrow) in the focal area; (D) short parakeratin strips and keratinocyte (arrow).

study, our objective was to evaluate the cell block's result as a cytological tool for KCOT diagnosis, regardless of the presence of inflammation.

### Materials and methods

This study was approved by the Ethics Committee of the Federal University of Santa Catarina (no. 145/2008).

Patients with intraosseous jaw lesions, and clinical recommendation of aspiration, were submitted to asepsis, local anesthesia, and puncture by an 18-gauge needle attached to a 10 mL syringe. The syringe containing the material collected was immediately packaged in an ice-cooled container. In the laboratory, the material was removed from the syringe, transferred to a test tube, and centrifuged at 2000 rpm for 20 min. The pellet obtained was transferred to absorbent paper and fixed in a 10% formaldehyde solution for 24 h. Sequentially, the material was processed as follows: dehydration, clearing, impregnation and embedment in paraffin. Sections of 3  $\mu$ m were obtained and stained with hematoxylin-eosin (H&E).

The cell block slides were analyzed by light microscopy (Axiostar Plus; Carl Zeiss, Oberkochen, Germany). From all lesions punctured, we selected those containing keratin in the cytological analysis. The selected cases were evaluated to characterize the type of keratin (parakeratin or orthokeratin), and to determine the presence of epithelial and inflammatory cells. In all cases, the histological diagnosis was performed by surgical biopsy.

### Results

From 135 cases of lesions punctured and processed by the cell block technique, 20 cases were found to contain keratin in the cytological analyses. Of these, 19 were KCOTs, and only one was an orthokeratinized odontogenic cyst (OOC).

In all cases of KCOT, we observed the presence of parakeratin (Fig. 1), even in lesions with intense inflammation (Fig. 1C). In some

samples, keratin was composed of short and sparse lamellae (Fig. 1A and D) and in others of long lamellae (Fig. 1B). Several desquamated normal keratinocytes, with different degrees of maturity, and numerous anucleated squamous cells were observed in most samples (Fig. 1A). These results demonstrated the high sensitivity of the technique.

The biopsy specimens of KCOT revealed a cystic capsule lined by parakeratinized stratified squamous epithelium, with palisaded basal cells and a corrugated surface pattern (Fig. 2A and B). In the presence of intense inflammation, some cases showed partial loss of epithelial appearance (Fig. 2C and D). In the OOC, the epithelial lining was thin and uniform, with an average thickness of 4–8 cells, showing an onion skin-like orthokeratin layer and a prominent granular cell layer (Fig. 3A). In the cytological analysis of this case, the keratin was composed of short and sparse lamellae, and parakeratin and epithelial cells were not observed (Fig. 3B).

In the other 115 cases punctured, in which cytological analyses showed a lack of keratin, none were classified as KCOT or OOC in the histological diagnosis.

### Discussion

Biopsy and histopathological analyses are necessary to establish a definitive diagnosis in most bone lesions [1]. As a surgical procedure may be complex at some maxillo-mandibular sites, with many local and systemic implications contraindicating it, aspiration may be used in some cases [15]. The material collected should be first visually examined, with a special focus on color and consistency. Later, this material must be microscopically assessed. This cytological analysis can be done by smearing the aspirated fluid directly onto a glass slide or by the cell block technique. The latter involves a histological technique for processing, and thus multiple sections of the same material can be used for routine stains. The advantage of using the cell block, as compared with conventional smears, is decreased cellular dispersion, contributing to maximum

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