In this study, we reported four cases of acinic cell carcinoma, diagnosed on FNA, which were retrieved from the records of the Department of Cytopathology of our hospital, over a period of 4 and ½ years (February 2013–May 2017). Air-dried MGG stained and alcohol-fixed Pap stained smears were examined. The clinical details assessed include age, sex, site, duration, symptom, and size of swelling. Three of the four cases were females, with the age ranging from 27 to 80 years. All patients complained swelling in the parotid region. Size of the swelling ranged from 2 × 1 cm to 6 × 4 cm.

Cytological features assessed are described in Table 1. In all of the cases, smears were cellular and the key cytological features observed were prominent acinar arrangement of cells with resemblance to the salivary gland acini and complete absence of ductal cells [Figure 1a]. Cells had uniform, round to oval nuclei with small central conspicuous nucleoli and abundant granular or finely vacuolated cytoplasm [Figure 1b]. Cell boundaries were ill-defined with frayed margins. Normal lobular architecture was completely absent. Numerous bare nuclei were present in the background [Figure 1c]. Final diagnosis was given on cytomorphological features.

In order to study the expression of DOG1 in acinic cell carcinomas, IHC was performed on alcohol-fixed destained slides using a rabbit monoclonal DOG1-SP31 clone, ready to use, Cell marquee, Rocklin, USA. Positive external control used was smears of DOG1 positive gastrointestinal stromal tumor.

Diffuse granular cytoplasmic and membranous positivity in more than 80% of cells was seen with DOG1 (SP31) in three of the four cases [Figure 2]. One case showed cells with weak granular cytoplasmic positivity in 20–30% of tumor cells.

Expression of DOG1 IHC helps in differentiating from benign salivary gland lesions, and hence correct diagnosis leads to appropriate and timely patient management.

Follow-up was available in only two patients. On imaging, they were both found to be inoperable and were given radiotherapy. One patient died within 2 months of diagnosis. Hence, excision biopsy and histopathological correlation could not be obtained.

**Discussion**

ACC is a common cause of false-negative interpretation due to similarity with the normal parotid acinar cells and the absence of hallmark features of malignancy such as necrosis, cellular pleomorphism, and high mitotic activity.[1] Thus, there is a need to familiarize with the cytological characteristics of ACC and with its differential diagnostic problems.

The key to the accurate cytological diagnosis of ACC lies in the recognition of the neoplastic acinar cells, numerous bare nuclei in the background, and complete absence of ductal epithelial cells.[2] The smear usually has abundant cellularity; cells are arranged in acini and dispersed singly. Cellular boundaries are poorly defined with frayed edges. Numerous bare nuclei are seen in the background.[3] Nagel et al. found in their study the presence of numerous bare nuclei and absent ductal cells in more than 90% cases, which was a constant finding in our study also.[2]

The differential diagnosis includes a hyperplastic or a normal salivary gland, due to the monotonous acinar cells resembling...
the normal salivary gland cells. However, in the normal salivary gland, cells are arranged intermingled with adipose tissue and ductal epithelial cells, but in ACC, there is a complete absence of lobular architecture. Sialadenosis is more difficult to differentiate from ACC because the background in both the conditions reveals numerous bare nuclei lying in a foamy proteinaceous background.[3]

Oncocytoma is the differential diagnosis in the ACC in which there is predominance of cells with oncocytic appearance and bare nuclei are not so frequent. Similarly, Warthins tumor with scant or no lymphoid component can create diagnostic difficulties with ACC, knowing that this tumor can exhibit sheets of oncocytic cells and the bare nuclei can mimic mature lymphocyte.[2] Lastly metastatic carcinomas like clear cell renal carcinoma and clear cell thyroid follicular carcinoma can be included in the differential diagnosis, and in these cases, relevant clinical history plays a crucial role.[3]

Acinic cell carcinoma is commonly misdiagnosed as benign, due to its similarity with the salivary gland acini. There are limited studies about the value of DOG1 in the diagnosis of ACC. In our study, we examined DOG1 expression on destained alcohol fixed smears of ACC to assess the role in diagnosis.

On review of the literature, we found that three different clones of DOG1 have been used to assess its expression in cases of ACC.[4,5] In this study, the DOG1-SP31 clone was used on destained smears. Out of the four cases, three showed diffuse strong granular cytoplasmic and membrane staining. The only one case that showed weak staining was the case that was diagnosed in the year 2013, and the possibility of antigenic loss of the cells on the smear could be a possible explanation. The staining pattern was diffuse granular cytoplasmic, in addition to complete membranous positivity. Our results were in concordance with others, where all cases of Acinic cell carcinomas showed strong DOG1 immunostaining.[5,6]

Although Acinic cell carcinoma is a challenging diagnosis, a careful attention to the cytomorphological features in conjunction with DOG1 immuno staining can help to reach an accurate diagnosis.

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Conflicts of interest
There are no conflicts of interest.

### Table 1: Cytomorphological features assessed in 4 cases

| Cellularity | Architecture | Ductal epithelial cells | Nuclear enlargement | Nucleoli | Cytoplasm | Bare nuclei | Basement membrane |
|-------------|--------------|-------------------------|---------------------|----------|-----------|-------------|-------------------|
| Cellular    | Acini & fragments | Absent                  | Mild                | Inconspicuous | Vacularated and granular | Present          | Present           |
| Cellular    | Acini & few loose fragments | Absent                  | Mild                | Inconspicuous | Foamy | Few | Absent           |
| Cellular    | Acini & few loose fragments | Absent                  | Mild                | conspicuous    | Foamy | Present | Present           |
| Cellular    | Acini & few loose fragments | Absent                  | Mild                | conspicuous    | Granular |              | Absent           |

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