

## Tubercular granulomas in Bronchoalveolar lavage fluid in SurePath liquid-based cytology smears: An enigmatic finding

Sir,

During the last decade, liquid-based cytology (LBC) has emerged as an alternative or adjunct to conventional cytopreparatory methods and can be successfully applied to fluid-based samples (urine and body cavity fluids), brushings, lavage specimens, and fine-needle aspirates.<sup>[1,2]</sup>

LBC is now increasingly being used all over the world for cervical cancer screening.<sup>[3]</sup> India harbors the largest burden of tuberculosis in the world. Hence, early and accurate diagnosis of pulmonary tuberculosis (PTB) can have significant effects on morbidity and mortality of patients and also the development of multidrug-resistant tuberculosis.<sup>[4]</sup> Bronchial cytology specimens are of considerable diagnostic value in the evaluation of PTB, especially in cases where it is difficult to obtain bronchoscopic biopsy material for histologic evaluation as well as in peripheral lesions.<sup>[5,6]</sup>

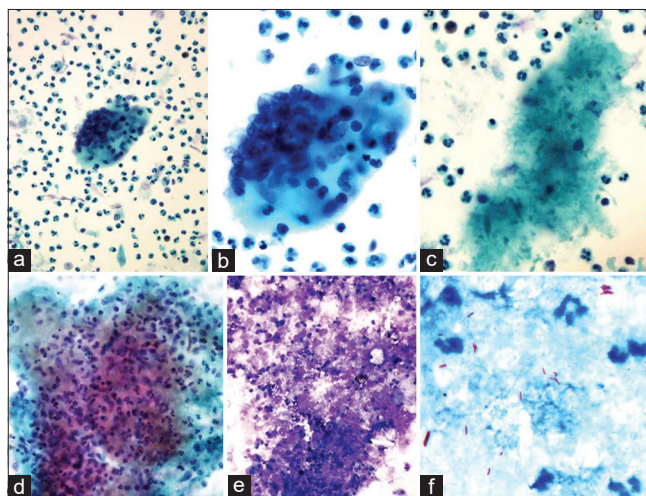
Herein, we present a case of PTB in which bronchoalveolar lavage (BAL) fluid analysis revealed intact granulomas in SurePath LBC smears.

A 30-year-old male presented to our pulmonary medicine outpatient department with complaints of cough with expectoration and streaking hemoptysis of 20-day duration. He had a history of fever. There was no history of loss of appetite or loss of weight. His Mantoux test was positive. Laboratory investigations revealed hemoglobin of 11.1 g/dl, prothrombin time – 13 s (control 11–13 s), and activated partial thromboplastin time – 30s (control 25–30 s). Contrast-enhanced computed tomography scan of the chest revealed bilateral upper lobe ground-glass opacities and small nodules along with small hilar and mediastinal lymph nodes. The presumptive diagnosis of PTB was made. The patient was planned for fiber optic bronchoscopy. BAL fluid and transbronchial lung biopsy (TBLB) were sent to our department.

Bronchial lavage fluid was mixed by manually shaking the container to homogenize the sample. An equal volume of CytoRich Red (SurePath, BD India Pvt. Ltd.) solution was added to the specimen and vortexed. After fixation, the specimen was processed and stained according to the SurePath manual protocol in a fully automated LBC machine leading to the preparation of two Pap-stained

slides. Conventional smears were also made. Microscopic examination of BAL fluid showed numerous collections of epithelioid histiocytes forming ill-formed granulomas and giant cells in LBC smear [Figure 1a and b]. These were at places intimately admixed with polymorphs and pigment laden macrophages in LBC smear [Figure 1d]. Few foci of necrosis were also seen [Figure 1c]. The conventional May–Grunwald–Giemsa stained smear showed necrotic foci admixed with polymorphs, pigment laden macrophages, and few scattered giant cells [Figure 1e]. Ziehl–Neelsen stain performed on a residual fluid sample showed numerous acid-fast bacilli [Figure 1f].

SurePath applies density gradient enrichment followed by gravity sedimentation onto a coated slide and centrifugation of nongynecological cytologic material before introducing it into the processor.<sup>[2]</sup> A SurePath proprietary device, CyRinge, is inserted into the collection vial to disaggregate larger cell fragments which result in separation of large cell clusters into individual cells which is why it is very difficult to find granulomas in



**Figure 1:** (a) Liquid-based cytology smear showing intact granuloma (PAP stain, ×400) (b) Higher magnification to show collection of pale staining epithelioid histiocytes forming granuloma (PAP, oil immersion) (c) Necrotic fragment in liquid-based cytology smear (PAP, ×400) (d) Epithelioid histiocytes intimately admixed with polymorphs and pigment laden macrophages (PAP, ×400) (e) Conventional smear showing necrotic fragments and collection of polymorphs (May–Grunwald–Giemsa, ×400) (f) Numerous acid-fast bacilli (Ziehl–Neelsen stain, ×400)

LBC preparations. In SurePath, the cellular distribution is uniform and thick and cells are in different planes of focus with preservation of three-dimensional configurations as compared to conventional cytosmears.<sup>[7]</sup> We demonstrate that easily recognizable granulomas are not so typical in the LBC samples. Here, the granulomas are more dyscohesive, pale staining. Furthermore, the inflammatory reaction and necrosis are significantly reduced in LBC processing which is conspicuous on FNA smears and histology sections.

In the present case, the load of bacilli was heavy and TBLB also showed numerous epithelioid cell granulomas in the alveolar wall, and some of these might have got aspirated during lavage. The literature had described only a single case report of the presence of intact granulomas in BAL fluid in a case of sarcoidosis.<sup>[8]</sup>

This case is being discussed here to familiarize cytopathologists with this rare enigmatic finding, and the present case may hold a lesson that a diligent search should be made to look for epithelioid histiocytes and giant cells even on fluid samples and a Ziehl-Neelsen stain should be ordered to confirm the diagnosis. This should be done to expedite the diagnostic process, especially in a country like ours where tuberculosis is endemic.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

**Rama Kumari Badyal, Vaneet Kaur Sandhu**

Department of Pathology, Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab, India.

E-mail: ramabadyal@gmail.com

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