Standardised Operating Procedure

Bronchoscopy and BAL

chILDRANZ 2020

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Proposed Best Practice Checklist:

Bronchoscopy and BAL

The role of Bronchoscopy

BAL is usually carried out via a paediatric flexible fibreoptic bronchoscope (FFB) either under general anaesthesia or sedation.

Whether the bronchoscopy is performed through an endotracheal tube, a laryngeal mask or facemask, suction should not be used before the bronchoscope has been passed beyond the vocal cord, in order to avoid contamination of bacteriological samples with upper airway flora, as far as possible.

Indications

A European Respiratory Society (ERS) task force report outlined the technical aspects, normal values, and indications for BAL in children (de Blic, 2000). Please see this report for technical aspects of performing the procedures and processing of specimens.

The primary indication for BAL in chILD patients is to exclude underlying infection. It can be useful to help support the diagnosis of pulmonary alveolar proteinosis and hypersensitivity pneumonitis. It can demonstrate the presence of blood in pulmonary haemorrhagic disorders, and lipid laden macrophages in aspiration disorders. None of these tests are diagnostic on their own.

The table below adapted from Kurland *et al*., (2013) outlines the specific diagnostic BAL findings.

Diagnostic Bronchoalveolar Lavage Findings
Diagnostic BAL findings
<u>Patients with suspected infections</u> Positive cultures in the appropriate clinical setting Positive viral cytophathologic findings in the appropriate clinical setting
<u>In all patients</u> Hemosiderin-laden macrophages: alveolar haemorrhage syndromes

PAS-positive granular material with hypocellularity: alveolar proteinosis (consider surfactant dysfunction mutation or GM-CSF-related disorders) Intracytoplasmic pentalaminar inclusion bodies (EM) or positive CD1a staining: pulmonary histiocytosis
Suggestive BAL findings
<u>BAL neutrophilia</u> Infectious lower airway disease (pneumonia, bronchitis, bronchiectasis) Aspiration syndromes Diffuse alveolar damage/ARDS
<u>BAL eosinophilia</u> Drug-induced DLD Eosinophilic lung disease Churg-Strauss syndrome Asthma Allergic bronchopulmonary mycosis Parasitic disease Fungal infection
<u>Lipid-laden macrophages</u> Suggestive, but not diagnostic, of aspiration
<u>BAL lymphocytosis</u> Predominant CD-4+ cells* Sarcoidosis Predominant CD-8+ cells* Pulmonary histiocytosis Hypersensitivity pneumonitis Drug-induced ILD Collagen-vascular disease

Miscellaneous findings Storage cells typical of Niemann-Pick disease
Definition of abbreviations: ARDS = acute respiratory distress syndrome; BAL = bronchoalveolar lavage; DLD = diffuse lung disease; EM = electron microscopy; GM-CSF = granulocyte-macrophage colony–stimulating factor; ILD = interstitial lung disease; PAS = periodic acid-Schiff. Data from de Blic (2000). *This is only applicable if flow cytometry is carried out on BAL specimen; this is not widely applied in pediatric clinical practice.

Location of BAL

In case of diffuse disease, the BAL target site should be chosen based on an HRCT performed before the procedure, rather than choosing a traditional BAL site (i.e., the right middle/upper lobe or lingula). If BAL and lung biopsy is to be done at the same session, BAL should not be performed in the lung lobe chosen for biopsy. If CT and BAL are to be combined, a CT should be performed first to direct the lavage site; BAL will cause an abnormal CT if performed immediately beforehand.

Acknowledgement:

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Australian Genomics Health Alliance

References:

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