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Infective complications from endobronchial ultrasound-transbronchial needle aspiration

To the Editors:

We read with significant interest the report from HAAS [1] in a recent issue of the *European Respiratory Journal*, which described two cases of infectious complications following endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA). This technique has been widely adopted for the evaluation of mediastinal and hilar lesions for several reasons, including its high-diagnostic accuracy, minimally invasive nature and excellent safety profile. As stated by HAAS [1], no significant complications have previously been reported.

We recently experienced a similar complication in our interventional bronchoscopy centre (Royal Melbourne Hospital, Parkville, Australia). A female with small cell lung cancer and a moderate-sized retrosternal thyroid lesion underwent EBUS-TBNA sampling of the thyroid lesion for the purpose of staging. EBUS imaging demonstrated a cystic space and cytology performed on the TBNA specimen revealed normal thyroid colloid. She presented to her local medical officer with erythema over the sternal notch 48 h after the procedure. Despite initial therapy with flucloxacillin this progressed and on re-presentation to our centre she had developed a spontaneous purulent discharge from this site, with subsequent resolution over the following 6 days. Penicillin-sensitive *Streptococcus pneumoniae* was isolated from multiple culture specimens of purulent material.

Bacteraemia following conventional TBNA is extremely rare [2]. The sole description of bacteraemia following TBNA reported *Streptococcus viridans* as the causative agent, suggesting an oral source [3]. Patients described by HAAS [1] and EPSTEIN *et al.* [4] developed bacterial infections complicating TBNA with microbiological and clinical features, highly consistent with inoculation of oropharyngeal bacteria into the relatively avascular pericardial space [1, 4]. Infection resulting from direct inoculation of relatively avascular necrotic tissue following endoscopic fine needle aspiration has also been reported [5]. With respect to our patient, S. *pneumoniae* is a common nasopharyngeal commensal and we believe infection was similarly caused by bronchoscope contamination during insertion through the upper airway, with subsequent direct inoculation of bacteria by the TBNA needle into an avascular cystic space.

EBUS-TBNA appears to be the optimal procedure for sampling of mediastinal and hilar lesions due to its safety in comparison to formal surgical procedures. However, our experience, and that of HAAS [1], indicates that a complication rate of 0% for a novel technique almost certainly means insufficient procedures have been performed to fully inform commentary on complications rates, or possibly that complications remain unreported. It is important for proceduralists performing EBUS-TBNA to be aware that, while rare, significant infection is a recognised complication. Contamination of the bronchoscope working channel during introduction into the airway is possible and direct inoculation of bacteria appears the likely cause of infective complications [1, 4, 5].

We commend HAAS [1] for the timely report on the potential for infection complicating EBUS-TBNA, but feel the issue of antibiotic selection in such cases should be emphasised. Further studies are required to elucidate the organisms involved in infections following EBUS-TBNA. However, our experience, and that reported by HAAS [1], suggests empiric antibiotic use in patients with clinical suspicion of infection must include agents with activity against indigenous oral and nasopharyngeal organisms. Prophylactic antibiotics for EBUS-TBNA do not appear to be indicated on the basis of risk of bacteraemia; however, we feel our experience, and previously reported experiences [1, 4, 5], indicate further evaluation is required to determine the role of prophylactic antibiotics in specific patient groups. Consideration of use of antibiotic prophylaxis may be appropriate in patients with relatively avascular lesions such as cysts or necrotic lymph nodes, or in immunocompromised patients at high risk of local infective complications.

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From the authors:

I wish to thank D.P. Steinfort and co-workers for their correspondence which describes another temporal infectious complication related to endobronchial ultrasound-transbronchial needle aspiration (EBUS-TBNA). New technology integration into current procedures utilised in clinical practice can evolve rapidly, often before thorough understanding of potential limitations and complications can be appreciated and reported. Early EBUS-TBNA experience had been contained within several highly experienced bronchoscopy programmes; however, the technology is spreading rapidly among all levels of academic and community practice worldwide. In 2003, the American College of Chest Physicians recommended 50 supervised procedures to attain competence in EBUS [1]. These recommendations preceded widespread experience with convex probe-EBUS bronchoscopy and did not delineate between convex probe- and radial probe-ultrasound competence. The question remains as to whether the infectious complication risk from EBUS-TBNA will be greater than that reported for regular TBNA. I have concerns that the infection complication rate may prove to be higher with EBUS-TBNA than conventional TBNA as thoracic physicians may not only perform more EBUS-TBNA, but may be more aggressive with their biopsies. As thoracic physicians go forward with this technology, it is important to recognise the possibility of infectious complications and record and report them so, as a medical field, we understand how to avoid these complications and how to identify who may be at greatest risk.

I concur with D.P. Steinfort and co-workers that patients with infectious symptoms following EBUS-TBNA should be evaluated for a possible infectious complication and empiric antibiotics should cover oral and nasopharyngeal organisms given the proposed contamination route. It would have been interesting to confirm the aetiology of the infectious source in the case reported by D.P. Steinfort and co-workers if a naso-oropharyngeal swab or blood cultures would have demonstrated *Streptococcus pneumoniae*. I agree with D.P. Steinfort and co-workers that, at this time, prophylactic antibiotics are not indicated for EBUS-TBNA. The current Infectious Disease Society of America guidelines regarding either surgical or endocarditis antibiotic prophylaxis do not recommend antibiotics unless the respiratory mucosa is to be violated in the setting of a high-risk patient (previous endocarditis, mechanical valve or congenital heart disease) [2, 3]. Two questions arise from this recommendation. First, does TBNA violate the respiratory mucosa as defined in the Infectious Disease Society of America guidelines? Secondly, do endocarditis risk factors alone define high-risk patients in whom EBUS-TBNA is performed? Rather, should high-risk be defined by lesion (cystic or necrotic lesion) or procedural characteristics (repeated passes, extended needle penetration depth)? Ultimately, I do not feel that prophylactic antibiotics will become routine for EBUS-TNBA. By presenting a provocative and controversial topic, I hope to encourage others to report their EBUS-TBNA complications to better ascertain the infection risk of this new technology. Only by relying on diligent reporting of infectious complications (or other complications) by thoracic physicians as general experience with EBUS-TBNA increases will we be able to appreciate what patient- or lesion-specific characteristics might predispose to infection and warrant prophylactic antibiotics consideration in the future.

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