First Human use of a New Robotic-Assisted Navigation System for Small Peripheral Pulmonary Nodules

Initiative Type  Model of Care
Status  Deliver
Added  01 May 2018
Last updated  13 June 2019


Summary
This project studied the feasibility of using a new robotic device in sampling small nodules via bronchoscopy. This is a first-in-human study performed at the Royal Brisbane and Women's Hospital Bronchoscopy Department.

The project team included: Farzad Bashirzadeh, Jung Hwa Son, Marianne Todman, Adrian Chin, Hau Tan, Karin Steinke, Morgan Windsor.

Key dates  Jan 2017 Jan 2018
Implementation sites  Royal Brisbane and Women's Hospital

Key Contacts
Dr David Fielding
Thoracic Physician
Metro North Hospital and Health Services
(07) 3646 8111
David.Fielding@health.qld.gov.au
Aim
To demonstrate safety and efficacy of a new robotic device in sampling small peripheral pulmonary nodules.

Benefits

• A bronchoscopic robot device allows direct airway visualisation, great precision, highly directional fine movements in all planes at the catheter tip.
• The catheter stays stationary in any position the physician places it.
• Real-time navigational driving and distal tip articulation of this catheter in pre-clinical studies showed the ability to target peripheral lesions.

Background
Sampling small nodules in the lung can be very challenging and any advance in this area is welcomed.

Solutions Implemented
Some of the smallest lung lesions reported in the literature for bronchoscopic biopsy were included in the study. Pre-procedure CT scans were uploaded to the system and navigational pathways were semi-automatically created. Side-by-side viewing of actual and virtual bronchi was used real-time during navigation to the target. Prior to biopsy under fluoroscopy control, an endobronchial ultrasound mini probe was used to confirm lesion location, if Bronchus-sign positive. Specifically-designed flexible transbronchial needle aspiration (TBNA) needles up to 19G were used along with forceps and brushes.

Evaluation and Results
• Overall diagnostic yield for these cases was 83 per cent and diagnostic yield for malignancy was 89 per cent.
• This robotic-assisted navigation system has safely navigated deep into the lung under continuous visualization to sample very small nodules.
• No device related adverse events occurred; in particular, no instances of pneumothorax or excessive bleeding were observed.

PDF saved 26/08/2019