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

Initiative Type

Model of Care

Status

Deliver

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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

Bonchoscopy 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

1053

paul.blee.hiu

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.