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Robot-assisted Navigation System for CT-guided Percutaneous Lung Lesions Procedures

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Introduction

BACKGROUND: Imaging-guided lung procedures are usually challenging due to patient breathing, especially during local anaesthesia procedures. This was prospective study in a university-based hospital. This was assessment of efficacy involving total 83 patients with lung lesions underwent CT-guided percutaneous lung interventions utilizing Robot-assisted Navigation system (Maxio, Perfint Healthcare, USA).

Objectives

PURPOSE: To evaluate the new Robot-assisted Navigation System for CT-guided percutaneous lung lesions procedures

Methodology

MATERIALS AND METHODS: All the procedures were performed under local anaesthesia. Targeted needle pathway was planned on Maxio Robotic system based on pre-procedural CT-scans. Primary endpoint was satisfactory instrument position for intended intervention. Lesion size and depth from skin were noted. Performance level was documented on five-point scale (5-1: excellent-poor). Total radiation doses were recorded and compared against 20 patients with conventional CT-guidance and CT-fluoroscopy lung procedures (ratio 1:1).

Result

RESULTS: There were 56 males and 27 females patients in Robotic group. Average age was 66.4 years (range 38-85). 78 patients underwent lung biopsy while rest had thermal ablation, fiducial-marker insertion or drainge. Average lesion size was 3.0cm (range 0.8-7.8cm). Average lesion depth was 5.6cm (range 2.8-9.5cm). All interventions met primary endpoint of satisfactory instrument positioning. There are 6 cases required a second planning for targerted needle pathway as these patients cannot achieve the same breath holding during the procedures. 1 case required a third planning due to the same reason. Average performance levels were 4.71. Average radiation dose (Dose Linear Product) was 446.1mGycm (range 83.7-2012.7) whereas conventional CT-guidance was 645.4mGycm (range 285.1-1043.5) and CT-fluoroscopy was 460.1mGycm (range 214.2-1157.0). There are 37 cases complicated with minimal to small pneumothorax while only 10 cases needed chest drain insertion. CONCLUSIONS: Our experience demonstrated effectiveness of Robot-assisted Navigation system for CT-guided lung lesions interventions with lower radiation dose compared with conventional CT-guided procedures. Radiation doses were similar to CT-fluoroscopy without radiation exposure to interventional radiologists. Targeting success rate for satisfactory intervention was 100%.