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Title: Intraoperative marking of a small pulmonary nodule with the multi-axis angiography system

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Body: INTRODUCTION: Often cases are difficult to identify the localization of small pulmonary nodule during operation, preoperative CT guided marking have been described. However, there were some problems including air embolism, pneumothorax or detection ratio. Now, we used Artis zeego (Siemens co ltd, Germany) which drew up a CT-like image during operation to determine the localization of the tumors for some cases. This is the first report of intraoperative marking using the Artis zeego. MATERIAL: Artis zeego is the first multi-axis angiography system based on robotic technology that can be positioned the way a physician wants. It can be controlled with far greater ease and precision than conventional C-arm system. METHODS: The patient was fixed lateral position under general anesthesia, and was sterilize and draped on the operation table. After marking to the pleura where was predicted the nearest portion from the nodule with a clip under the VATS view, Artis zeego was entered and provide a CT-like image. After Artis zeego was disconnected from the patient, the excision region was determined by the image. RESULTS: Four patients, five small pulmonary nodules were performed this procedure. All regions were successfully detected by the image and removed completely. Since this system did not provide to detect pulmonary regions, there were some problems including narrowing of the bed for lateral position, the little device, the elbow or equipments were easy to strike on the machine when rotation. CONCLUSIONS: This procedure could be an extremely useful and safety method for intraoperative marking a small pulmonary nodule. We also need to resolve some problems of this procedure such as the devices.