Pneumothorax Following Superior Plating of Clavicle Fractures: Are the Concerns Warranted?

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INTRODUCTION: One of the reasons for the emergence of antero-inferior plating of clavicle fractures is due to a perceived increase risk of pneumothorax (PTX) with superior plating. The primary aim of this study was to determine the anatomic relationship between the clavicle and the apical lung segment. The secondary aim was to determine the incidence of pneumothorax in patients who underwent clavicle open reduction internal fixation.

METHODS: Six hundred thirty-one patients with a midshaft clavicle fracture who underwent superior plating at a single institution were identified. Of these patients, 42 patients had a CT scan of the chest. To evaluate the anatomic relationship between the clavicle and the lung, measurements were made using the sagittal cut of the CT scans. Three points on the uninjured clavicle were defined: 2.5 cm from the medial end of the clavicle, the mid-point of the clavicle, and 2.5 cm from the lateral end of the clavicle. At each point, the thickness of the clavicle and the distance from both the inferior cortex and the superior cortex of the clavicle to the apical lung segment were measured. All 631 patients who had surgical repair of their clavicle had a post-operative chest x-ray to evaluate implant placement, restoration of clavicular length and presence of PTX.

RESULTS: From the lateral end of the clavicle, the mean distance of the lung was 61.2±14.7 mm (39.3 to 95.8 mm) from the inferior cortex of the clavicle and 73.1±14.9 mm (54.0 to 107.0 mm) from the superior cortex of the clavicle. At the mid-point of the clavicle, the mean distance of the lung was 32.3±7.2 mm (19.5 to 45.3 mm) from the inferior cortex of the clavicle and 45.2±8.0 mm (32.6 to 60.8 mm) from the superior cortex of the clavicle. At the medial end of the clavicle, the mean distance of the lung was 18.1±5.5 mm (7.9 to 29.0 mm) from the inferior cortex of the clavicle and 40.0±5.8 mm (30.2 to 54.6 mm) from the superior cortex of the clavicle. Review of post-operative radiographs for all 631 patients revealed none (0%) with a postoperative iatrogenic PTX.

DISCUSSION AND CONCLUSION: The mean distance from the inferior cortex of the clavicle to the apex segment of the lung ranges from 18.1±5.5mm to 61.2±14.7mm, depending on location and is sufficient that risk of injury is minimal in all three zones. There was no incidence of iatrogenic PTX during the use of superior plating in our cohort. Post-operative chest radiographs following clavicle fracture repair to rule out PTX is an unnecessary.