

## Bilateral Pulmonary Embolism After Reverse Total Shoulder Arthroplasty: A Case Report

Mohammed H Al Rumaih\*, Hassan A Al Ramadhan, Abdulmohsen I Al Abdulaaly, Saad I Al Shammari, Yasser A Al Haddab and Omar M Al Jebreen

Department of Orthopaedic Surgery, Prince Sultan Military Medical City, Riyadh, Saudi Arabia.

### \*Corresponding author

Mohammed H Al Rumaih, Department of Orthopaedic Surgery, Prince Sultan Military Medical City, Armed Forces Medical Services, Ministry of Defense, Saudi Arabia.

Submitted: 02 July 2020; Accepted: 09 July 2020; Published: 18 July 2020

### Abstract

*Venous thromboembolism is a rare surgical complication after shoulder replacement surgery. Most common seen for those who underwent for lower limb reconstruction such as: total hip or knee arthroplasty as well as orthopaedic trauma surgery in general. we report one case of 56-year-old male known to have diabetes mellitus and hypertension who had an isolated proximal humerus fracture. He underwent for reverse shoulder arthroplasty and the patient had an uneventful day of surgery. On postoperative day 2, patient started to have lightheadedness with decreased oxygen saturation. He denied any history of chest pain or shortness of breath. Patient was put on 2L oxygen face mask. Patient was evaluated by the medical team. CT spiral was done and it revealed bilateral small filling defects involving the right lower pulmonary artery and the left upper lobar pulmonary artery. Patient was started on anticoagulant therapy with improvement in his condition.*

**Keywords:** Anticoagulant, Computed Tomography (CT), Humerus, Pulmonary Embolism, Shoulder Arthroplasty

### Introduction

Venous thromboembolism (VTE) is a well-documented complication after lower extremity surgery such as: hip and knee replacement as well as orthopaedic trauma surgery. The incidence rate for developing VTE after hip and knee arthroplasty without prophylaxis ranges from 29% to 60% [1, 2]. Pulmonary embolism after upper extremity surgery is uncommon and not well documented in the literatures. The first case was reported in 1997 by Arcand et al of axillary vein thrombosis after shoulder hemiarthroplasty [3]. Prophylactic anticoagulation in case of shoulder arthroplasty is controversial among different surgeons because it carries the risk of bleeding, wound complication, and reoperation. Therefore, the decision to provide prophylaxis for those patients is based on the clinical suspicion from the surgeons.

### Case Presentation

A 56-year-old male known to have diabetes mellitus and hypertension had history of trauma to the right shoulder and it was resulted a comminuted proximal humerus head-splitting fracture (**Figure 1**). Upon physical examination, there was an obvious deformity on the right shoulder with moderate swelling and limited range of

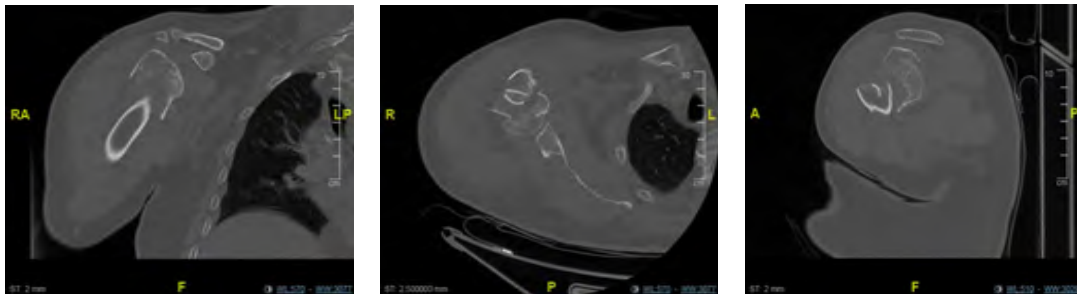
motion. Computed Tomography (CT) scan of the right shoulder showed comminuted fracture at the proximal humerus metaphysis with fracture line extending to the lesser and greater tuberosities, humeral head and proximal diaphysis (**Figure 2**). Due to fracture pattern and the age of the patient, the surgical plan was made to go for reverse total shoulder arthroplasty (RSA) of the right shoulder.

After two days, patient underwent for reverse total shoulder arthroplasty of the right shoulder (**Figure 3**). The patient had an uneventful day of surgery. Two days postoperatively, patient started to have lightheadedness with decreased oxygen saturation up to 86 % on the room air. He denied any history of chest pain or shortness of breath. Medical Team was consulted and involved and they asked for spiral computed tomography to roll out pulmonary embolism and to put the patient on 2L oxygen face mask.

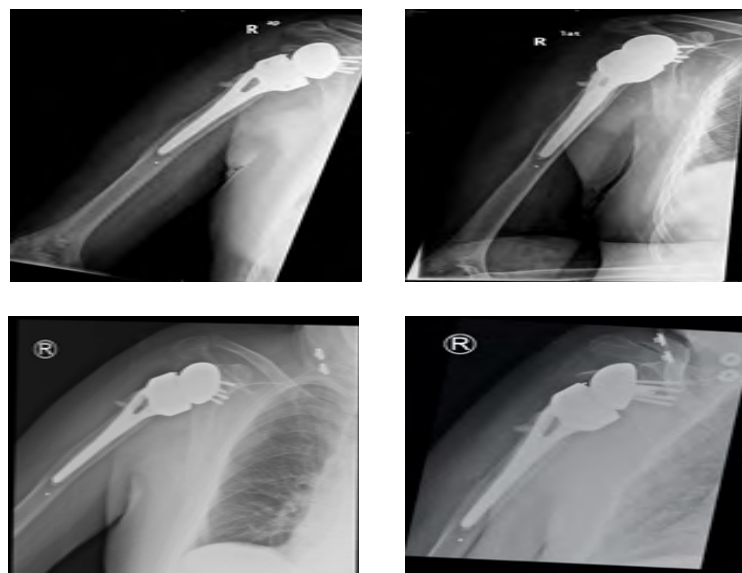
CT showed bilateral small filling defects involving the right lower pulmonary artery and the left upper lobar pulmonary artery extending into the segmental branch suggested pulmonary embolism (**Figure 4**). Patient was kept on therapeutic dose of anticoagulant for 3 days and he was improved. Patient was discharged on oral anticoagulant for 3 weeks as a recommendation by the medical team and he was given follow up appointment in anticoagulant clinic in our institution.



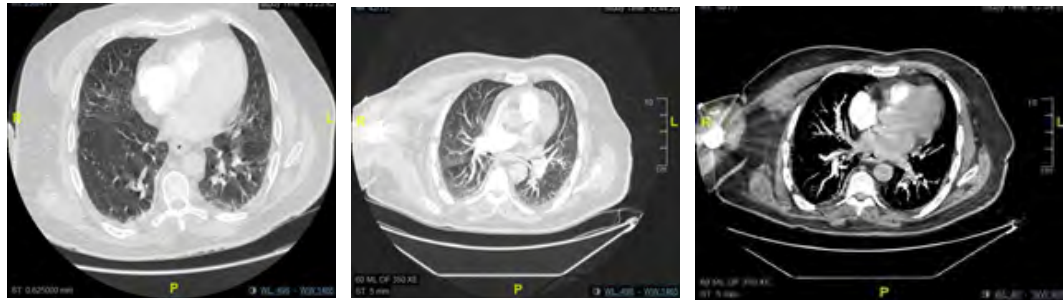
**Figure 1 :** X-ray of the right shoulder showed severe comminuted proximal humerus head-splitting fracture



**Figure 2 :** Computed Tomography (CT) scan of the right shoulder showed comminuted fracture at the proximal humerus metaphysis with fracture line extending to the lesser and greater tuberosities, humeral head and proximal diaphysis



**Figure 3 :** Postoperative x-ray of the right shoulder after reverse total shoulder arthroplasty



**Figure 4 :** CT chest scan with contrast showed bilateral small filling defects involving the right lower pulmonary artery and the left upper lobar pulmonary artery extending into the segmental branch suggested pulmonary embolism .

## Discussion

Most of the literatures and studied are reported the incidence of venous thromboembolism after lower limb reconstruction surgery. However, there are some reported cases of patients who had pulmonary embolism after shoulder surgery.

Sperling et al. reported in their study about 2885 patients who underwent for primary shoulder arthroplasty from 1981 to 2001 [4]. Five of the patients developed pulmonary embolism after the procedure. Three of them were symptomatic. Four of those patients underwent for hemiarthroplasty for different surgical indications such as: Acute fracture, malunion and avascular necrosis. The 5th patient underwent for total shoulder arthroplasty due to osteoarthritic changes. The time of the diagnosis of pulmonary embolism was ranged from the day of surgery today seven postoperatively. Diagnosis was confirmed based on CT scan or ventilation-perfusion scan.

Hoxie et al. reported in their study of 137 patients who had an isolated proximal humerus fracture underwent for different surgical procedures such as: open reduction and internal fixation as well as hemiarthroplasty [5]. Seven of them were diagnosed as a pulmonary embolism after the surgery. Four of those patients were treated by shoulder replacement. The age of those patients ranged from 48 to 78. The time of the diagnosis ranged from day 3 to day 21 postoperatively.

Rockwood et al. reported two cases after an elective shoulder surgery [6]. The first patient was 53 years old male and he was not known to have any medical illness. Patient had pervious surgical history of total shoulder arthroplasty which was done on 1994. After four years from the surgery, patient came to the clinic for follow-up and they noticed a glenoid loosening and he underwent for revision arthroplasty. Intermittent pneumatic compression was applied preoperatively and postoperatively.

There were no intra- or postoperative complications. On postoperative day 2, patient started to have lightheadedness and they put him on nasal cannula. Patient was evaluated by the medical team and the impression was orthostatic hypotension due to loss of large amount of blood during the surgery, and they recommended to transfer the patient to cardiology unit for better care. Patient was fine and started to improved. On the 3rd day postoperatively, he went into the bathroom to use the toilet and take a shower, and

he did not come out of the bathroom after a few minutes.

They found him unresponsive and resuscitation was done but it failed. Autopsy showed the pulmonary artery was filled by emboli and large clot was discovered in the right femoral vein. The second patient was 36 years old of age male, athletic underwent for total shoulder arthroplasty due to severe degenerative osteoarthritic changes. On postoperative day six, patient started to have pleuritic chest pain which was aggravating by deep breathing. Ventilation perfusion scan was done and it was showed three small segmental defects consistent with an intermediate to high probability for pulmonary emboli, and they started him on heparin therapy.

## Conclusion

Prophylactic anticoagulants therapy should be given after shoulder arthroplasty to an elderly patient or those who have multiple comorbidities. Surgeons should have a high degree of clinical suspicion for pulmonary embolism when a patient has development of respiratory difficulty, hypoxia, and tachycardia following shoulder arthroplasty.

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