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Unwinding of a 4.5 mm partially threaded cannulated screw in an elderly patient: A case report

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Abstract

Case: An elderly patient sustained a base of the coracoid fracture with superior clavicle migration requiring open reduction internal fixation. When inserting our 4.5 mm partially threaded cannulated screw, it began to unravel revealing an underlying screw defect.

Conclusion: There may be a biomechanical defect with the partially threaded cannulated screws which may require pre-drilling prior to insertion.

Keywords unwinding, 4.5 mm partially, threaded cannulated screw, elderly patient

Introduction

Partially threaded, cannulated cancellous screws are applicable in a variety of fracture patterns but appear to have an increasingly reported mechanical fault. There have been previous reports of the screw unwinding with insertion through dense cortical bone in young patients but our case occurred in an older patient through cancellous bone^[1,2].

Case Report

A 71-year-old right hand dominant old male sustained a right displaced coracoid fracture after a tree fell onto his shoulder (figure 1). Given the amount of displacement at the base of the coracoid, superior migration of the clavicle and the increased pain the patient was experiencing, he elected to proceed with an ORIF of his coracoid.

Under anesthesia, the fracture was reduced using a point reduction clamp and a guidewire was placed through the medial base of the coracoid. A 4.5 mm x 46 mm long partially threaded cannulated screw was placed over the guidewire and inserted without any issues. A second guidewire was placed lateral to the first screw through the coracoid and an additional 4.5 mm x 68 mm long screw was inserted over top of the guidewire. When we checked our screw position on x-ray, it was revealed that the second screw had unraveled leaving a ribboned piece embedded in bone (figure 2). No increase in resistance was felt during the insertion of the defective screw. The drill bits and guidewires for both screws were inspected and there did not appear to be any evidence of hardware failure or damage. The shoulder was ranged under fluoroscopy and the ribboned strand did not appear to be intraarticular. The threads of the unraveled screw were past the fracture site and we felt we had adequate fixation and decided to leave it in place. At the patient's two-week follow-up, a repeat x-ray was performed and no screw migration or fracture displacement was noted.

Discussion

This case represents a rare complication associated with the cannulated partially threaded screw, but there have been some cases discussed in the past. A case series performed in 2013 revealed eight reported incidents of cannulated partially threaded screws unraveling². The study by Kupperman et al revealed that this complication occurred in young males with dense bone in either the humerus, tibia or cuneiform. It was reported that 75% of cases documented no change in resistance when inserting the screw, only 50% of the defective screws were successfully removed and 25% of screws were left in without attempted removal². Our case is unique in that our patient was elderly and it involved cancellous bone in the scapula.

The mechanism of the screw unwinding has been thought to be due to weakness that develops at the self-cutting flute that propagates along the screw as the screw is inserted^[3]. Previous case reports have cited catching on dense cortical bone which lead to the screw unwinding^[1,4,5].

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What is unusual in our case is that our screw unraveled in cancellous bone in a patient with advanced age. It has been postulated that pre-drilling and pre-tapping prior to insertion may be a way of preventing this complication ^[4].

Conclusion

This case represents a nuance in a previously established problem with the cannulated partially threaded cancellous screws. Given that our screw unraveled in elderly, cancellous bone, it may be prudent to pre-drill and tap prior to insertion of any screw or perhaps further manufacturer investigation into the integrity of the screw is warranted.



Fig 1: X-ray of the right shoulder showing a displaced coracoid fracture with superior migration of the clavicle



Fig 2: AP of the right shoulder showing the lateral screw unravelling

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