

Hidden Bone Shard Causes Life-Threatening Axillary Artery Transection During Elective Total Shoulder Arthroplasty.

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INTRODUCTION

- We describe an unpredictable clinical scenario involving an intraoperative vascular injury during an elective total shoulder arthroplasty (TSA).
- We aim to alert anesthesia practitioners and ambulatory surgical centers (ASCs) of this rare but life-threatening complication of TSA.

CASE

- **72 y.o. woman**
 - Elective case, shoulder arthritis
 - GERD, hiatal hernia, mild anemia
 - B.M.I. 15 kg/m², 45 kg, 161 cm
 - Ground-level fall 12-months prior
 - Humeral fx, conservatively managed
- **Pre-Op:**
 - Interscalene block for post-op pain
 - Single-shot
 - 10 mL of 1.3% liposomal bupivacaine
 - 7 mL of 0.5% bupivacaine
- **Intra-Op:**
 - GETA
 - Beach chair position
 - Early into the case:
 - Acutely hypotensive
 - Unable to register NIBP
 - Critical event:
 - Complete transection of Axillary Artery by existing bone shard from humerus fx.
 - Mass Transfusion Protocol (MTP) called
 - 4u pRBCs, 1u FFP, 1u cryoprecipitate
 - Vascular Surgery called

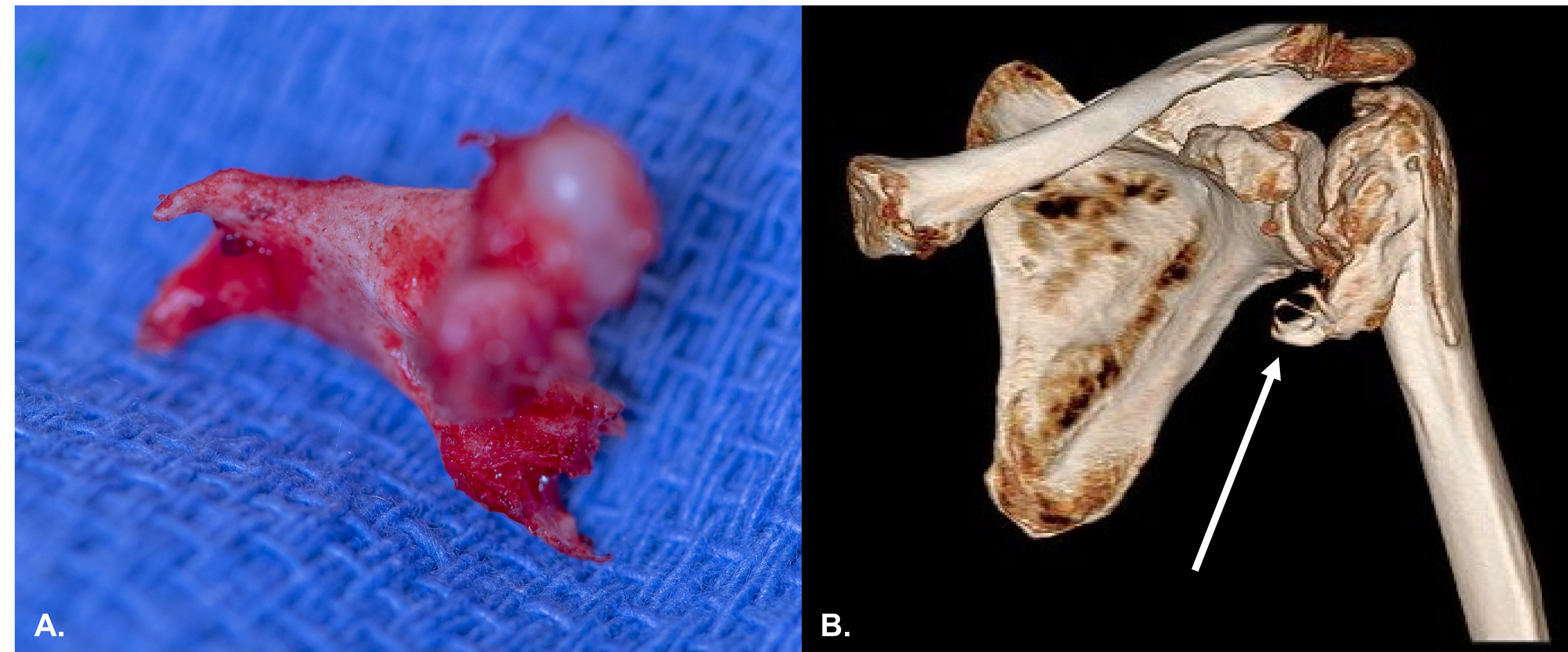


Figure 1 | The patient's sharp bone shard.
A. Bone shard surgical specimen from patient;
B. 3D CT reconstructed image showing bone shard (arrow).

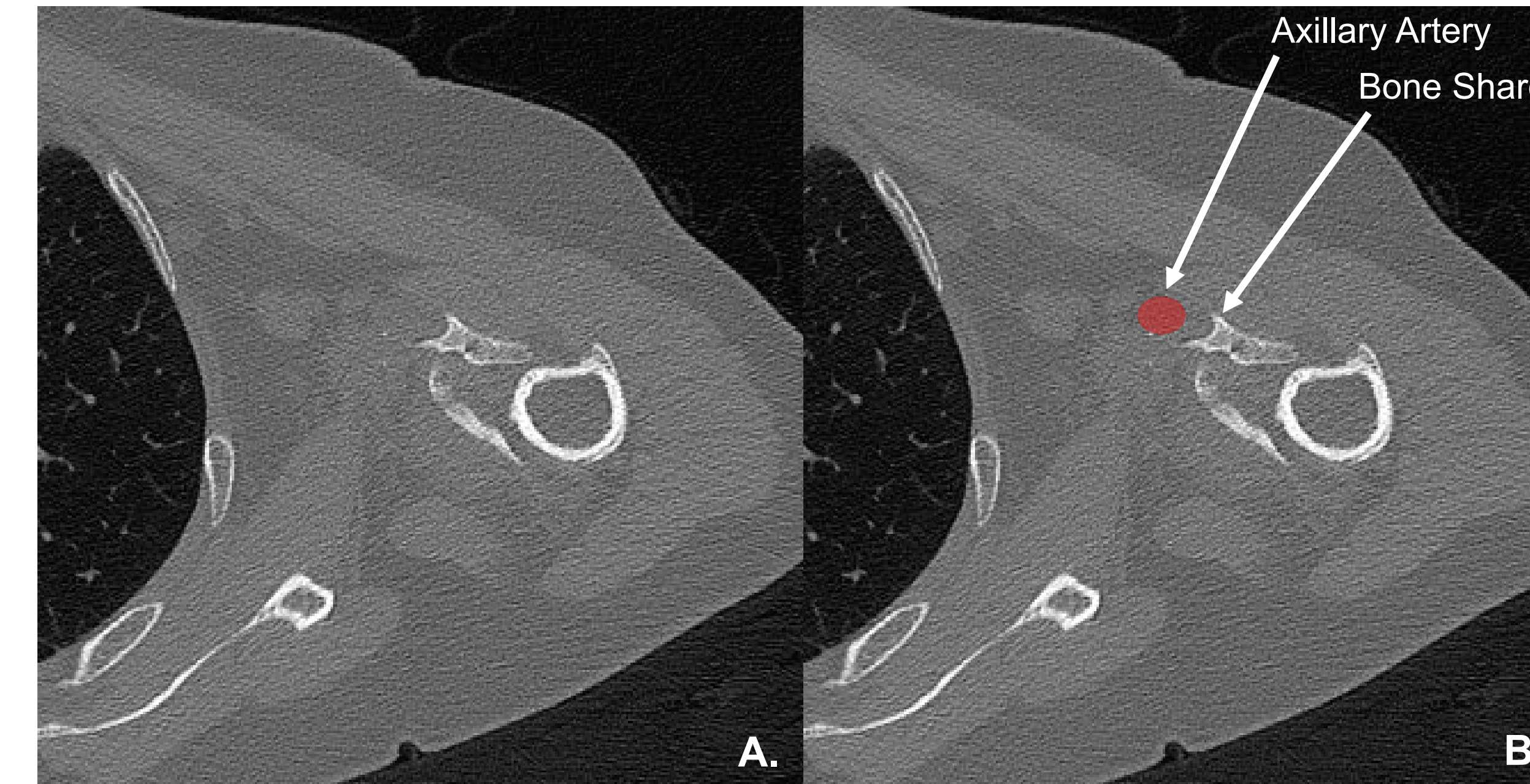
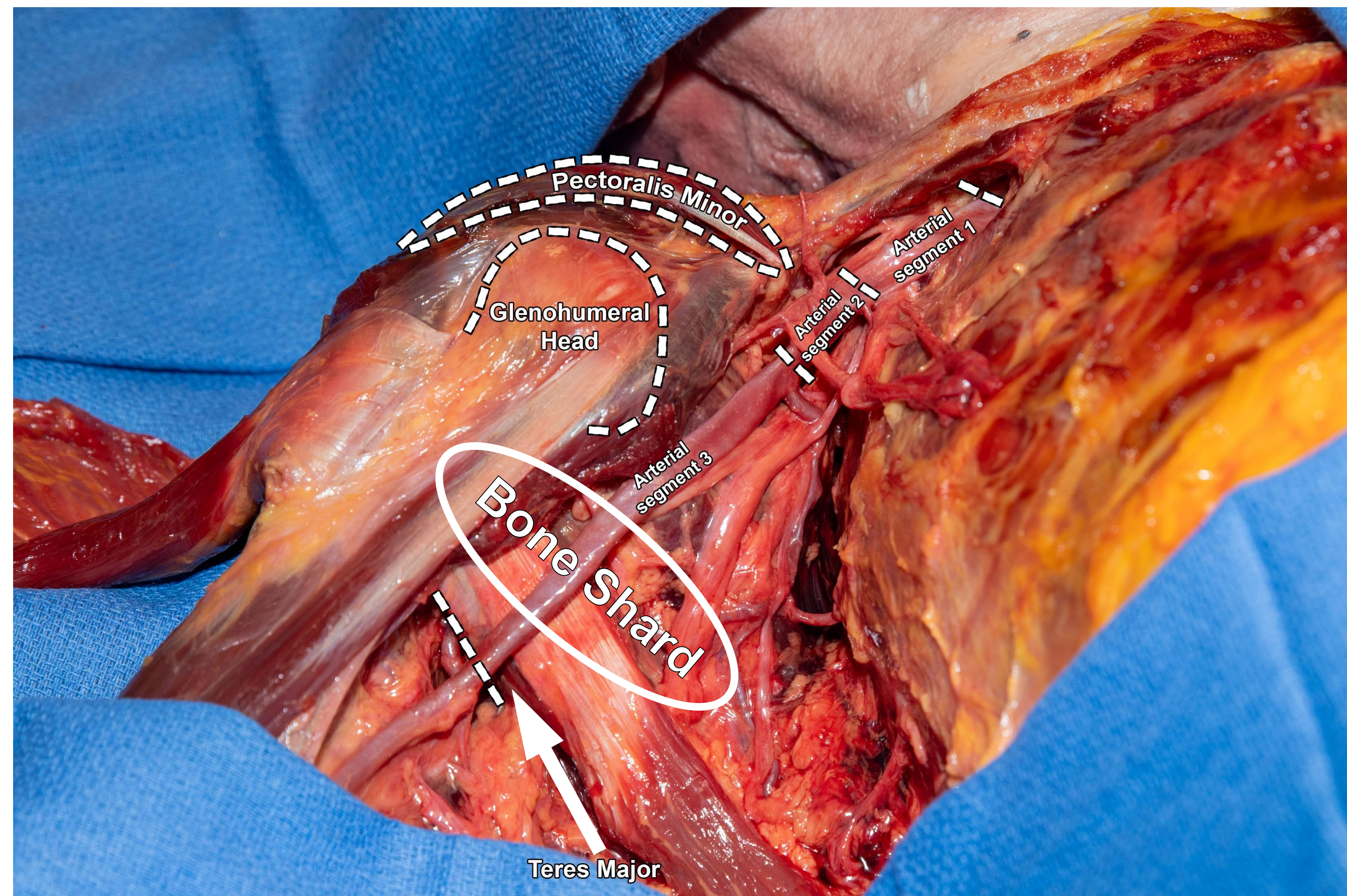


Figure 2 | Preoperative CT showing A.A. near bone shard.

- A.** Proximal humerus with bone shard in view;
- B.** Repeated image of 2A with axillary artery color-highlighted;
- C.** Moving distally down the humerus with bone shard in view;
- D.** Repeated image of 2C with axillary artery color-highlighted.

Figure 3 (left) | Fresh-frozen cadaveric donor dissection example of A.A.

- Segment 1:** Subclavian artery becomes axillary artery at first rib lateral border;
- Segment 2:** Runs posterior to the pectoralis minor muscle (reflected), beginning at the superior border of pectoralis minor;
- Segment 3:** Begins at the lateral/inferior border of pectoralis minor. Becomes brachial artery at the inferior border of teres major (labeled dotted line with arrow). Oval label showing approximate location of the bone shard.

DISCUSSION

- Have mastery of relevant critical surgical anatomy.
- 40,000-70,000 TSA performed/yr. in the U.S.⁷
- OP TSAs increased by 358% between 2010-2020⁸
- Despite the favorability of TSAs in ASCs, contingency planning must continue. ASC advantages:
 - Favorable safety profile^{1,2}
 - Enhanced patient satisfaction^{1,2}
 - Same-day discharge¹³
 - Low complications and admissions¹⁴
 - 3x lower cost¹⁵
- Contingency Planning:
 - Reviewing institutional MTP protocols.
 - Ensuring emergency surgical subspecialty access.
 - Reviewing transfer process to higher care levels.
- Patient Outcome:
 - Full recovery
 - Successful TSA (2nd attempt) three months later w/o complications.
 - Blood products readily available.
 - Vascular Surgery team present during the case.

CONCLUSION

- Since most TSA procedures are performed in freestanding ASCs, we share this case to raise awareness of this rare complication and highlight the importance of contingency planning.

REFERENCES & FULL MANUSCRIPT

