

Rotator Cuff Tear and Osteonecrosis Secondary to Influenza Vaccine

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- Background
- Shoulder Injury Related to Vaccine Administration (SIRVA) defined as injury to muscle, tendon, ligament, or bone (1)
 - Limited number of SIRVA cases annually tracked on Vaccine Adverse Event Reporting System (VAERS) (2)
 - Range of 128-223 cases from approximately 130 million influenza vaccines annually from 2010-2016
 - 7 hospitalizations in this time-frame with 2 rotator cuff tears
 - More common (70%) in women
 - Potential etiologies include inappropriate technique and an immune response to vaccine components (3-5)
 - No gold standard treatment: NSAIDs, steroid injection, PT, & surgery (4)

- Case Study
- 41 year old left-handed female with a history of anxiety and fibromyalgia complaining of constant right shoulder pain 2 weeks after receiving the influenza vaccine (her 1st in 15 years)
 - No prior shoulder pathology, trauma, or injury.
 - Right shoulder pain with motion, inability to perform overhead activities, decreased ROM immediately post-vaccination
 - Right shoulder exam: Decreased range of motion in all planes, 3-4/5 muscle strength in all motions, pain with abduction and internal/external rotation, tenderness to palpation over deltoid. Positive Hawkins, Jobe, and Neer test. Negative Obrien, Spurling, and Speed test
 - Neck exam: Full ROM, Negative Spurling test

Timeline of Events	
Day 0	Seasonal influenza vaccine administered Injection site reaction, shoulder pain, and decreased motion
Week 2	Constant shoulder pain and limited ROM since vaccine 1 st office visit. Recommended NSAIDs/APAP Steroid taper pack prescribed, giving brief relief
Week 4	Persistent pain and limited ROM/strength Normal Shoulder X-ray. MRI ordered (denied by insurance) Subacromial 40mg methylprednisolone with no relief Refer to physical therapy. Patient didn't attend
Week 12	Evaluated by Orthopedic surgery. MRI: full infraspinatus tear, marrow edema, large effusion
Week 13	Planned arthroscopic rotator cuff repair reveals necrotic rotator cuff and posterior humeral head Extensive surgical debridement and culture. Unable to repair rotator cuff due to necrosis and edema 8 day hospitalization for IV antibiotics Consultation with Infectious Disease
Week 18	Completed 4 weeks of IV daptomycin via PICC at home Surgical rotator cuff reconstruction with allograft

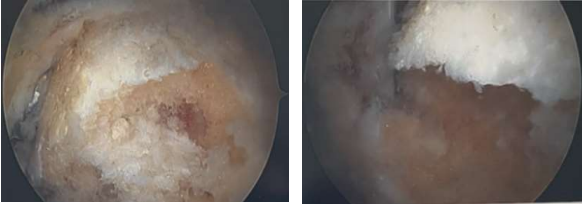

Results	
	
	
Surgical gram stain	No organisms
Surgical culture	No growth
Blood culture	No growth
Bone biopsy	No osteomyelitis. Nonspecific reactive change
CRP	0.9 mg/dL (0.2-0.8 mg/dL)
ESR	14 mm/hr (0-20 mm/hr)

Figure 3. Post-surgical debridement of necrotic cuff

- Discussion
- Osteonecrosis is an uncommon subset of SIRVA
 - Findings are consistent with a case during the H1N1 outbreak in 2009 (7)
 - Limitations of this case, as well as VAERS, is that causality cannot be proven
 - negative cultures, negative bone biopsy, and clinical history do suggest it
 - Antibiotics prescribed by hospital arguably with questionable utility
 - Bone involvement in this case suggests an inflammatory or autoimmune response to the vaccine components
 - Pathology unexplained by improper placement alone
 - Several pathogenic explanations hypothesized and evaluated (5-6)
 - Prevention is the best treatment. Avoid “too high” and “too deep”
 - Several factors lead to prolonged recovery including patient non-compliance with PT, imaging delays, and unclear clinical picture following initial surgery

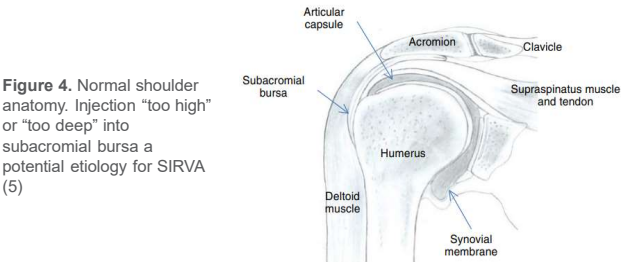


Figure 4. Normal shoulder anatomy. Injection “too high” or “too deep” into subacromial bursa a potential etiology for SIRVA (5)

- Conclusion
- Although exceedingly rare, this case discussed a potential complication of the influenza vaccine
 - SIRVA should not deter physicians from recommending vaccination, but should be on the differential for patient's with prolonged pain following vaccination

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Figure 1. Pre-operative MRI of right shoulder demonstrating bone marrow edema of the humeral head and rotator cuff tear