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## Case Report

# Synovial cutaneous fistula complicating a reverse total shoulder arthroplasty

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## ABSTRACT

Reverse total shoulder arthroplasty is becoming a common form of shoulder arthroplasty that is often performed in the setting of rotator cuff pathology. Infection is a rare complication but is more common in reverse total shoulder arthroplasty than in hemiarthroplasty or anatomic total shoulder arthroplasty. We present the case of a 69-year-old patient with a reverse total shoulder arthroplasty who presented with purulent drainage from the skin of his anterior shoulder. Computed tomography arthrogram confirmed the presence of a synovial cutaneous fistula. Synovial cutaneous fistula is a rare variant of periprosthetic infection that, to our knowledge, has not been described previously in the setting of a reverse total shoulder arthroplasty. Computed tomography arthrogram proved to be a reliable method for confirming the diagnosis and was used for operative planning to remove the hardware.

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## Introduction

Reverse total shoulder arthroplasty is becoming an increasingly common orthopedic procedure. It is most often performed in the setting of rotator cuff arthropathy and rotator cuff deficient shoulders [1]. The most common complications of reverse total shoulder arthroplasty include scapular notching, postoperative hematoma, and glenosphere dissociation [1]. Infection is a less common complication, occurring in approximately 1–10% of reverse shoulder arthroplasties [1]. A synovial cutaneous fistula is a very rare form of periprosthetic infection that has not been previously described in

the setting of reverse total shoulder arthroplasty. Physical examination, laboratory data, and imaging findings all play an important role in detecting periprosthetic infection.

## Case history

A 69-year-old man with history of obesity, atrial fibrillation, and diabetes mellitus, initially presented to an orthopedic surgeon after a motor vehicle accident in which he sustained a comminuted fracture of the proximal left humerus. At that time, he underwent an open reduction internal fixation of the

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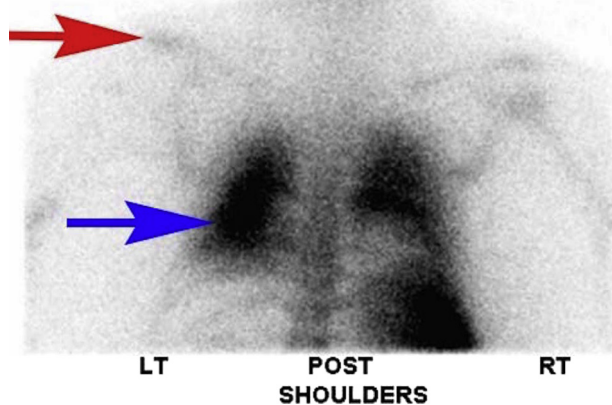
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proximal left humerus. After surgery, he continued to have severe shoulder pain and limited mobility of the left shoulder. Therefore, 2 years later, he underwent reverse total shoulder arthroplasty of the left shoulder. A few weeks after that surgery, he began to have redness and swelling of the skin overlying the left shoulder. He was treated conservatively with antibiotics as well as incision and drainage of an abscess that developed subsequently. A Technetium ( $^{99m}\text{Tc}$ ) exametazime (Ceretek, GE Healthcare, Medi-Physics Inc, Melbourne, FL, USA) scan (Fig. 1) was performed and did not reveal evidence of osteomyelitis. The patient was monitored by an infectious disease physician and was treated with the long-term oral antibiotics.

His symptoms continued to worsen over the next 2 years, and he developed purulent drainage from a soft-tissue wound on the skin overlying the left shoulder (Fig. 2). He presented to our institution to be evaluated by an orthopedic surgeon. His C-reactive protein level was 73 mg/L (normal range is <5 mg/L), and his white blood cell count was  $11.6 \times 10^3/\mu\text{L}$  (normal range is  $<10.5 \times 10^3/\mu\text{L}$ ). Of note, his hemoglobin A1c was elevated at 8.7% (normal is <5.5%). The orthopedic surgeon wanted to know if the purulent drainage was in continuity with the reverse total shoulder arthroplasty device.

A preoperative computed tomography (CT) arthrogram was ordered. During the fluoroscopic portion of the examination, the contrast agent (a cocktail of equal parts 1% lidocaine and Ominpaque 300) that was injected into the joint rapidly decompressed superiorly through a fistula into the subcutaneous tissues and into an open wound (Fig. 3). The subsequent CT images also demonstrated the fistulous tract between the glenohumeral joint and the skin surface (Fig. 4). The chronic infection had also led to multiple complications of the hardware. For example, the metaglene was no longer

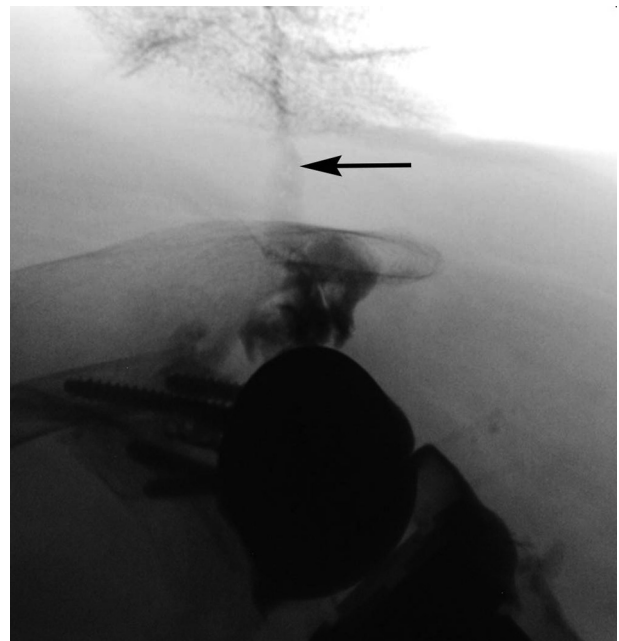


**Fig. 1 – Normal Technetium ( $^{99m}\text{Tc}$ ) exametazime study.** Posterior image of the thorax and shoulders after administration of 27.2 mCi of Technetium ( $^{99m}\text{Tc}$ ) exametazime demonstrates no significant uptake of radioisotope in the left shoulder (red arrow) when compared with the right. Incidental note is made of diffuse uptake in the lungs bilaterally (blue arrow) consistent with inflammation.



**Fig. 2 – Gross image of the left shoulder.** There is an exposed soft-tissue wound on the superior aspect of the patient's left shoulder.

positioned flush with the glenoid (Fig. 5A). Three of the anchoring screws were not coursing appropriately through the glenoid, including the central metaglene anchoring screw (Figs. 5B and C). The polyethylene insert was intact, as were



**Fig. 3 – Intraoperative fluoroscopic image of the left shoulder.** A linear streak of contrast (black arrow) extends superiorly from the joint and through the soft tissues, exiting through the skin. A rotator interval approach was used for the procedure.

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