College of
Osteopathic Medicine
Michigan State University

Streptococcus lutetiensis Prosthetic Shoulder Infection Aiding in the Diagnosis of Invasive Adenocarcinoma of the Colon

Jamil Haddad B.S.,[1,2] Majed Alzahabi, D.O.,[2] Sharif Bishai, D.O.[3]
Department of Orthopedic Surgery
[1]Michigan State University College of Osteopathic Medicine, [2]McLaren Macomb, [3]Henry Ford Health System

Introduction

- Infection is the most common cause of early (<2 years) primary failure of a joint replacement.[1]
- Cost of revision arthroplasties for PJI is more than 5 times as high as revisions for other reasons.[1]
- Incidence of PJI for primary arthroplasties
  - THA: 0.3-1.3%.[2,3] TKA: 1-2%.[2,3] TSA: 4%.[4]
- Incidence of PJI in revision arthroplasties:
  - THA: 3-4%.[5,6] TKA: 5-6%.[5,6] rTSA and TSA: 15%[4,7]

Risk Factors[8]

- Modifiable: Anemia, IVDU, Obesity, Tobacco use
- Nonmodifiable: Cardiac, renal, liver disease, PVD
- Clinical Presentation[9]: Joint pain, stiffness, warmth

Patient Presentation

- 72 year old male presenting in November of 2022
- CC: Acute severe right shoulder pain x 3-4 days
- No fevers, chills, night sweats
- No GI bleeding, changes in bowel or bladder habits
- No traumas or falls
- No cancer histories
- Social: Alcohol abuse, denies IV drugs, tobacco or marijuana
- Medical: COPD, CAD, AAA
- Surgical: Arthroscopic right RCR in 2013, anatomic TSA in 2016

Objective Data

- ROM limited secondary to pain
- ESR: Elevated serum levels
- CRP Elevated synovial and serum levels
- WBC: Elevated synovial levels
- Shoulder Aspiration: Calcium pyrophosphate disease, Synovial neutrophils 90%
- Cultures were sent but no antibiotics were started
- Cultures became positive for S. lutetiensis

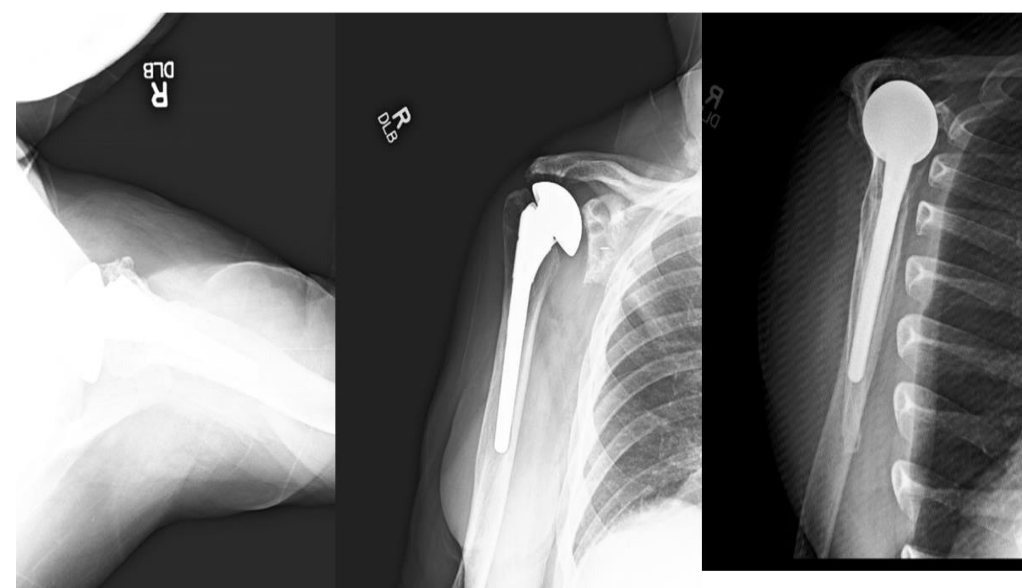

Figure 1 Radiographs revealing the original anatomic shoulder arthroplasty.

Objective Diagnosis

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Major criteria (at least one of the following)	Decision
Two positive cultures of the same organism	Infected
Sinus tract with evidence of communication to the joint or visualization of the prosthesis	

		Minor Criteria	Score	Decision
Preoperative Diagnosis	Serum	Elevated CRP *or* D-Dimer	2	≥6 Infected 2-5 Possibly Infected [a] 0-1 Not Infected
		Elevated ESR	1	
	Synovial	Elevated synovial *WBC count or LE*	3	
		Positive alpha-defensin	3	
		Elevated synovial PMN (%)	2	
		Elevated synovial CRP	1	

	Inconclusive pre-op score *or* dry tap [a]	Score	Decision
Intraoperative Diagnosis	Preoperative score	-	≥6 Infected 4-5 Inconclusive [b] ≤3 Not Infected
	Positive histology	3	
	Positive purulence	3	
	Single positive culture	2	

Table 1 Radiographs revealing the original anatomic shoulder arthroplasty.

Clinical Course

- Infectious diseases consulted for the atypical organism, IV Vancomycin and inpatient colonoscopy was recommended
- Colonoscopy: polyps suspicious for invasive adenocarcinoma
- Open irrigation, debridement and explantation was done
- Intraoperative tissue cultures were obtained

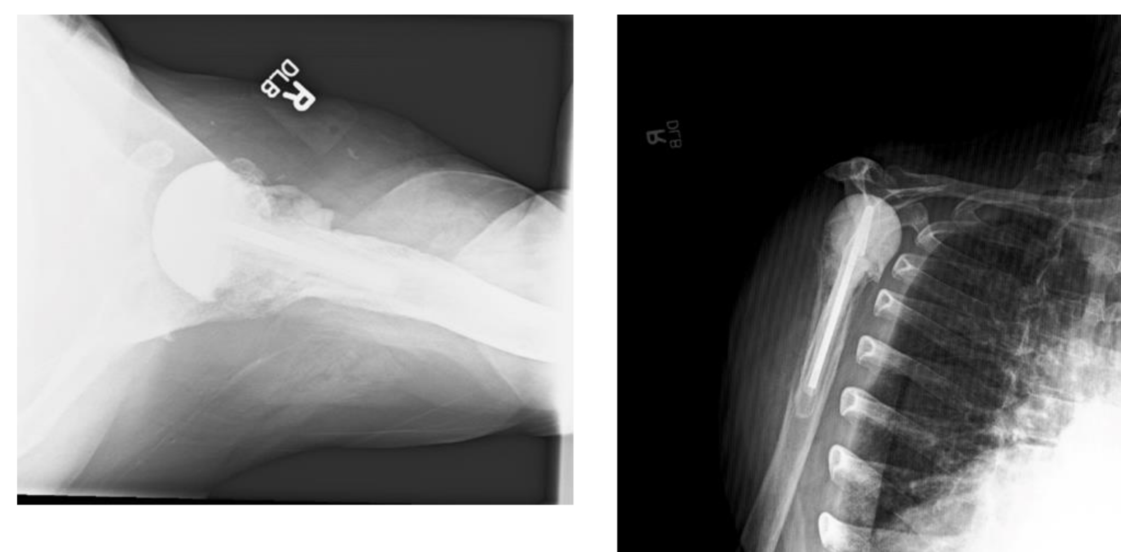

Figure 2 Radiographs revealing explanation of the anatomic shoulder arthroplasty and insertion of the antibiotic spacer. Placed for six months.

- Patient was placed on IV Vancomycin for 6 weeks
- Then transitioned to oral clindamycin for 6 months
- ID recommended another 6 weeks of IV Vanc following rTSA

Conclusions

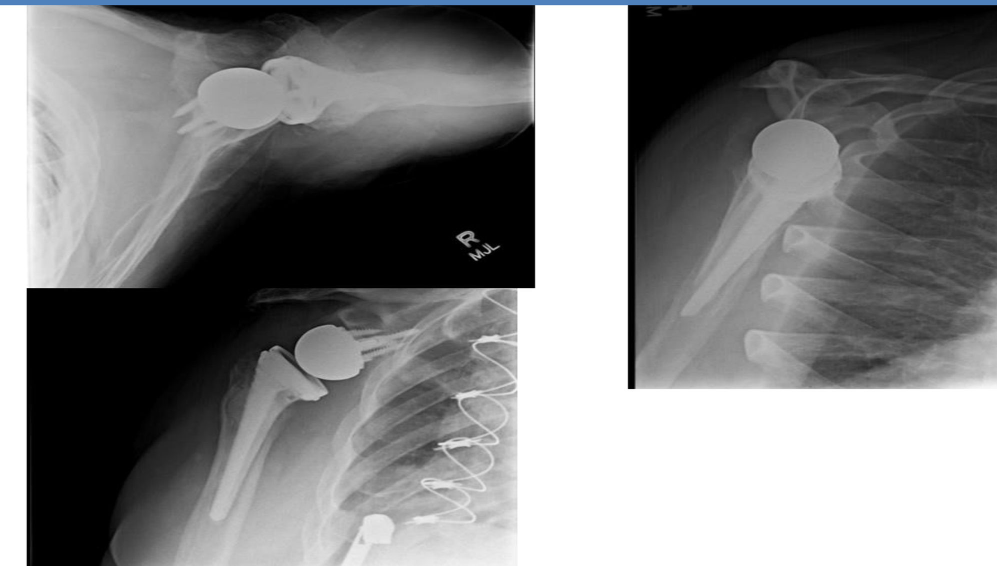

Figure 3 Radiograph of the final reverse total shoulder arthroplasty.

- Negative margins for the adenocarcinoma
  - Invasion to the level of the submucosa
- No metastasis
- Patient underwent right hemicolectomy

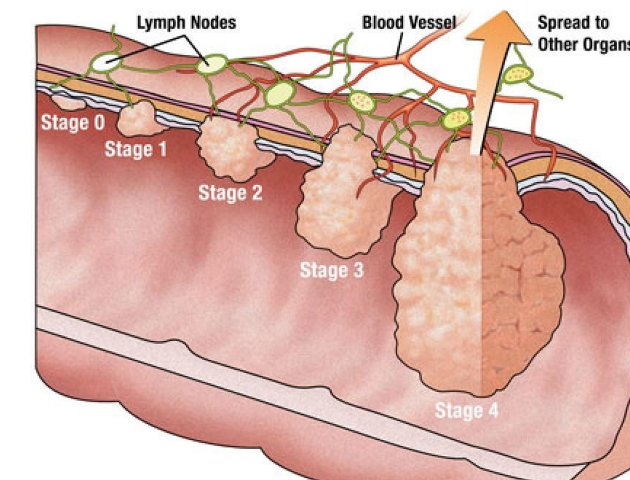

Figure 4 Stages of invasive colonic adenocarcinoma. https://ontariocountyny.gov/919/Tests-for-Colorectal-Cancer

Discussion

Common bacterial etiologies in Shoulder PJI's[10]

- Cutibacterium acnes (60%)
- Coagulase negative Staphylococcus (12.8%)
- Staphylococcus aureus (6.9%)
- Other organisms (18.3%)

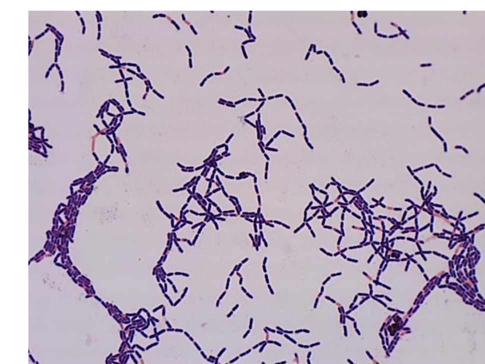

Figure 5 S. Bovis bacteria. https://www.jcm.riken.jp/cgi-bin/jcm/jcm_number?JCM=1157

- Streptococcus bovis group (SBG) Incidence
  - 55% in intestinal flora among patients with colon carcinomas[11]
  - 19% in intestinal flora in patients with noncolonic neoplasms[11]
  - 5-16% of healthy controls[12,13]
- Colorectal carcinoma (CRC) alters the native gut microbiome and promotes SBG[14]
- A strong association: SBG bacteremia and CRC[15]
- SBG bacteremia can cause a biofilm and a PJI[16]

Conclusions

- The European Society of Cardiology entails a colonoscopy for any diagnosis of S. bovis endocarditis[17]
- No such recommendation exists, to our knowledge, with S. lutetiensis or SBG PJIs
- SBG PJIs (including S. lutetiensis) should be worked up with appropriate referral to GI for potentially indolent CRC

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Disclosures

The authors have no financial interests or relationships to disclose.