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Methicillin-Resistant Staphylococcus aureus Sternoclavicular Joint Septic Arthritis With Contiguous Sternomanubrial Osteomyelitis in a Patient With Diabetes Mellitus: A Case Report

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Abstract

Sternoclavicular joint (SCJ) septic arthritis with contiguous sternomanubrial osteomyelitis is rare but potentially life-threatening because of its proximity to the mediastinum and great vessels. This report describes a middle-aged man with diabetes mellitus and prior right lower-extremity osteomyelitis requiring below-knee amputation (BKA) who presented with left anterior chest pain and swelling near the sternoclavicular joint, accompanied by shoulder and neck pain and dysphagia. Computed tomography (CT) and magnetic resonance imaging (MRI) demonstrated left sternoclavicular joint septic arthritis with osteomyelitis involving the medial clavicle, manubrium, and adjacent first rib, associated chest wall abscess with extension toward the anterior mediastinum. Although blood cultures obtained during the index hospitalization were negative, methicillin-resistant *Staphylococcus aureus* (MRSA) was isolated from the resected intraoperative bone specimen. The patient underwent surgical debridement and sternoclavicular joint resection with pectoralis major muscle flap coverage, followed by prolonged anti-MRSA antimicrobial therapy. During rehabilitation, an acute febrile episode was empirically managed with escalated broad-spectrum coverage. Following completion of parenteral therapy, the patient demonstrated complete short-term clinical recovery, surgical site improvement, and declining inflammatory markers. However, persistent mild inflammatory marker elevations highlight the need for continued surveillance, as short-term clinical improvement cannot be equated with confirmed long-term infection eradication. Early recognition and appropriate imaging are critical to identify extensive local disease. This case underscores the importance of considering sternoclavicular joint infection in patients with localized chest pain and swelling, particularly those with diabetes or recent bloodstream infection, even without fever or marked leukocytosis.

Categories: Orthopedics, Internal Medicine, Infectious Disease
Keywords: diabetes mellitus, methicillin-resistant staphylococcus aureus (mrsa), muscle flap transposition, sternoclavicular joint septic arthritis, sternomanubrial osteomyelitis

Introduction

Sternal osteomyelitis is a rare infection involving the osseous structures of the sternum, including the manubrium (the upper segment of the sternum), sternal body, and manubriosternal junction (the articulation connecting the upper manubrium to the sternal body). It is generally classified as either primary or secondary. Primary sternal osteomyelitis develops in the absence of preceding sternotomy, trauma, or direct local infection and is considered to arise predominantly through hematogenous dissemination, whereas secondary sternal osteomyelitis is more commonly associated with median sternotomy, cardiothoracic surgery, chest trauma, or contiguous spread from an adjacent infectious focus [1-3].

Sternoclavicular joint (SCJ) septic arthritis is likewise rare, accounting for less than 1%-2% of all septic arthritis cases in the adult population [1,4]. Despite its rarity, SCJ infection is clinically significant because of the joint's close anatomical relationship with the mediastinum, great vessels, trachea, esophagus, and adjacent chest wall structures. Infection may extend beyond the joint into surrounding soft tissues and adjacent osseous structures, predisposing to retrosternal abscess formation, chest wall phlegmon, contiguous osteomyelitis, or life-threatening mediastinitis, with reported systemic complication and mortality rates ranging between 4% and 15% in complex cohorts [5,6]. *Staphylococcus aureus* is the most frequently isolated pathogen, with both methicillin-sensitive and methicillin-resistant strains reported [1,4]. Diagnosis can be challenging because the initial presentation may consist of nonspecific chest, shoulder, or neck pain, and fever may be absent [4]. Early clinical recognition and appropriate imaging are therefore important, particularly in patients with predisposing conditions or a recent bloodstream infection. Recent literature emphasizes that prompt diagnosis and aggressive multidisciplinary management are essential to prevent severe deep-space complications and reduce recurrence risks [6,7].

The present case involves a middle-aged man with several predisposing factors, including poorly controlled diabetes mellitus and a recent history of lower-extremity osteomyelitis requiring below-knee amputation

(BKA). This prior infectious focus likely served as the source for transient bacteremia and subsequent hematogenous seeding of the SCJ [2,3]. Notably, the absence of prior median sternotomy or postoperative sternal wound infection excluded a secondary post-surgical etiology.

Here, we report the rare and complex presentation of methicillin-resistant *Staphylococcus aureus* (MRSA) sternomanubrial osteomyelitis with concomitant SCJ septic arthritis and anterior mediastinal extension in a middle-aged host with suboptimally controlled diabetes mellitus and recent remote osteomyelitis, highlighting the diagnostic nuances and successful surgical and medical management.

Case Presentation

Clinical presentation and examination

The patient is a 42-year-old man with a medical history of type 2 diabetes mellitus complicated by chronic osteomyelitis of the right lower extremity requiring right below-knee amputation (BKA), hypertension, and chronic kidney disease (CKD). He had been hospitalized for right lower-extremity osteomyelitis five weeks prior, during which he underwent right BKA and was subsequently discharged on intravenous antibiotic therapy for approximately four weeks. Near the end of this antibiotic course, he developed left chest wall pain and swelling, for which an outpatient chest radiograph was recommended. However, progressive worsening of his symptoms prompted hospital admission. On further evaluation, the patient described gradually intensifying stabbing pain originating from the area of swelling and radiating to the left shoulder and back. The pain also radiated along the left side of the neck and was associated with dysphagia and ipsilateral shoulder pain exacerbated by movement. He reported that the pain began toward the end of the antibiotic course prescribed for his preceding right lower-extremity osteomyelitis and progressively worsened. Initial examination revealed a firm, nonfluctuant, erythematous lesion that progressively enlarged and became increasingly tender, erythematous, and warm. The swelling progressively became tender toward the completion of his outpatient antimicrobial therapy. He reported no preceding fever, headache, recent chest trauma, or night sweats.

On admission, his blood pressure was 121/76 mmHg, measured in the left arm while supine; pulse rate, 79 beats/min; temperature, 36.5°C (97.7°F), measured orally; respiratory rate, 17 breaths/min; and oxygen saturation, 100% on room air. Prior administration of rectal acetaminophen (650 mg every eight hours) may have attenuated fever at presentation.

On examination, the patient was diaphoretic and had dysphagia and neck pain. A prominent swelling was present over the left sternoclavicular joint on the anterior chest wall, with associated erythema and increased local warmth. The swelling was firm and nonfluctuant. Cardiovascular examination was unremarkable, with no tachycardia or lower-extremity edema, and gastrointestinal and pulmonary examinations were also unremarkable. The prior BKA site appeared healthy, with an intact stump.

Laboratory and imaging findings

Initial evaluation included a complete blood count (CBC), comprehensive metabolic panel (CMP), coagulation studies, electrocardiography, serial troponin measurements, blood cultures, imaging, specialty consultations, and subsequent intervention. Marked systemic inflammation was noted with an elevated C-reactive protein (CRP) level of 18.8 mg/dL despite a normal peripheral leukocyte count (10.9 × 10^3/µL). The comprehensive metabolic panel demonstrated elevated blood urea nitrogen (39 mg/dL) and serum creatinine (1.45 mg/dL), consistent with the patient's baseline stage 3 chronic kidney disease (1-2 mg/dL). Glycemic control was suboptimal, with a glycated hemoglobin (HbA1c) of 6.9% and an admission blood glucose of 94 mg/dL. Baseline serum electrolytes, preoperative coagulation parameters (prothrombin time (PT): 13.2 seconds, international normalized ratio (INR): 1.19), and serial cardiac troponins were within normal limits.

Initial blood cultures obtained on admission to the preceding facility (where the patient had undergone BKA) grew methicillin-resistant *Staphylococcus aureus* (MRSA). Following the initiation of targeted intravenous (IV) vancomycin, repeat blood cultures at 48 hours demonstrated clearance of bacteremia, and all subsequent blood cultures remained negative. This rapid 48-hour clearance confirmed early systemic microbiological control.

Contrast-enhanced computed tomography (CT) of the chest at the referring hospital demonstrated erosive bone changes, joint space disruption, and surrounding soft-tissue inflammation at the left sternoclavicular joint (SCJ), involving the medial clavicular head, sternal manubrium, and anterior left first rib, suggestive of septic arthritis and contiguous osteomyelitis. After being transferred to the second hospital, non-contrast magnetic resonance imaging (MRI) of the chest was performed to further characterize soft-tissue extension, demonstrating extensive signal hyperintensity and soft-tissue edema centered at the left SCJ on short tau inversion recovery (STIR) sequences, extending throughout the left anterior chest wall, supraclavicular space, neck, and shoulder. A loculated fluid collection was identified within the subcutaneous soft tissues anterior to the joint, measuring approximately 1.9 × 2.1 × 2.1 cm and concerning for an abscess. Cortical erosion of the clavicular head, left sternum, and manubrium, together with bone marrow edema, was

concerning for osteomyelitis. Additionally, marked retrosternal edema extended toward the anterior mediastinum, raising concern for early mediastinitis, accompanied by a deep hyperintense collection measuring 5.6 x 2.3 x 2.3 cm located posterior to the manubrium and sternum, concerning for a retrosternal abscess or phlegmon. To definitively evaluate for a drainable fluid collection, a repeat CT of the chest with contrast was subsequently obtained at our facility. This confirmed left SCJ osteomyelitis and septic arthritis with bilateral bone erosions, but re-characterized the retrosternal collection as a heterogeneous 4.0 cm phlegmon without a drainable abscess. Associated mediastinitis and cellulitic fat stranding extended into the left central neck compartment, providing a plausible anatomical cause for local nerve irritation and the patient's presenting dysphagia. Additionally, renal ultrasonography demonstrated no hydronephrosis with a post-void residual volume of 100 mL.

Diagnosis and treatment

The initial differential diagnosis included chest wall cellulitis or abscess, traumatic or inflammatory disorders of the sternoclavicular joint, and, less likely, neoplastic disease. The confluence of recent MRSA bacteremia, localized inflammatory swelling, and cross-sectional imaging demonstrating joint destruction with contiguous osseous erosion strongly favored an infectious etiology. The final diagnosis was MRSA-associated left sternoclavicular joint septic arthritis with contiguous osteomyelitis of the medial clavicle and manubrium, an adjacent chest wall abscess or phlegmon, and soft-tissue extension toward the anterior mediastinum.

Empiric intravenous vancomycin (1.25 g every 24 hours) was initiated on the basis of the patient's recent MRSA bacteremia. To address his suboptimally controlled type 2 diabetes mellitus (HbA1c: 6.9%), oral antihyperglycemic agents were discontinued, and he was transitioned to an inpatient basal-bolus insulin regimen comprising bedtime subcutaneous insulin glargine (5 units) and correctional mealtime insulin lispro (0-12 units). Home antihypertensive therapy with amlodipine and losartan was continued.

The infectious disease service was consulted and endorsed continuation of vancomycin therapy. Repeat peripheral blood cultures obtained during the current admission demonstrated no growth at 48 hours, and transthoracic echocardiography revealed no valvular vegetations. Otolaryngology was consulted to evaluate persistent dysphagia and a suspected soft-tissue asymmetry of the posterolateral oral tongue noted on MRI; however, the patient was unable to tolerate bedside flexible nasopharyngoscopy.

Cardiothoracic surgery subsequently performed resection of the left SCJ and extensive soft-tissue debridement. A skin incision was carried out over the left medial clavicle, and devitalized, boggy subcutaneous tissue was excised. Dissection was maintained along the clavicular periosteum and extended circumferentially around its undersurface. While dissecting around the undersurface of the clavicle and exploring the retrosternal space, no abscess cavity was encountered. The medial clavicular head and SCJ were transected and removed; intraoperative inspection confirmed gross purulence and destruction within the joint space. A rongeur was utilized to debride the head of the anterior left first rib, which appeared viable without overt infection. Following thorough antibiotic irrigation and meticulous hemostasis, a 10-Fr Jackson-Pratt (JP) closed-suction drain was placed deep within the surgical bed via a separate stab incision. A pectoralis major muscle transposition flap was mobilized and advanced over the bony defect to obliterate dead space. The subcutaneous tissues and skin were reapproximated in layers, and the patient tolerated the procedure without immediate complications. Intraoperative bone cultures yielded MRSA, confirming the microbiological diagnosis. Infectious disease recommended a 4- to 6-week course of targeted intravenous antimicrobial therapy postoperatively.

Clinical course and outcome

Postoperatively, the white blood cell (WBC) count was stabilized to 10.08 × 10^3/μL over five days. The patient was transferred to a nursing rehabilitation facility for physical therapy addressing generalized weakness, gait disturbance, and reduced endurance. During his rehabilitation course, he experienced an acute febrile flare with chills and chest pain. His temperature peaked at 40°C (104°F) before defervescing to 38.3°C (101°F) following acetaminophen administration.

The chest pain was described as sharp, localized over the surgical site, exacerbated by left shoulder motion, and initially rated 10/10 in severity before decreasing to 7/10 on the subsequent day. Laboratory evaluation showed a secondary leukocytosis (14.57 × 10^3/μL) and hyperglycemia (glucose: 214 mg/dL, HbA1c: 7.7%), while serum creatinine (1.61 mg/dL) remained within his baseline range (1-2 mg/dL). The JP drain yielded 30 mL of turbid output; however, repeat peripheral blood cultures demonstrated no growth. Antimicrobial coverage was empirically escalated to IV daptomycin (700 mg once daily) and IV meropenem (500 mg every eight hours), and his basal-bolus insulin regimen was titrated (Table *1*).

Clinical setting and phase	Antimicrobial regimen and dosage	Duration	Clinical rationale and anchoring milestone
Phase 1: initial BKA course	IV vancomycin 1250 mg OD	4 weeks	Completed following BKA at the initial facility. There was a gap of one week between the last antimicrobial dose and admission to hospital for chest pain.
Phase 2: pre-SCJ resection	IV vancomycin 1250 mg OD	2 weeks	Initiated upon readmission for SCJ involvement; achieved blood culture clearance at 48 hours.
Phase 3: post-SCJ resection	IV vancomycin 1250 mg OD	6 weeks	Initiated postoperatively; duration anchored to intraoperative bone debridement/source control.
Phase 4: rehabilitation flare	IV daptomycin 700 mg OD + IV meropenem 500 mg TDS	2 weeks (completed)	Empirical escalation during acute febrile episode to cover tolerant Gram-positive strains, nosocomial Gram-negative bacilli, and anaerobes. Fully completed.

TABLE 1: Overview of the sequential antimicrobial therapy administered across the clinical course

BKA: below-knee amputation, SCJ: sternoclavicular joint, IV: intravenous, OD: once daily (omne in die), TDS: three times daily (ter die sumendum)

The patient defervesced the following day. Over the subsequent five days, repeat wound and drain cultures demonstrated no growth, the leukocyte count normalized to 7.45 × 10^3/µL, and serum creatinine improved to 1.24 mg/dL; however, the erythrocyte sedimentation rate (ESR) and CRP remained elevated at 52 mm/h and 2.23 mg/dL, respectively. The infectious disease service recommended continuing targeted antimicrobial therapy for an additional two weeks. Blood cultures remained persistently negative, and the patient experienced no further fever spikes or recurrent chest pain. Postoperative chest radiography demonstrated the resected sternoclavicular joint without other significant abnormalities (Figure *1*). Contrast-enhanced CT of the chest showed a comminuted fracture of the left clavicle with associated erosive changes at the left sternoclavicular joint, but no fluid collection or mature drainable abscess cavity was identified. Drain output decreased to 10 mL of mildly turbid in nature. During the available follow-up period, the patient demonstrated clinical improvement, resolution of leukocytosis, improved renal function, and progressive healing of the surgical wound. However, long-term outcomes could not be assessed because the patient was transferred to his previously affiliated tertiary facility for precautionary subspeciality review of his last CT findings, leaving subsequent longitudinal records unavailable. At the time of discharge from the rehabilitation facility, the surgical incision was clean, dry, and well-approximated without residual warmth, erythema, or purulent drainage. The drain was removed after the output was less than 10 mL/day and initial leukocytosis and systemic symptoms had fully normalized. Serial inflammatory markers demonstrated marked improvement overall; however, ESR and CRP remained mildly elevated at discharge. The overview of the sequential antimicrobial therapy administered is summarized in Table *1*, the serial laboratory trends are detailed in Table *2*, and the chronological course of the patient's presentation, diagnosis, treatment, and recovery is summarized in Table *3*.

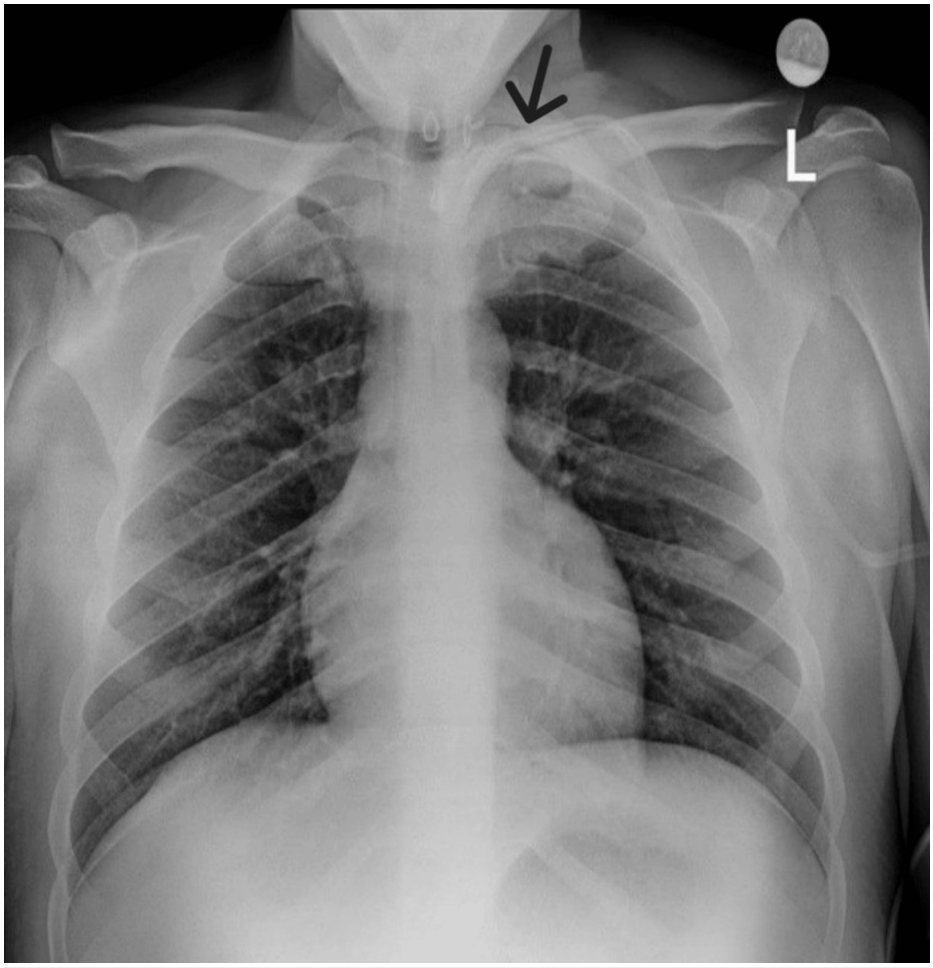


FIGURE 1: Postoperative chest radiograph (anteroposterior view)

Full-view chest radiograph demonstrating asymmetry of the sternoclavicular joints, with truncation and absence of the medial head of the left clavicle following surgical debridement and resection (arrow), compared with the intact right sternoclavicular joint

Parameter	Admission/baseline	Postoperative period	Rehabilitation (febrile episode)	Rehabilitation (after treatment)	Reference values (male)
WBC (× 10^3/uL)	10.9	10.08	14.57	7.45	4-11
CRP (mg/dL)	18.8	-	-	2.23	<1
ESR (mm/h)	-	-	-	52	0-15
BUN (mg/dL)	39	47	42	40	7-20
Creatinine (mg/dL)	1.45 *(baseline 1-2)	1.71	1.61	1.24	0.7-1.3
Hb (g/dL)	10.1	9.7	10.3	10.4	13.8-17.2
Hematocrit (Hct%)	33	30.8	32.5	32.5	40.7%-50.3%
HbA1c (%)	6.9	-	7.7	-	Normal: <5.7%, prediabetes: 5.7%-6.4%, diabetes: ≥6.5%

TABLE 2: Serial laboratory values during clinical course

*Note: Baseline serum creatinine level (1-2 mg/dL) reflects the patient's pre-existing stage 3 CKD.

WBC: white blood cell, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, BUN: blood urea nitrogen, Hb: hemoglobin, Hct: hematocrit, HbA1c: glycated hemoglobin, CKD: chronic kidney disease

Date/timeframe	Event
Week 0	The patient underwent right BKA for lower-extremity osteomyelitis at an outside facility. Blood cultures grew MRSA, and he was discharged on a 4-week outpatient IV antibiotic regimen.
Week 4	During the final week of his 4-week antibiotic course, the patient developed progressive left chest wall pain, local swelling, dysphagia, and neck radiation.
Week 5	Admitted to the previous hospital due to unbearable pain one week later. Initial blood cultures yielded MRSA on the first day of admission. Empiric IV vancomycin was initiated. Repeat blood cultures at 48 hours demonstrated clearance of bacteremia (no growth), with all subsequent cultures demonstrating no growth.
Week 6, day 2	Transferred to a new hospital for cardiothoracic surgery evaluation due to concern for anterior mediastinitis findings on the MRI.
Week 6, day 6	Advanced imaging completed at the hospital. CT and MRI confirmed left SCJ septic arthritis with osteomyelitis (clavicle, sternum, first rib) and a 4 cm retrosternal phlegmon/fat stranding extending toward the anterior mediastinum, with no discrete drainable abscess.
Week 7	Operative intervention: left SCJ resection, medial clavicular head excision, first-rib debridement, pectoralis major muscle flap transposition, and 10-Fr JP drain placement. Intraoperative bone cultures yielded MRSA.
Week 7	Completed a 4- to 6-week course of targeted IV vancomycin postoperatively. Progressive surgical wound healing, decrease in JP drain output, and stabilization of inflammatory markers.
Week 9	Transferred to a nursing rehabilitation facility for physical therapy and gait training and completion of the remaining antibiotic regimen.
Week 12	Acute febrile flare: the patient developed fever (104°F), sharp chest pain, leukocytosis (14.57 × 10^3/μL), and turbid JP drain output. Antimicrobial therapy was empirically escalated to IV daptomycin and meropenem.
Week 12, day 4	Defervescence and clinical stabilization with no recurrent pain. Leukocytes normalized (7.45 × 10^3/μL), and ESR (52 mm/h) and CRP (mg/dL) remained elevated. ID advised extending antimicrobial coverage for two additional weeks.
Week 14	Following completion of the extended 2-week antibiotic course, repeat blood, wound, and drain cultures showed no growth. The patient was transferred back to the tertiary hospital for subspecialty review of repeat chest CT findings.
Week 17	The patient was successfully discharged home after staying in hospital for three weeks. Outcome records from the post-nursing rehabilitation facility are unavailable, as the patient was lost to follow-up and could not be contacted.

TABLE 3: Chronological summary of the patient's clinical course, diagnosis, treatment, and recovery

BKA: below-knee amputation, CRP: C-reactive protein, CT: computed tomography, ED: emergency department, ESR: erythrocyte sedimentation rate, ID: infectious disease, IV: intravenous, JP: Jackson-Pratt, MRI: magnetic resonance imaging, MRSA: methicillin-resistant *Staphylococcus aureus*, SCJ: sternoclavicular joint, WBC: white blood cell

Discussion

Diagnostic challenges and risk of serious complications

The nonspecific clinical manifestations of sternoclavicular joint (SCJ) infection can lead to diagnostic delay [8]. Ross and Shamsuddin reported chest pain in 78% of patients and shoulder pain in 24%, whereas fever was present in only approximately two-thirds of cases [4]. Similarly, Kachala et al. identified pain as the most common presenting symptom among surgically treated patients [9]. Notably, while classic SCJ septic arthritis typically presents acutely with localized joint tenderness, high-grade fever, and marked leukocytosis, our patient presented with an atypical afebrile onset and prominent dysphagia. The absence of fever upon presentation was potentially attenuated by his routine outpatient administration of rectal acetaminophen (650 mg every 8 hours) for musculoskeletal pain, serving as a recognized clinical confounder that can obscure early diagnostic recognition. Furthermore, his presenting complaint of progressive dysphagia, an unusual feature in joint infections, was attributable to mechanical compression and soft-tissue inflammation, which were some of the other atypical features that made this case different. Blunted inflammatory responses or normal leukocyte counts are recognized diagnostic confounders in SCJ infection and may obscure early clinical recognition [10,11]. Ultimately, the presence of firm, erythematous, warm swelling over the SCJ in the context of recent MRSA bacteremia prompted further imaging, which revealed extensive joint, osseous, and soft-tissue involvement. These findings emphasize the need for a high index of suspicion for SCJ infection even in the absence of fever or marked leukocytosis [4,8].

SCJ involvement is frequently diagnosed late because of its rarity and nonspecific presentation. SCJ septic arthritis accounts for only 0.5%-1% of all cases of septic arthritis in the general population [8,12]. Despite its low incidence, timely recognition is critical because of the joint's anatomical proximity to the mediastinum, great vessels, trachea, esophagus, and upper chest wall [8]. Infection may therefore extend beyond the joint and result in osteomyelitis, chest wall abscess, phlegmon, mediastinitis, and other serious complications [10,12]. In a review of 180 cases of SCJ infection, osteomyelitis occurred in 55% of patients, chest wall abscess or phlegmon in 25%, and mediastinitis in 13%, demonstrating the substantial potential for local extension [4]. Studies by Kwon et al. [12] and Ali et al. [13] further highlighted the considerable morbidity associated with SCJ infection and the frequent need for surgical intervention in advanced disease. In our patient, the infection extended beyond the SCJ to involve the medial clavicle and manubrium, culminating in osteomyelitis, with extensive surrounding soft-tissue infection, abscess/phlegmon formation, and extension toward the anterior mediastinum. This pattern illustrates the potentially aggressive local progression of this uncommon infection.

Furthermore, post-rehabilitation cross-sectional imaging describing a comminuted fracture of the left clavicle with surrounding erosive changes highlighted a notable diagnostic challenge. Because active osteomyelitis and post-surgical osseous healing share significant overlapping features on cross-sectional imaging, both producing cortical irregularity, periosteal reaction, and structural bone defects from surgical rongeuring, it was not radiologically possible to definitively distinguish residual infection from expected postoperative bone remodeling and healing margins. This diagnostic ambiguity, coupled with the preceding postoperative febrile flare, underscored the limitations of routine follow-up CT in complex chest wall resections. Consequently, the patient was transferred back to the affiliated facility for specialized subspecialty review and advanced imaging interpretation, ensuring that subtle structural complications or persistent deep-space involvement could be reliably evaluated before final clinical disposition.

Risk factors and possible route of infection

Several predisposing risk factors have been associated with sternoclavicular joint (SCJ) septic arthritis and contiguous sternomanubrial osteomyelitis, including diabetes mellitus, chronic kidney disease, a distant source of infection, intravenous drug use, and indwelling vascular catheters [8,12,13]. In their respective series, Ross and Shamsuddin [4] and Kachala et al. [9] demonstrated a particularly high prevalence of suboptimally controlled diabetes mellitus and remote bacteremic sources among patients requiring surgical management for advanced SCJ infections. The patient described herein possessed multiple potential risk factors, including diabetes mellitus, chronic kidney disease, and recent right lower-extremity osteomyelitis secondary to recent methicillin-resistant *Staphylococcus aureus* (MRSA) infection. Intraoperative bone cultures from the resected SCJ subsequently yielded MRSA with an identical resistance profile, strongly implicating hematogenous seeding from the recent lower-extremity infectious source. The patient reported no history of chest trauma or sternotomy. Given the absence of prior sternotomy or direct chest trauma and the recent MRSA bacteremia associated with lower-extremity osteomyelitis, hematogenous seeding was considered the most plausible mechanism, consistent with its recognized role as a major route of joint inoculation in nontraumatic cases [11,12]. Nevertheless, the exact route of dissemination could not be definitively determined.

Surgical and antimicrobial management

Management of SCJ septic arthritis depends on the anatomical extent of disease, presence of associated complications such as osteomyelitis or abscess formation, pathogen virulence, and the patient's response to therapy [8,12]. Although localized infection without adjacent osseous involvement or abscess formation may respond to antimicrobial therapy alone, extensive disease involving surrounding bone, abscess formation, or mediastinal extension generally warrants surgical source control. Ross and Shamsuddin emphasized the importance of surgical intervention in patients with extensive bony destruction, abscess formation, or mediastinal involvement [4]. Similarly, surgical series have shown that SCJ resection is frequently required in advanced disease, while systematic review data have strengthened that resection is the predominant operative approach reported in the literature [5,6]. In our patient, contiguous disease involvement extending into the medial clavicular head and manubrium, coupled with retrosternal phlegmon, provided a compelling indication for radical surgical debridement and joint resection [8,13].

The dual objectives of surgical management in advanced SCJ osteomyelitis are the eradication of infected tissue and the provision of vascularized soft-tissue coverage to obliterate dead space while maintaining musculoskeletal stability [5,12]. Muesse et al. demonstrated favorable long-term outcomes utilizing operative debridement, SCJ resection, and local muscle flap coverage for sternomanubrial osteomyelitis [14]. In the present case, the infected clavicular head and SCJ were resected, unhealthy soft tissue was debrided, the first rib was assessed and found to have no gross evidence of infection, and the wound was irrigated before drain placement. A pectoralis muscle flap was subsequently advanced to cover the underlying defect. This approach enabled removal of the infected joint and bone while providing vascularized soft-tissue coverage of the surgical defect [14,15]. The patient's subsequent clinical improvement, development of healthy granulation tissue, decreasing drain output, and eventual healing of the surgical site were consistent with effective surgical source control.

Targeted antimicrobial therapy remains an indispensable adjunct to operative source control. Although the optimal duration of postoperative antimicrobial therapy is not universally standardized because of the rarity of the disease, treatment courses typically range from four to eight weeks depending on the clinical resolution, laboratory trends, and clearance of bacteremia [4,12]. Given the patient's history of MRSA bacteremia and intraoperative bone cultures yielding MRSA, vancomycin was initiated and was continued after surgical source control under infectious disease service guidance. During rehabilitation, the patient experienced an acute febrile flare with chills, transient chest pain, leukocytosis (14.57×10^3/μL), and turbid JP drain output, raising initial clinical concern for persistent or recurrent deep-space infection. Consequently, empiric antimicrobial coverage was broadened to intravenous daptomycin and meropenem. However, subsequent blood and wound cultures remained negative, the patient became afebrile, leukocytosis resolved, renal function improved, and the surgical site continued to heal. Therefore, recurrence of the original infection could not be microbiologically confirmed. Continued clinical improvement with prolonged antimicrobial therapy and progressive surgical wound healing supported a favorable short-term response following definitive source control and tailored antimicrobial therapy [12,14].

Limitation

A primary limitation of this case is the lack of long-term longitudinal follow-up, which precludes distinguishing definitive microbiological cure from short-term clinical stabilization. At the conclusion of parenteral therapy, the patient achieved complete clinical recovery, leukocytosis resolution, surgical site healing, and a downward trend in acute phase reactants; however, mild ESR and CRP elevations persisted. In this clinical context, declining biomarker trends alongside residual mild elevations support two main conclusions: expected physiological lag during post-surgical tissue repair and bone remodeling, or a low-grade, antimicrobially suppressed residual infection. Because inflammatory marker kinetics frequently lag behind clinical recovery following radical chest wall resections, absolute normalization is not strictly required prior to antibiotic discontinuation in a stable host, although it mandates structured outpatient surveillance with serial monitoring.

Conclusions

This case highlights the importance of maintaining a high index of clinical suspicion for sternoclavicular joint septic arthritis and contiguous osteomyelitis in patients presenting with localized anterior chest wall pain and swelling, particularly those with underlying diabetes mellitus, chronic kidney disease, or a recent remote bloodstream infection. Crucially, affected individuals may present without systemic fever or marked leukocytosis, leading to potential diagnostic delay. Prompt contrast-enhanced imaging is critical for detecting osteomyelitis, soft-tissue phlegmon, and extension toward vital retrosternal and mediastinal structures. In patients with extensive infection involving the sternoclavicular joint and adjacent bone, radical surgical resection combined with vascularized muscle flap reconstruction and prolonged pathogen-directed antimicrobial therapy serves as a key therapeutic strategy for achieving effective source control. Given the diagnostic ambiguity of post-surgical imaging and mildly elevated discharge inflammatory markers, this outcome represents successful short-term clinical stabilization rather than verified long-term eradication. Longitudinal outpatient follow-up with serial ESR/CRP monitoring remains essential to confirm lasting recovery and rule out late indolent recurrence.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Shubhangi Kansal, Dinesh Sethi

Acquisition, analysis, or interpretation of data: Shubhangi Kansal

Drafting of the manuscript: Shubhangi Kansal

Critical review of the manuscript for important intellectual content: Shubhangi Kansal, Dinesh Sethi

Supervision: Dinesh Sethi

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Beacon Rehabilitation and Nursing Center Institutional Review Board (IRB) issued approval N/A. This retrospective single-patient case report was reviewed and formally approved by the Institutional Review Board (IRB) of Beacon Rehabilitation Center. The report was prepared in accordance with the ethical principles of the Declaration of Helsinki and institutional standards governing clinical research. Written informed consent for publication was not obtained because the patient could not be

reached despite reasonable and repeated efforts to contact the patient. He had subsequently been transferred to another healthcare facility and discharged and was therefore no longer available for follow-up at our facility. The case report has been fully de-identified and contains no direct patient identifiers or clinical photographs in strict compliance with HIPAA privacy guidelines. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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