

CASE REPORT

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Septic dislocation of the knee in the immunosuppressed: A triad of jeopardy in the face of COVID-19 pandemic

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ABSTRACT

Introduction: Posterior knee dislocation in adult sequel to septic arthritis of the knee joint is very rare. Being immunocompromised poses a greater threat on the morbidity and mortality that is associated with septic arthritis. Therefore, there is a need to be proactive in the diagnosis and treatment of septic arthritis, especially in the setting of immunosuppression. Reports in this aspect of the disease have been petit, therefore, this case report seeks to further create awareness of this unconventional presentation of acute septic arthritis, its rapid progression, and outcome in a diabetic. **Case Report:** A 40-year-old man with background diabetic nephropathy presented with clinical and radiological features of septic dislocation of the left knee. He had multidisciplinary care by the endocrinology, renal, and orthopedic teams which include urgent joint arthrotomy and washout, reduction of dislocation, and immobilization with an above knee backslab, renal dialysis, and glycemic control with good clinical outcome. He was subsequently discharged for follow-up but he had difficulties booking appointment with the attending physicians because of the ensuing COVID-19 lockdown and he subsequently deteriorated and died. **Conclusion:** The effect of COVID-19 is not only on infected patients but also hampering access to healthcare on the generality of patients.

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INTRODUCTION

Since the outbreak of COVID-19 in Wuhan, China, and its subsequent spread to other parts of the world, the pandemic has had continued untoward consequences, especially on healthcare delivery.

Septic arthritis is the infection of the joint space with subsequent destruction of the articular cartilage and the subchondral bone. It is commoner in the extremes of ages with no sex predilection.

Septic arthritis is one of the most dreaded orthopedic emergencies with multiple and rapidly occurring sequelae on the affected joint in the body [1, 2]. High index of suspicion and proactiveness is needed in the diagnosis, evaluation, and management especially in the immunosuppressed, because the outcome of this disease condition is generally more debilitating than in the general population [2–4]. If not promptly treated, it can cause a rapid destruction of the joint cartilages [5]. Risk factors include extremes of ages, immunosuppression, joint surgeries, and presence of a prosthesis [2, 6, 7]. The immunosuppression as seen in the index patient is of special consideration. Although the knee joint is the commonest location of septic arthritis in adults and hip joint is the commonest

in children [4], septic dislocation of the knee joint in adult is a very rare complication. [1] The only case report we found in literature was seen as a long-term complication following treatment [1]. However, dislocation of the shoulder and elbow following septic arthritis has been well documented [6, 8].

Sequel to the ongoing rise in diabetes mellitus and other immunosuppressive diseases globally, especially in middle–low income countries where patients present to the hospital at the late stages of disease, so there is a need to understand the susceptibility of these groups of patient [2, 9]. Diabetic nephropathy is a recognized microvascular complication of diabetes mellitus and it has a significant effect on kidney function. Persistent hyperglycemia suppresses neutrophil locomotion, chemotaxis, and phagocytosis, reducing the viability of the body's response to infection. Therefore, infections can easily go unrecognized because of the breach in the patients' cell-mediated immune system [4] due to the persistent increase in blood sugar especially in patients who are noncompliant with drugs and/or are not consistent with clinic appointment, as in the index case who had hampered access to healthcare due to COVID-19 lockdown.

This case shows clearly the impact of immunosuppression on the clinical presentation, course, and outcome of septic arthritis and how sensitivity in the diagnosis, prompt treatment when diagnosed is required to maximize resources and minimize the morbidity and decimated quality of life caused by delay [4, 9]. The objective of this case report was to highlight the need for early diagnosis, prompt appropriate treatment of septic arthritis sequel to immune suppression and the awareness of a knee dislocation as a rare dreadful complication even in young adults.

CASE REPORT

The patient is a 40-year-old man who presented with a week history of left knee pain and swelling. The pain was dull and severe, hampering his daily activities. It was aggravated by movement at the knee joint and relieved by analgesia. Also the swelling was progressive, associated with inability to bear weight on the same limb. There was no associated fever, chill, and rigors, and there are no swellings in other parts of the body. Other systems were essentially normal.

The patient was a known diabetic, diagnosed two years ago, complicated by diabetic nephropathy, and had one course of hemodialysis. He had been non-compliant with medications and follow-up. He was not a known hypertensive, asthmatic, or peptic ulcer disease.

Clinical examination revealed a middle aged man, chronically ill-looking, mildly pale, anicteric, afebrile (37 °C), no pedal edema. There was a 2 cm by 6 cm wound on the anteromedial surface of the lower third of the left thigh, the left knee joint was held in slight

flexion. There was differential warmth, tenderness, and limited range of movement of the left knee with abnormal translation of the left femoral condyle over the left tibia. Test aspiration of the joint yielded pus. A diagnosis of posterior dislocation of the left knee from septic arthritis in a patient with background diabetic nephropathy was made which was confirmed by radiographs of the affected knee (Figures 1 and 2).

The patient care was multidisciplinary, involving orthopedic surgeon, endocrinologist, nephrologist, microbiologist, and the physiotherapist. He had levofloxacin, initially intravenous (IV) then oral empirically, based on the local antibiotic sensitivity pattern. Subcutaneous soluble insulin monitored using the four point glucose check. Electrolyte, urea, and creatinine at the time of review showed: Na⁺ 124 mmol/L, K⁺ 3.5 mmol/L, Cl⁻ 89 mmol/L, HCO₃⁻ 20 mmol/L, urea 3.5 mg/dL, Cr 103 mg/dL. Hematocrit of 19% was optimized by blood transfusion, hematinics, subcutaneous erythropoietin 4000 IU twice weekly and multivitamins. Also had oral alpha meditol 0.25 ug on alternate days. He had surgical arthrotomy and copious irrigation of the knee joint. Findings include: near-to-full destruction of the articular cartilages on the femoral condyles, tibia plateau, and patella surface with pocket of pus extending into lateral recess of the knee joint and dislocation of the left knee joint. There was no neurovascular deficit. The knee was reduced and thereafter dressed with sterile gauze, crepe bandage, and an above knee backslab was applied to maintain the



Figure 1: Clinical image of the left knee upon presentation.



Figure 2: (A) Lateral view of the left knee joint. (B) Anteroposterior view of the left knee joint.

reduction. Daily dressing of the thigh wound was effected with povidone iodine and honey. The patient's clinical condition improved with good glycemic control and was discharged to follow-up on oral hypoglycemics and partial weight bearing with bilateral axillary crutches. Following the COVID-19 lockdown and the attendant difficulty in securing an appointment with the endocrinologist and the nephrologist, the patient's glycemic control and renal status deteriorated. The patient was readmitted for an urgent dialysis, however, he died before he could be dialyzed of uremic cardiac failure.

DISCUSSION

COVID-19 has continued to be a global threat, impacting almost all human endeavors [10]. Countries are therefore taking different measures to curtail the spread, necessitating lockdown in most part of the world. The lockdown has a pronounce effect on patients' follow-up, especially in resource limited centers where the patient may need to always book a face-to-face clinical appointment with their physicians [11]. The lockdown may have more negative effect on patient with multiple comorbidities as seen in the index patient.

Septic arthritis is the infection of the joint space with subsequent destruction of the articular bone surfaces. Though it affects both immunocompetent and immunocompromised patients [4, 12], it is however commoner in the extreme of ages, individuals undergoing treatment for other joint diseases. Septic arthritis of the hip and knee joint is the commonest form in children and adult respectively [4, 12], with most knee dislocation in adult and secondary to trauma being anterior [1]. However, septic dislocation is an extremely rare presentation of septic arthritis [4]. It is one of the most dreaded orthopedic emergencies, not only due to its rapid clinical course but also its fatal outcome on the affected joint [4, 13].

Though in the index patient the organism was not isolated, gonococcal septic arthritis was the most common cause of septic arthritis in the pre-antibiotic era. However, the etiology of septic arthritis differs among different groups of patients. *Neisseria gonorrhoea* is the leading cause among young sexually active adults, meanwhile *Staphylococcus aureus* and *Streptococcus* are mostly implicated cumulatively with *Staphylococcus aureus* posing more virulence [2, 4, 5]. Other organisms include *Pseudomonas*, *Klebsiella* spp., *Proteus* spp., and the atypical ones such *Kingella*, *Legionella* spp., *Bordetella*, *Sphingomonas* spp. more common in the immunocompromised patients. Mechanism of infection may be through hematogenous spread, direct inoculation, or spread from other surrounding structures in the index patient [4, 5], the hematogenous spread constituting a higher percentage. Infection leads to the erosion of the articular cartilages and other joint structures which lead to fibrous and bony ankylosis that may manifest as pain and reduced range of movement [2, 5]. The immunosuppression not only predisposes the patient to infection, it can also alter the clinical presentation, course and outcome of septic arthritis in them [2, 4, 9]. Also, any infection or sign of infection in the immunosuppressed may be a signal for the managing physician to do a thorough screening in preparation for others [2]. In this patient, there was a history of necrotizing fasciitis of the distal thigh which was managed by the plastic surgeons and discharged to follow-up after which the knee joint infection occurred on the ipsilateral limb [14]. This history alongside the immunosuppression posed a significant risk for the septic arthritis in this patient [14].

Clinical features of septic arthritis may include the following depending on the part of the body affected: fever $>38^{\circ}\text{C}$, fatigue and generalized weakness, inability to bear weight on the affected limb, reduced range of movement, swelling, and warmth. However, presentation in the immunosuppressed tends to be atypical, high index of suspicion is therefore required by the physician, especially the orthopedic surgeons, in making the diagnosis [2, 4]. The fever which is commonly seen in acute septic arthritis as a result of the body's acute inflammatory response may be absent in the diabetic due to the immunosuppression and the tendency to be infected by atypical organisms [2, 4, 14].

The diagnosis of septic arthritis is essentially clinical, that is detailed history and physical examination. However, laboratory and radiological investigations are used as adjunct and to corroborated clinical findings. Full blood count may show increased white blood cell count. Erythrocyte sedimentation rate and C-reactive protein may be increased but are usually not specific especially in the presence of other inflammatory conditions in the body. Diagnostic joint aspiration and blood culture for microscopy, culture, and sensitivity help determine the implicated microorganism and type of antibiotic treatment which would eliminate the microbial load. Radiological investigation is of little importance in

diagnosis of septic arthritis. However, a computerized tomogram is more useful in assessing joint sclerosis and effusion.

Treatment of septic arthritis varies from center to center depending on the facilities available, time of presentation, and presence of other comorbidities. Treatment is both medical with antibiotics and surgical targeted toward irrigation and debridement of the joint to reduce microbial burden, which could be by arthroscopy or open arthrotomy with both modalities having their pros and cons [3, 4, 13, 15, 16]. Antibiotic treatment is guided by culture and sensitivity. Surgical joint debridement and irrigation is the mainstay of treatment and usually improves the outcome and shortens hospital stay.

The outcome of this disease condition in the immunocompetent is guarded, depending on factors such as time of presentation, associated comorbidities, the available expertise in the managing center, and the virulence of the organism implicated [2, 4]. Complications which can occur include: osteomyelitis, abscess formation, septicemia, death, and dislocation in some very rare cases. In this patient, the joint infection was complicated by posterior dislocation of the left knee. Septic arthritis is considered more serious in the immunocompromised because the disease tends to be non-specific, following a rapid course and associated with severe complication which are most of the times irreversible [4, 13]. Dislocation of the knee joint following septic arthritis in adult is very rare [1], however, the few cases reported in literatures were diagnosed during the patient follow-up after discharge from the hospital. This rare complication was also found to be prevalent among patients with other comorbidities [3]. In the index patient, there is a history of poorly controlled diabetes mellitus and non-compliant with drugs and clinic visit due to poor access to healthcare in the face of COVID-19 pandemic. Immunosuppression in the diabetic is as a result of persistent hyperglycemia which suppresses the patient's humoral immune system thereby predisposing the patient to infection of various sorts [4]. Dislocation of the sternoclavicular joint and other atypical joint was found to be related to drug abuse [17]. Bagheri et al. reported a case of shoulder dislocation following septic arthritis of the joint [6]. Also, there has been reported cases of septic hip dislocation in children [3]. However, with detailed review of literature, there is no reported case of acute septic arthritis presenting with posterior knee dislocation especially in the immunocompromised patients. However, posterior knee dislocation is commoner in the post-treatment (follow-up) period rather than as a presentation of the disease [1]. Following the same mechanism, joint destruction progresses faster than in the immunocompetent [4] which is one of the learning point in these case. There are reports of treatment of septic knee dislocation by a total joint replacement following serial arthroscopic joint washout and debridement with laboratory evidence of infection eradication [18].

The patient who received prompt treatment following infection is usually discharged to follow up on outpatient basis during which the patient is monitored regularly for complication or failure of treatment. The management of septic arthritis is still evolving with many clinical trials coming up which would influence the management of this group of patients. Some of these upcoming trends include: the use of corticosteroids and bisphosphonate in the treatment of septic arthritis [19].

CONCLUSION

Septic arthritis, septic dislocation, and immunosuppression are a triad of jeopardy. Therefore, septic arthritis in the immunocompromised patients must be treated as an emergency in order to curb the potential tragic outcome. Also, posterior dislocation of the knee joint, though a rare presentation of acute septic arthritis in adults, still occurs even in young adults, especially in the immunosuppressed. Proactiveness and promptness are required at every level in its management to curb the potential crippling outcome that can occur within a short period of time.

REFERENCES

1. Bonnaig NS, Casstevens EC, Freiberg R. Posterior knee dislocation following septic arthritis of the knee. *Geriatr Orthop Surg Rehabil* 2012;3(1):45-7.
2. Salar O, Baker B, Kurien T, Taylor A, Moran C. Septic arthritis in the era of immunosuppressive treatments. *Ann R Coll Surg Engl* 2014;96(2):e11-2.
3. Singla R, Gogna P, Singh A, Singh P, Mukhopadhyay R, Singla M. Posterior dislocation of hip joint: An unusual presentation of septic hip in infant. *Indo Global Journal of Pharmaceutical Sciences* 2013;3(2):138-41.
4. Wang DA, Tambyah PA. Septic arthritis in immunocompetent and immunosuppressed hosts. *Best Pract Res Clin Rheumatol* 2015;29(2):275-89.
5. Ateschrang A, Albrecht D, Schroeter S, Weise K, Dolderer J. Current concepts review: Septic arthritis of the knee pathophysiology, diagnostics, and therapy. *Wien Klin Wochenschr* 2011;123(7-8):191-7.
6. Bagheri F, Ebrahimzadeh MH, Sharifi SR, Ahmadzadeh-Chabok H, Khajah-Mozaffari J, Fattahi AS. Pathologic dislocation of the shoulder secondary to septic arthritis: A case report. *Cases J* 2009;2:9131.
7. Betz RR, Cooperman DR, Wopperer JM, et al. Late sequelae of septic arthritis of the hip in infancy and childhood. *J Pediatr Orthop* 1990;10(3):365-72.
8. Chu CM, Wang SJ, Wu SS. Posterior dislocation of a cruciate-retaining total knee arthroplasty following an acute bacterial infection. *Arch Orthop Trauma Surg* 2003;123(2-3):121-4.
9. Whallett EJ, Stevenson JH, Wilmshurst AD. Necrotising fasciitis of the extremity. *J Plast Reconstr Aesthet Surg* 2010;63(5):e469-73.
10. Ross SW, Lauer CW, Miles WS, et al. Maximizing the Calm before the storm: Tiered surgical response plan

- for novel coronavirus (COVID-19). *J Am Coll Surg* 2020;230(6):1080–91.e3.
11. Ohannessian R, Duong TA, Odone A. Global telemedicine implementation and integration within health systems to fight the COVID-19 pandemic: A call to action. *JMIR Public Health Surveill* 2020;6(2):e18810.
 12. Rutz E. Septic arthritis of the hip joint in children is an emergency. *Afr J Paediatr Surg* 2012;9(1):1–2.
 13. Stake S, Scully R, Swenson S, et al. Repeat irrigation & debridement for patients with acute septic knee arthritis: Incidence and risk factors. *J Clin Orthop Trauma* 2020;11(Suppl 1):S177–83.
 14. Angoules AG, Kontakis G, Drakoulakis E, Vrentzos G, Granick MS, Giannoudis PV. Necrotising fasciitis of upper and lower limb: A systematic review. *Injury* 2007;38 Suppl 5:S19–26.
 15. Ateschrang A, Albrecht D, Schroeter S, Weise K, Dolderer J. Current concepts review: Septic arthritis of the knee pathophysiology, diagnostics, and therapy. *Wien Klin Wochenschr* 2011;123(7–8):191–7.
 16. Bovonratwet P, Nelson SJ, Bellamkonda K, et al. Similar 30-day complications for septic knee arthritis treated with arthrotomy or arthroscopy: An American College of Surgeons National Surgical Quality Improvement Program analysis. *Arthroscopy* 2018;34(1):213–19.
 17. Shioya N, Ishibe Y, Kan S, et al. Sternoclavicular joint septic arthritis following paraspinal muscle abscess and septic lumbar spondylodiscitis with epidural abscess in a patient with diabetes: A case report. *BMC Emerg Med* 2012;12:7.
 18. Öztürkmen Y, Akman YE, Ünkar EA, Şükür E. Total joint replacement for neglected posterior knee dislocation following septic arthritis after arthroscopy. *Acta Orthop Traumatol Turc* 2017;51(4):347–51.
 19. Verdrengh M, Carlsten H, Ohlsson C, Tarkowski A. Addition of bisphosphonate to antibiotic and anti-inflammatory treatment reduces bone resorption in experimental *Staphylococcus aureus*-induced arthritis. *J Orthop Res* 2007;25(3):304–10.

Author Contributions

Mosimabale Balogun – Design of the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Olubunmi Emmanuel Odeyemi – Conception of the work, Design of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Gboyega Oyewole – Design of the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Guarantor of Submission

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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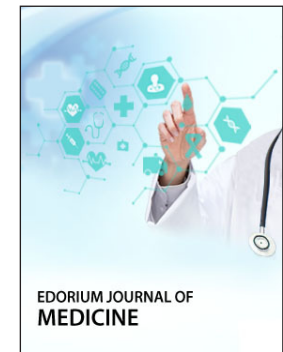
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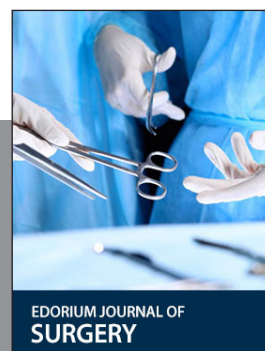
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