

Wound Dehiscence, a Potential Complication of Total Knee Arthroplasty in a COVID-19 Patient: A Case Report and Literature Review

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Abstract

Background: Dehiscence of the wound is an infrequent complication following total knee arthroplasty (TKA); numerous risk factors are responsible for this. This study aims to represent a case who underwent TKA, was infected with coronavirus disease-2019 (COVID-19) soon afterward, took corticosteroid as an immunosuppressive agent to resolve COVID-19 symptoms, and presented with wound dehiscence with minor trauma in early postoperative follow-ups.

Case Report: A 62-year-old man underwent TKA, and soon after discharge from the hospital, he was hospitalized with COVID-19. A corticosteroid was started for the patient, and a traumatic impaction occurred on his operated knee after he fell in the hospital. As a result, wound dehiscence was performed on the operated knee.

Conclusion: Numerous risk factors such as diabetes mellitus and corticosteroid consumption are implicated as known risk factors for wound dehiscence after TKA, which must be followed precisely to prevent the unfortunate development of such complications. Postoperative care must be considered in patients at risk for wound dehiscence. In the presented case, wound management was fulfilled with proper timing of irrigation and debridement without any prosthesis component exchange.

Keywords: COVID-19; Knee Arthroplasty; Surgical Wound Dehiscence

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Background

Total knee arthroplasty (TKA) is the gold standard treatment for patients suffering from severe osteoarthritis (OA) on their knee due to aging with a favorable outcome (1). Wound complications, including early wound dehiscence and surgical site infections (SSI), are serious conditions every surgeon encounters during their line of practice. Surprisingly the prevalence of early wound dehiscence just after TKA varies from 0.33% up to 5%, based on the surgeon's experience and patients' postoperative observance (2). Serious following complications will occur respectively as a consequence of such conditions, such as prosthetic joint infections (PJIs), sepsis, and eventually, due to the extreme amount of infectious state and life-threatening situation, amputation is the utmost choice declared for these conditions (3).

Knowledge about wound care and symptoms related to probable wound complications, such as persistent wound drainage directly linked to SSI, will alert physicians to act before further complications occur (3). Accordingly, the more surgeries performed each year, the more surgical complications may occur, including wound dehiscence (4). Several pre-operative, intra-operative, and postoperative factors have been discussed as risk factors that lead to wound complications, such as patients' underlying diseases like diabetes mellitus, skin scars due to previous surgical operation, excessive consumption of corticosteroids, histology of skin, excessive smoking, patient's malnutrition, peripheral vascular disease, obesity, and creation of insufficient skin flaps within surgical incisions which may decrease skin blood supply and lead to tissue necrosis (5).

As mentioned above, corticosteroids are of the medications which could be a contributing factor to postoperative wound dehiscence by disturbing the physiologic cycle of wound healing (6). Corticosteroids are one of the treatments for coronavirus disease-2019 (COVID-19)-infected patients, which could increase the risk of wound dehiscence following TKA (7). Several studies have proposed protocols for total joint arthroplasty (TJA) during COVID-19 (8, 9); however, in some cases, patients get infected with COVID-19 after TJA, which cannot be prevented.

In the present report, we are about to represent a case who underwent TKA, was infected with the COVID-19 virus soon afterward, took corticosteroid as an immunosuppressive agent to resolve COVID-19 symptoms, and presented with wound dehiscence with minor trauma in early postoperative follow-ups.

Case Report

A 62-year-old man with a chief complaint of left knee degenerative joint disease (DJD), who was a candidate for TKA, was scheduled for surgical operation. The patient was discharged from the hospital the day after the surgery, informed about probable routine postoperative complications, and trained efficiently on how to walk properly either on plain ground or stairs by simulation in the hospital ward. He was instructed on proper postoperative medication, including anti-coagulant agents [aspirin (ASA) 325 mg/BID] and postoperative antibiotics.

Two days after surgery, he was referred to the hospital with constitutional symptoms and coughing. A viral polymerase chain reaction (PCR) diagnosis and chest



computed tomography (CT) scan confirmed COVID-19 infection. He was admitted at once with primary health care management and, due to decreased blood oxygen level, received supplementary oxygen without invasive mechanical ventilation and a bolus dose of intravenous (IV) remdesivir 200 mg/day followed by 100 mg/day for four days, two doses of IV dexamethasone 8 mg/day, and one single shot of IV methylprednisolone 250 mg/day.

After the drug adjustment, the symptoms subsided, and he was discharged from the hospital on day 6. However, suddenly after an accidental falling in the hospital yard, the patient suffered acute trauma to his knees; hence, dehiscence of his prior surgical wound took place; besides, all the underlying tissues and prosthesis were exposed entirely (Figure 1).



Figure 1. Wound dehiscence after total knee arthroplasty (TKA)

The patient was immediately admitted to the emergency ward, transferred to the operating room within 2 hours, and irrigated with a total amount of 14 liters of normal saline 0.09 serum, and the deep infected tissues with debris were cleansed and debrided entirely. The patient was hospitalized for three days in the orthopedic ward under the treatment of IV broad-spectrum antibiotics of meropenem and vancomycin with wound care management. On the fourth day, with proper postoperative instructions, he was discharged from the hospital with oral antibiotics (linezolid and rifampin) for two weeks and referred several times (6 months) in the follow-up periods without any wound SSI or prosthesis loosening or any further complications (Figure 2).

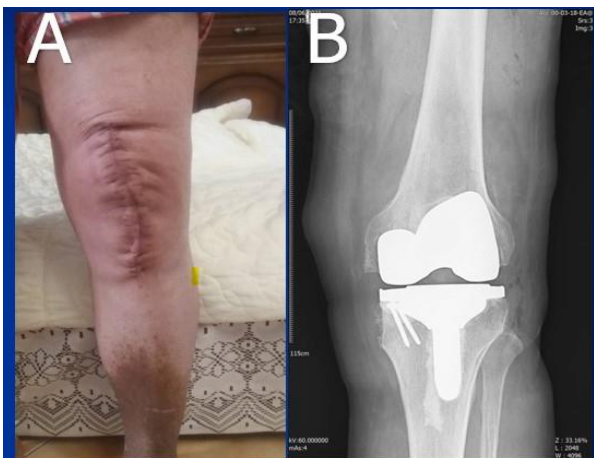


Figure 2. The surgical wound healed without any complication (A); the follow-up radiography of the total knee arthroplasty (TKA) (B)

Discussion

The impact of wound dehiscence, particularly after TJA wounds, can be significant for both patients and orthopedic surgeons, despite taking every precaution possible. Based on the literature review, the experience of accurate occurrence of traumatic wound dehiscence after TKA is unknown, which shows scattered amounts of incidence. Due to postoperative imbalance of stance and gait in patients, about one to three falls are reported every day in 1000 TKA patients (10).

Based on the study of Gausden et al. (11), which gathered information on the total amount of 16134 cases of primary TKA for 16 years (2002-2018), 26 cases (0.1%) had traumatic wound dehiscence within 30 days after primary TKA. In 22 of 26 cases, the patients fell acutely because of postoperative gait imbalance, and in four cases, the wound dehiscence once staples were removed. The joint capsule was disrupted in 15 cases, and 4 patients suffered from complete disruption of the knee extensor mechanism. Massive irrigation with joint debridement (I&D) of suspected tissues was performed within 48 hours after traumatic injury in 19/26 patients, followed by infectious department consults on empiric antibiotic therapy, and they were discharged on outpatient antibiotic therapy. Among the seven patients left, three had to undergo reoperations, one of them had two-stage surgical reoperation for PJI, one had repeated I&D for suspected PJI, and one had repeated surgery due to loosening of the tibial component. The mean follow-up for each patient was nearly 2-15 years. PJI rate after TJA seems more prevalent in those who underwent surgery more recently, and had traumatic events, even for those implants with shorter exposure time to the environment (12). Based on the study discussed above, it is imperative to mention that traumatic wound dehiscence would increase the risk of PJI by 6.5 folds. The study suggested using irrigation and debridement with component retention (IDCR) within 48 hours to maintain a joint's physiologic state.

There are multiple known predisposing factors leading to traumatic wound dehiscences, such as tobacco, corticosteroid consumption, creation of large lateral skin flaps, being elderly, patients' undernutrition, and increased application of pressure on skin edges within wound closure (6). Based on the study made by Inabathula et al. (13), there is a strong relationship between those who are already at risk for PJI and the increased risk of PJI after traumatic wound dehiscence; these risk factors include body mass index (BMI) > 35 kg/m², active smoking, diabetes mellitus, autoimmune system disease (rheumatoid arthritis), and chronic kidney disease. Based on this study, they suggest prescribing a minimum period of seven days of prophylactic antibiotic therapy in those who are already at risk for PJI infection, followed by IDCR. Saleh et al. reported that the main risk factor for further major complications due to wound dehiscence after TKA was diabetes mellitus (1).

There is a need to investigate the affected replaced joint for possible joint instability after traumatic impaction, as this has been observed numerous times in relative articles, especially during irrigation and debridement for flexion and extension laxity (14). Vince et al. have studied the role of the possible risk factors mentioned above in the exact process of wound healing in patients who recently had TKA and recommended early surgical intervention to inhibit further prospective soft tissue complications (15). Partezani et al. have reported the clinical outcome of 4 patients with traumatic wound

dehiscence after TKA and demonstrated that the rate for traumatic wound dehiscence was very low with an average of 0.1% of TKA surgeries; they reported that 3 out of those patients needed additional infection management surgeries, two lost their prosthesis with total device replacement after wound management, and one endured transfemoral amputation in case of uncontrollable wound infection (16).

The specific classification for wound failure has been demonstrated below to achieve a more intense knowledge about leading interventions (Table 1) (17). Based on the scoring carried out by wound classification failure, appropriate management must be maintained. Our patient suffered from a grade IV wound failure with an exposed prosthesis. Based on the authors' proposed clinical intervention, devitalized tissues should be aggressively debrided following excessive irrigation with saline, and large latissimus dorsi flaps should be considered in case of a great deal of soft tissue loss, which we did not encounter.

Table 1. Classification of wound failure described by Laing et al. (17)

Grade of wound failure	Description
Grade 0	Simple wound erythema only without any breakdown of the skin
Grade I	Skin necrosis and breakdown of the superficial wound without the involvement of the deep layers or the presence of a wound sinus
Grade II	More extensive superficial necrosis associated with a wound sinus into the joint but without deep wound breakdown
Grade III	Deep wound dehiscence with a sinus but little or no exposure of the prosthesis on inspection
Grade IV	Deep dehiscence with obvious exposure to the prosthesis

Conclusion

One of the main but rare complications after TKA is wound dehiscence, followed by unexpected traumatic events. Patients with a high likelihood of wound dehiscence after TKA must be precisely followed up. Corticosteroid consumption in managing patients with COVID-19 infection has a known role in wound complications, especially after TKA. Therefore, patients who underwent TKA and were infected with COVID-19 should be protected from any trauma or falling.

Conflict of Interest

The authors declare no conflict of interest in this study.

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