World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Complications of total knee arthroplasty: A 15-year retrospective study of 35 complicated cases

Mohammed-Anass BENAMER [1, 2, *], Kabwe CHIPALO [1, 2], Mohamed BENSAKA [1, 2], Hatim ABID [1, 2], Mohammed EL IDRISSI [1, 2] and Abdelmajid EL MRINI [1, 2]

[1] *Department of Orthopedic and Traumatology Surgery B4, Hassan II University Hospital, Fez, Morocco.*
[2] *Faculty of Medicine, Pharmacy and Dental Medicine of Fez, Sidi Mohamed Ben Abdellah University, Fez, Morocco.*

World Journal of Advanced Research and Reviews, 2026, 29(03), 981-990

Publication history: Received on 05 February 2026; revised on 12 March 2026; accepted on 14 March 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.29.3.0643

Abstract

Total knee arthroplasty (TKA) is an effective treatment for disabling gonarthrosis, but complications may compromise function, prolong treatment, and require complex revision strategies. This study aimed to describe the epidemiological profile, spectrum of complications, management, and outcomes of complicated TKA cases treated at our institution. A retrospective single-center study was conducted in the Department of Orthopedic and Traumatology Surgery B4 of Hassan II University Hospital, Fez, Morocco. Across the available records from 2009 to 2024, 278 TKA procedures were identified and 35 patients with one or more perioperative or postoperative complications were included. Data were extracted from medical records, operative reports, imaging, and follow-up visits. Functional assessment relied on the International Knee Society (IKS) score and postoperative pain evaluation. The mean age was 65.8 years (range: 46–80 years), and women accounted for 71.4% of the cohort. Primary gonarthrosis represented 77.1% of indications. Major intraoperative events included one popliteal artery injury and one patellar tendon injury. The most frequent postoperative events were periprosthetic joint infection or septic loosening (12 events), arthrofibrosis (10 cases), aseptic loosening (5 cases), deep venous thrombosis (3 cases), postoperative hematoma (3 cases), and femorotibial dislocation or major instability (3 cases). Mean follow-up was 36 months. Postoperatively, 68.6% of patients reported no pain, the mean IKS score improved from 106 to 156, flexion improved substantially, and radiological normocorrection was achieved in 82.8% of patients. Infectious complications and stiffness were the dominant failure patterns in this series. Early recognition, meticulous technique, multidisciplinary care, and structured follow-up remain essential to improve implant survival and functional recovery.

Keywords: Total knee arthroplasty; Complications; Periprosthetic joint infection; Arthrofibrosis; Aseptic loosening; Revision surgery

1. Introduction

Total knee arthroplasty (TKA) is one of the most reliable operations in orthopaedic surgery for the treatment of advanced knee osteoarthritis, and the demand for both primary and revision procedures continue to rise worldwide [1,33-35]. Long-term success depends not only on implant design but also on accurate component positioning, restoration of limb alignment, and balanced periarticular soft tissues [2-4].

Despite technical progress, TKA remains exposed to intraoperative, early postoperative, and late complications that may compromise pain relief, mobility, implant survival, and patient satisfaction. The most feared complications include periprosthetic joint infection, thromboembolic disease, wound problems, arthrofibrosis, aseptic loosening, extensor mechanism disruption, and instability [5-21,29-32].

* Corresponding author: Mohammed-Anass BENAMER

The aim of the present study was to report the epidemiological profile, therapeutic management, and short- to mid-term outcomes of complicated TKA cases treated in a tertiary referral center in Fez, Morocco. Particular attention was paid to infectious complications, stiffness, loosening, and instability, which are the main reasons for reoperation and revision in daily practice [10-14,29-35].

2. Materials and methods

2.1. Study design and eligibility

A retrospective descriptive study was performed in the Department of Orthopedic and Traumatology Surgery B4, Hassan II University Hospital, Fez, Morocco. Across the available records from 2009 to 2024, 278 patients who underwent TKA were identified. Thirty-five patients who developed at least one perioperative or postoperative complication were included in the analysis. The 2010 hospitalization register was unavailable and could not be analyzed. Incomplete files, patients lost to follow-up, and patients who were not treated after diagnosis of the complication were excluded.

Data were collected from hospitalization charts, operative reports, outpatient follow-up notes, and imaging archives. The study focused on epidemiological variables, preoperative clinical and radiological status, operative details, postoperative management, complication patterns, and outcomes. Because some patients experienced more than one adverse event, event counts could exceed the number of included patients.

2.2. Operative technique and postoperative protocol

In our institution, all cases were managed with cemented tricompartmental sliding TKA implants. The standard approach was an anteromedial arthrotomy with trans-vastus medialis extension. Mean operative time was 105 minutes (range: 90-170 minutes). General anesthesia was used in 30 patients (85.7%) and spinal anesthesia in 5 (14.3%). Postoperative care included 48 hours of antibiotic prophylaxis, multimodal analgesia, prophylactic low-molecular-weight heparin for 15 days, and early rehabilitation with quadriceps activation, progressive range-of-motion exercises, and protected ambulation.

2.3. Outcomes and statistical analysis

Functional assessment relied on the International Knee Society (IKS) score. Pain intensity was recorded clinically and knee flexion was compared before and after surgery. Radiological assessment included standard anteroposterior and lateral radiographs as well as postoperative long-leg alignment films to assess mechanical axis correction. Descriptive analysis was performed using Microsoft Excel.

3. Results

3.1. Baseline characteristics

Baseline characteristics are summarized in Table 1. Mean age was 65.8 years (range: 46-80 years). Women predominated (71.4%), with a female-to-male ratio of 2.5:1. Ten patients (28.6%) had bilateral TKA involvement, whereas 25 (71.4%) had unilateral arthroplasty; among unilateral cases, 16 were right-sided and 9 left-sided. Excess body weight was frequent: 57.1% of patients were overweight and an additional 20.0% were obese. Hypertension (22.9%) and diabetes mellitus (11.4%) were the most common medical comorbidities.

Primary gonarthrosis was the leading indication for surgery (77.1%), followed by post-traumatic gonarthrosis (14.3%), rheumatoid arthritis (5.7%), and one oncologic indication (2.9%). Preoperative radiographs showed advanced degenerative disease in most patients, with Ahlback stage IV or V in 24 cases (70.6%).

3.2. Complication profile and management

The complication spectrum and corresponding management strategies are detailed in Table 3 and illustrated in Figure 1. Two major intraoperative events were recorded: one popliteal artery injury causing hemorrhagic shock, treated with immediate venous bypass between the popliteal artery and the tibioperoneal trunk followed by early thrombectomy, and one iatrogenic patellar tendon section repaired by direct suture.

Early postoperative complications included three significant hematomas, three deep venous thromboses diagnosed between postoperative days 2 and 3, one early periprosthetic joint infection, and one marginal skin necrosis. Two

hematomas required surgical evacuation and one resolved with conservative treatment. All thromboembolic events were treated with curative enoxaparin. The early infection was treated successfully by debridement, lavage, and adapted antibiotic therapy. The skin lesion healed by directed local care without implant exposure. The clinical discussion of the series also documented one common peroneal nerve palsy that recovered completely after three months of rehabilitation.

Table 1 Baseline characteristics of the complicated TKA cohort

Variable	Value
Number of included patients	35
Mean age (range), years	65.8 (46-80)
Female sex, n (%)	25 (71.4)
Male sex, n (%)	10 (28.6)
Bilateral involvement, n (%)	10 (28.6)
Unilateral involvement, n (%)	25 (71.4)
Right side among unilateral cases, n (%)	16/25 (64.0)
Left side among unilateral cases, n (%)	9/25 (36.0)
Overweight, n (%)	20 (57.1)
Obesity (all classes), n (%)	7 (20.0)
Hypertension, n (%)	8 (22.9)
Diabetes mellitus, n (%)	4 (11.4)
Primary gonarthrosis, n (%)	27 (77.1)
Post-traumatic gonarthrosis, n (%)	5 (14.3)
Rheumatoid arthritis, n (%)	2 (5.7)
Knee osteosarcoma, n (%)	1 (2.9)
Ahlback stage IV-V, n (%)	24 (70.6)
Mean follow-up, months	36

Table 2 Operative characteristics and standardized postoperative management

Perioperative item	Description / value
Implant type	Cemented tricompartmental sliding total knee arthroplasty
Approach	Anteromedial arthrotomy with trans-vastus medialis extension
Anesthesia	General anesthesia in 30 cases (85.7%); spinal anesthesia in 5 cases (14.3%)
Mean operative time	105 min (range: 90-170 min)
Antibiotic prophylaxis	48 hours, based on a second-generation cephalosporin or amoxicillin-clavulanate
Thromboprophylaxis	Preventive low-molecular-weight heparin for 15 days
Early rehabilitation	Immediate active-passive mobilization, quadriceps isometrics, progressive protected weight-bearing

Table 3 Spectrum of complication events and principal management strategies

Complication/event	Number of events	Main management strategy
Periprosthetic joint infection / septic loosening	12	Debridement and antibiotics for early infection; staged revision with spacer for chronic cases
Arthrofibrosis	10	Intensive rehabilitation in 6 cases; manipulation under anesthesia in 4 cases
Aseptic loosening	5	Revision surgery after septic loosening was excluded
Deep venous thrombosis	3	Curative enoxaparin after Doppler confirmation
Postoperative hematoma	3	Two surgical evacuations and one conservative treatment
Femorotibial dislocation / major instability	3	Revision to a rotating-hinge prosthesis
Patellar fracture-related complication	2	Cerclage fixation in one case; reconstruction for neglected pseudoarthrosis in one case
Skin complication	1	Directed local care and close surveillance
Common peroneal nerve palsy	1	Rehabilitation with complete recovery
Intraoperative vascular injury	1	Urgent vascular bypass and thrombectomy
Intraoperative patellar tendon injury	1	Immediate primary repair by direct suture

Note: Because some patients experienced more than one complication, event counts exceed the number of included patients.

Table 4 Functional and radiographic outcomes

Outcome parameter	Preoperative	Postoperative
Mean global IKS score	106	156
No pain, n (%)	0	24 (68.6)
Mild/occasional pain, n (%)	0	6 (17.1)
Moderate occasional pain, n (%)	2 (5.7)	4 (11.4)
Moderate permanent pain, n (%)	9 (25.7)	1 (2.9)
Severe pain, n (%)	23 (65.7)	0
Flexion <90°, n (%)	17 (48.6)	5 (14.3)
Mid-range flexion category*, n (%)	16 (45.7)	25 (71.4)
Flexion >110°*, n (%)	2 (5.7)	5 (14.3)
Walking perimeter improvement, n (%)	-	28 (80.0)
Radiological normocorrection, n (%)	-	29 (82.8)
Hypocorrection, n (%)	-	6 (17.2)
Overall good result, n (%)	-	75.0
Overall fair result, n (%)	-	19.0
Overall poor result, n (%)	-	6.0

* The mid-range flexion category corresponds to 90-120° preoperatively and 90-110° postoperatively.

Late complications were dominated by infection and stiffness. Eleven additional late periprosthetic infections or septic loosenings were identified, bringing the total number of infectious events to 12. Four recurrences were observed within

the septic subgroup. Arthrofibrosis occurred in 10 cases; six improved with intensive rehabilitation and four required manipulation under anesthesia. Five cases of aseptic loosening were revised surgically after infection was excluded. Three femorotibial dislocations reflecting major instability were treated by revision to a rotating-hinge prosthesis. Two patellar fracture-related complications were managed surgically, including one cerclage fixation and one reconstruction for neglected patellar pseudoarthrosis. Representative radiological examples are shown in Figures 4 and 5.

3.3. Functional and radiographic outcomes

Outcome data are summarized in Table 4 and illustrated in Figures 2 and 3. Mean follow-up was 36 months. Postoperatively, 24 patients (68.6%) reported no pain, 6 (17.1%) mild or occasional pain, 4 (11.4%) moderate occasional pain, and 1 (2.9%) moderate permanent pain; no patient had severe postoperative pain. The mean global IKS score improved from 106 preoperatively to 156 postoperatively. Flexion improved from a predominantly restricted distribution before surgery to a mid-range distribution after surgery, while the walking perimeter improved in 80% of patients. Radiological assessment showed satisfactory mechanical-axis correction in 29 patients (82.8%), whereas 6 patients (17.2%) remained hypocorrected. Overall results were judged good in 75% of cases, fair in 19%, and poor in 6%.

4. Discussion

The main finding of this series is that infectious complications and arthrofibrosis were the dominant modes of failure among complicated TKA cases. This observation is clinically relevant because both conditions substantially increase morbidity, prolong treatment, and may ultimately require complex revision procedures. The growing use of TKA makes the understanding of these adverse events even more important as revision activity continues to expand [33-36].

Periprosthetic joint infection remains one of the most serious complications after TKA and is a leading cause of early revision as well as a major source of economic burden [10-14]. In our experience, the septic subgroup required prolonged multidisciplinary management, often with debridement or staged revision using antibiotic spacers, and recurrence was not uncommon. This pattern is consistent with the literature, which emphasizes the importance of rigorous diagnosis, classification, and staged treatment in chronic infection [12-14,22,38]. The presence of diabetes and rheumatoid arthritis in part of our cohort may also have contributed to septic risk [11,38].

Arthrofibrosis was the second most frequent complication in our study. Limited preoperative mobility, postoperative pain, soft-tissue scarring, and technical factors are well-recognized contributors to postoperative stiffness [9,19-21]. In our patients, most cases improved with rehabilitation, while manipulation under anesthesia was required in refractory early cases. This approach remains aligned with the current literature, which supports early, progressive treatment and reserves arthrolysis or component revision for selected mechanical causes [19-21].

Mechanical complications also carried a major functional burden. Aseptic loosening, instability, and extensor mechanism failure are classic causes of painful failure and revision surgery after TKA [23-32,34,35]. In our cohort, aseptic loosening required revision in every confirmed case, while major instability or femorotibial dislocation required conversion to more constrained implants. These findings reinforce the importance of component alignment, fixation, soft-tissue balance, and the choice of implant constraint level [4,23,29-32,37].

Hematoma, deep venous thrombosis, wound complications, and nerve injury were less frequent but still clinically important. Their occurrence despite standard prophylaxis highlights the need for meticulous surgical technique, careful postoperative monitoring, and rapid multidisciplinary intervention [5-8,15-18].

This study has several limitations. It was retrospective and single-center, the sample size of complicated cases was modest, 2010 records were unavailable, and some patients had multiple overlapping complications, which complicates direct event-based incidence comparisons. Nevertheless, the series provides a coherent picture of the practical difficulties encountered in complicated TKA within a tertiary-care setting and offers a useful overview of management pathways and outcomes in routine practice.

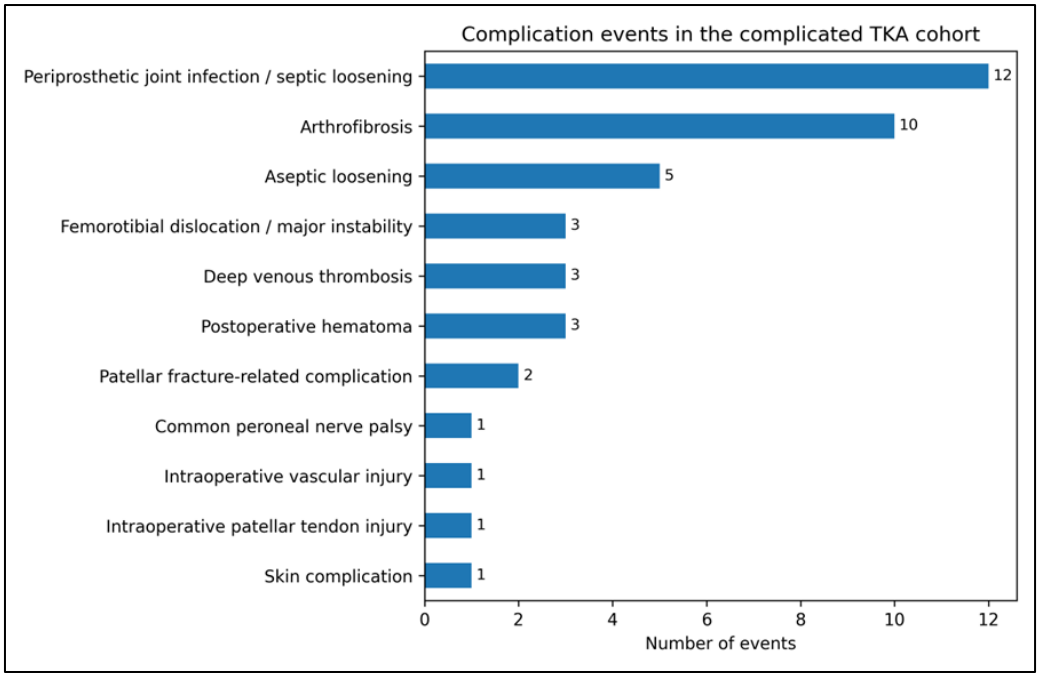

Figure 1 Complication events in the complicated TKA cohort. Because some patients experienced more than one adverse event, the total number of events exceeds the number of included patients.

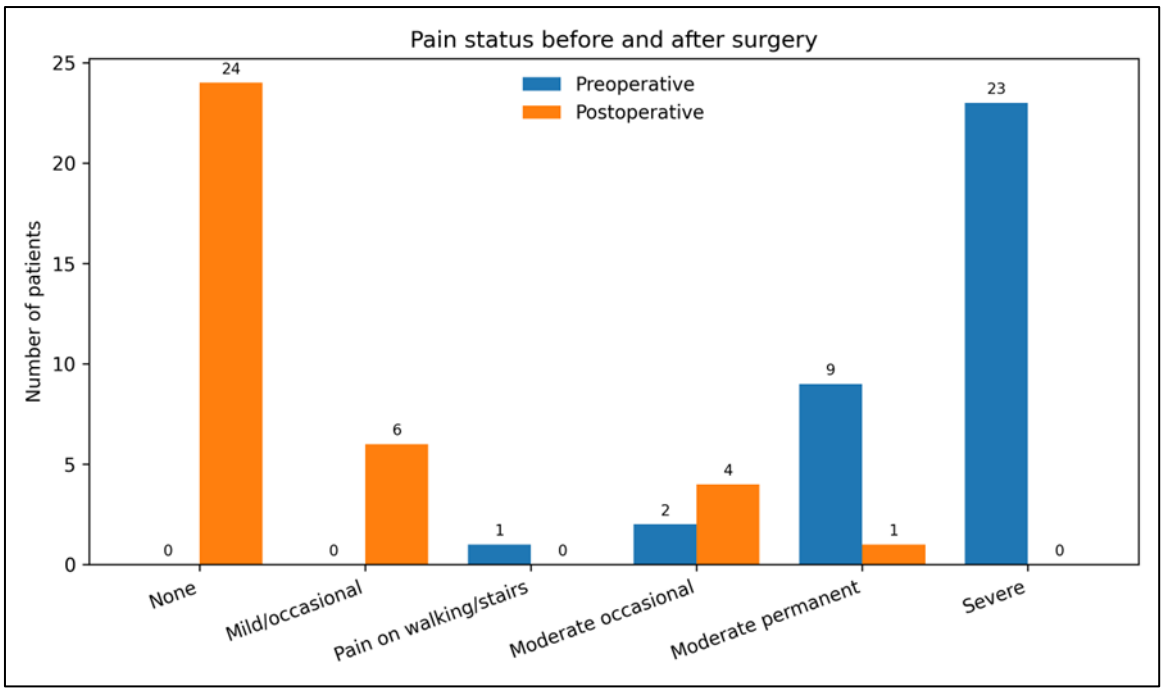

Figure 2 Pain status before and after surgery.

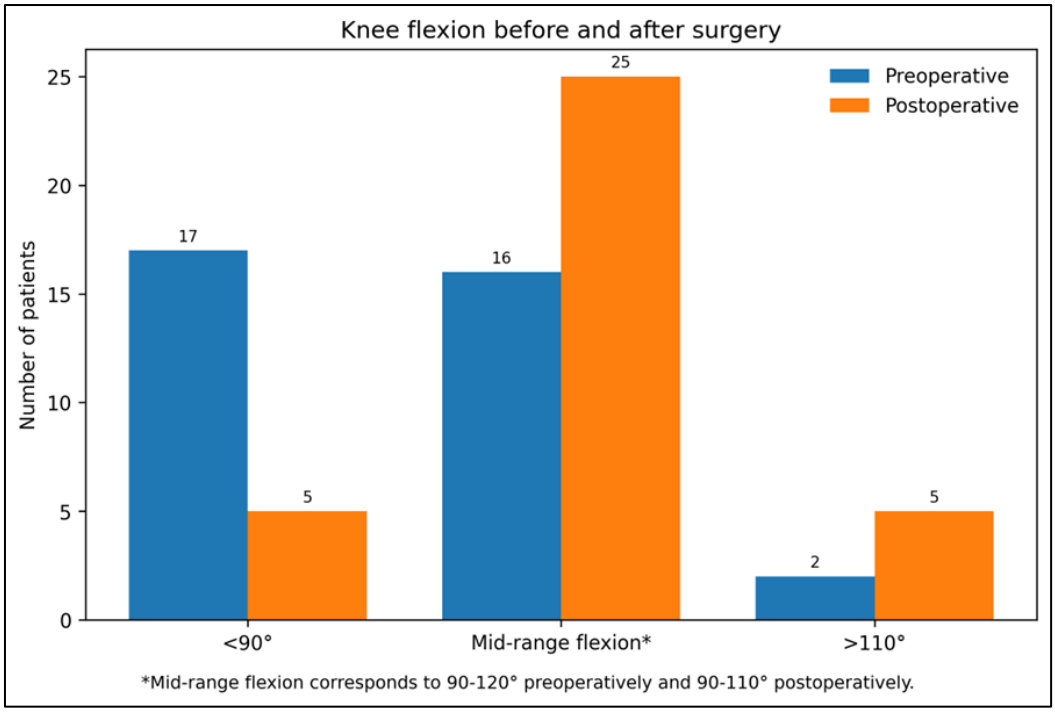

Figure 3 Knee flexion before and after surgery. The mid-range flexion category corresponds to 90-120° preoperatively and 90-110° postoperatively**.**

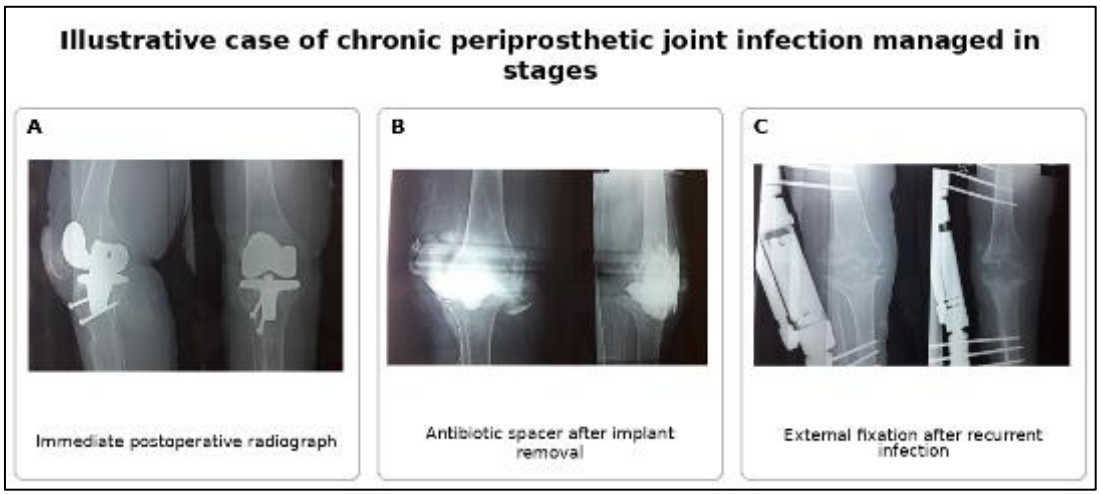

Figure 4 Illustrative case of chronic periprosthetic joint infection managed in stages: (A) immediate postoperative radiograph after primary TKA, (B) antibiotic spacer after implant removal, and (C) external fixation after recurrent infection.

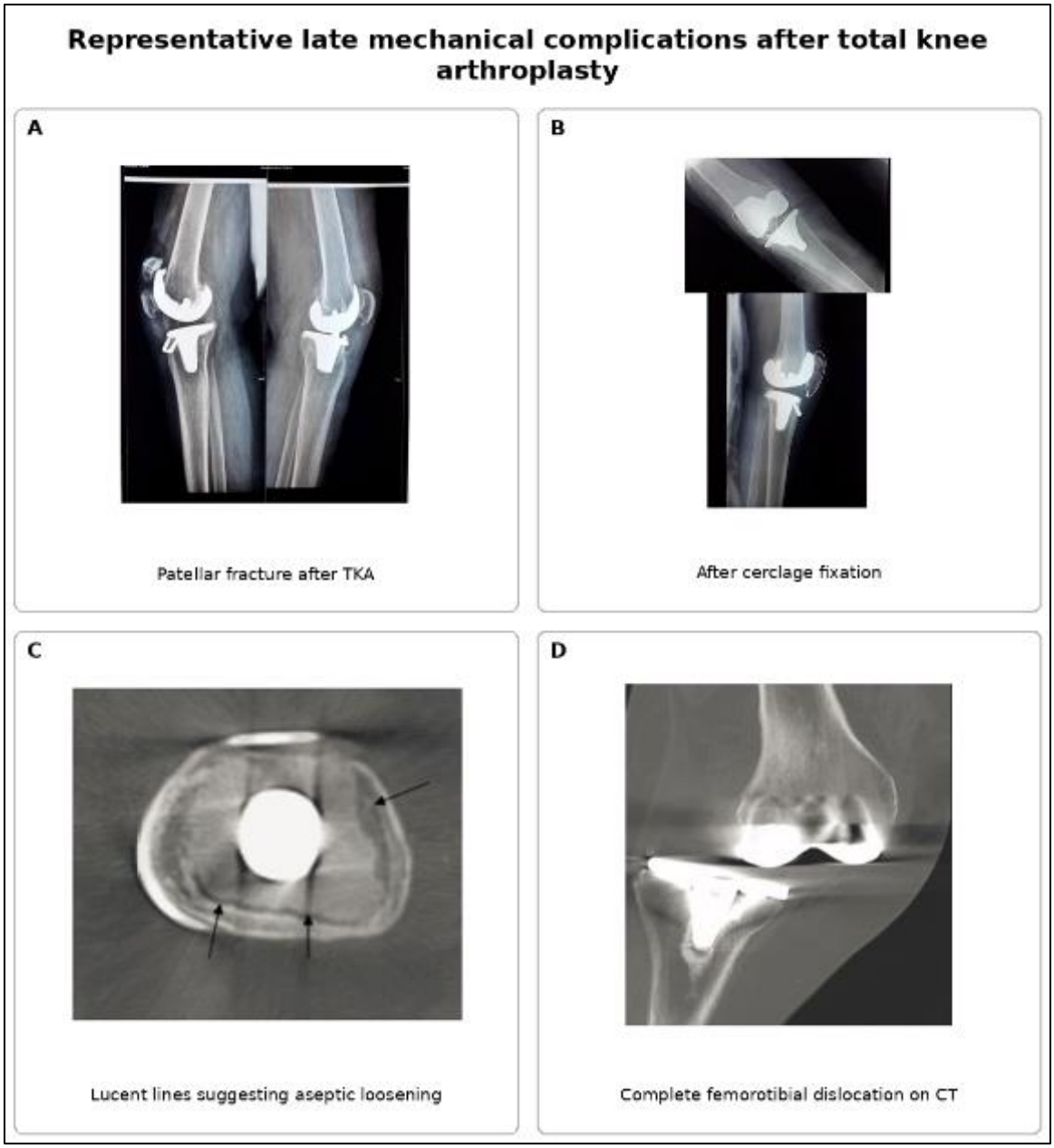

Figure 5 Representative late mechanical complications after TKA: (A) patellar fracture after TKA, (B) after cerclage fixation, (C) lucent lines suggesting aseptic loosening, and (D) complete femorotibial dislocation on CT

5. Conclusion

TKA remains a highly effective procedure for disabling knee disease, but complications continue to represent a major therapeutic challenge. In this series, infectious complications and arthrofibrosis were the predominant adverse events, followed by aseptic loosening and instability. Prevention through meticulous technique, strict asepsis, appropriate thromboprophylaxis, and early rehabilitation is essential. Once complications occur, timely diagnosis and tailored multidisciplinary management are critical to preserve function, reduce revision burden, and improve implant longevity.

Compliance with ethical approval

Acknowledgements

The authors thank the staff of the Department of Orthopedic and Traumatology Surgery B4, Hassan II University Hospital, Fez, for their contribution to patient care and the preservation of clinical records and imaging archives.

Disclosure of Conflict of interest

The authors declare that they have no conflict of interest.

Statement of Ethical approval

This manuscript was prepared from retrospective anonymized clinical data. The local ethics approval number or waiver should be inserted before journal submission if required by institutional or journal policy.

Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to institutional regulations.

Funding

No external funding was reported for the preparation of this manuscript.

Authors' contribution

All authors contributed to the conception of the work, interpretation of the data, drafting or critical revision of the manuscript, and approval of the final version.

References

[1] Insall JN, Scott WN, Ranawat CS. The total condylar knee prosthesis. A report of two hundred and twenty cases. J Bone Jt Surg Am. 1979;61:173-80.

[2] Hetaimish BM, Khan MM, Simunovic N, Al-Harbi HH, Bhandari M, Violante MR. Meta-analysis of navigation vs conventional total knee arthroplasty. J Arthroplasty. 2012;27(6):1177-82.

[3] Ji W, Wang S, Yue B, Ma J, Liang Q. Computer navigation versus conventional total knee arthroplasty: A systematic review and meta-analysis. Int J Surg. 2020;79:17-27.

[4] Parratte S, Pagnano MW, Trousdale RT, Berry DJ. Effect of postoperative mechanical axis alignment on the fifteen-year survival of modern, cemented total knee arthroplasty. J Bone Jt Surg Am. 2010;92(12):2143-9.

[5] Parvizi J, Ghanem E, Joshi A. Early return to surgery for evacuation of a postoperative hematoma after primary total knee arthroplasty. J Bone Jt Surg Am. 2008;90(11):2331-6.

[6] Januel JM, Chen G, Ruffieux C. Symptomatic in-hospital deep vein thrombosis and pulmonary embolism following hip and knee arthroplasty among patients receiving recommended prophylaxis: a systematic review. JAMA. 2012;307(3):294-303.

[7] Wilson DG, Poole WE, Chauhan SK. Systematic review of venous thromboembolism prophylaxis in major orthopaedic surgery. A different perspective. Ann R Coll Surg Engl. 2016;98(6):368-75.

[8] Bjornara BT, Gudmundsen TE, Dahl OE. Frequency and timing of clinical venous thromboembolism after major joint surgery. J Bone Jt Surg Br. 2006;88(3):386-91.

[9] Kim J, Nelson CL, Lotke PA. Stiffness after total knee arthroplasty. Preval Assoc Factors J Bone Jt Surg Am. 2004;86(7):1479-84.

[10] Kurtz SM, Lau E, Watson H, Schmier JK, Parvizi J. Economic burden of periprosthetic joint infection in the united states. J Arthroplasty. 2012;27(8 Suppl):61-5.

[11] Phillips JE, Crane TP, Noy M. The incidence of deep prosthetic infections in a specialist orthopaedic hospital: a 15-year prospective survey. J Bone Jt Surg Br. 2006;88(7):943-8.

[12] Osmon DR, Berbari EF, Berendt AR. Diagnosis and management of prosthetic joint infection: clinical practice guidelines by the Infectious Diseases Society of America. Clin Infect Dis. 2013;56(1).

[13] Zimmerli W, Trampuz A, Ochsner PE. Prosthetic-joint infections. N Engl J Med. 2004;351(16):1645-54.

[14] Hofmann AA, Goldberg T, Tanner AM, Cook TM. Treatment of infected total knee arthroplasty using an articulating spacer. Clin Orthop Relat Res. 2005;430):125-31.

[15] Idusuyi OB, Morrey BF. Peroneal nerve palsy after total knee arthroplasty. Assessment of predisposing and prognostic factors. J Bone Jt Surg Am. 1996;78(177).

[16] Schinsky MF, Macaulay W, Parks ML. Nerve injury after primary total knee arthroplasty. J Arthroplasty. 2001;16(1048).

[17] Vince K, Chivas D. Wound problems in total knee arthroplasty. J Arthroplasty. 2007;22(4 Suppl 1):37-41.

[18] Weiss AP, Krackow KA. Persistent wound drainage after primary total knee arthroplasty. J Arthroplasty. 1993;8(3):285-9.

[19] Issa K, Rifai A, Boylan MR. Do various interventions improve outcomes for patients with stiffness after total knee arthroplasty? A systematic review. Clin Orthop Relat Res. 2015;473(3):1108-16.

[20] Cheuy VA, Foran JRH, Paxton RJ. Arthrofibrosis After TKA: A Review of the Literature. J Arthroplasty. 2017;32(11):3578-84.

[21] Bong MR, Cesare PE. Stiffness after total knee arthroplasty. J Am Acad Orthop Surg. 2004;12(3):164-71.

[22] Parvizi J, Tan TL, Goswami K. The 2018 Definition of Periprosthetic Hip and Knee Infection: An Evidence-Based and Validated Criteria. J Arthroplasty. 2018;33(5):1309-14.

[23] Morgan-Jones R, Oussedik SI, Graichen H, Haddad FS. Zonal fixation in revision total knee arthroplasty. Bone Jt J. 2015;97-B(2):147-9.

[24] Lewis PL, Rorabeck CH, Bourne RB. Periprosthetic fractures of the femur and tibia in total knee arthroplasty. Instr Course Lect. 1999;48:449-55.

[25] Singh J, Sloan M, Sukeik M. Periprosthetic fractures of the knee: a review of the literature. J Orthop. 2017;14(4):460-4.

[26] Vaishya R, Chauhan M, Vaish A. Extensor mechanism disruption after total knee arthroplasty: A systematic review. J Clin Orthop Trauma. 2017;8(3):248-53.

[27] Parvizi J, Tarity TD, Slenker N. Extensor mechanism disruption after total knee arthroplasty. Clin Orthop Relat Res. 2010;468(1):95-101.

[28] Browne JA, Hanssen AD. Reconstruction of extensor mechanism disruption after total knee arthroplasty. J Bone Jt Surg Am. 2011;93(11):1083-9.

[29] Vince KG, Abdeen A, Sugimori T. The unstable total knee arthroplasty: causes and cures. J Arthroplasty. 2006;21(4 Suppl 1):44-9.

[30] Rodriguez-Merchan EC. Instability after TKA: a dreadful complication. J Orthop Traumatol. 2011;12(1):1-3.

[31] Parratte S, Pagnano MW. Instability after total knee arthroplasty. J Bone Jt Surg Am. 2008;90(1):184-94.

[32] Laskin RS. The unstable total knee replacement: the dramatic results of a simple surgical solution. J Arthroplasty. 2004;19(4 Suppl 1):97-100.

[33] Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. J Bone Jt Surg Am. 2007;89(4):780-5.

[34] Bozic KJ, Kurtz SM, Lau E. The epidemiology of revision total knee arthroplasty in the United States. Clin Orthop Relat Res. 2010;468(1):45-51.

[35] Postler A, Lützner C, Beyer F, Tseliuyko V, Lützner J. Analysis of total knee arthroplasty revision causes. BMC Musculoskelet Disord. 2018;19(1).

[36] Koh IJ, Kwak DS, Kim MS, Choi KY, In Y. The use of computed tomography and a 3D-printing-based patient-specific guide for accurate implant positioning in revision TKA. J Arthroplasty. 2018;33(2):533-9.

[37] Longstaff LM, Sloan K, Stamp N. A constrained condylar knee prosthesis in the treatment of the unstable knee. J Bone Jt Surg Br. 2009;91(4):469-74.

[38] Jämsen E, Huhtala H, Puolakka T, Moilanen T. Risk factors for infection after knee arthroplasty. A register-based analysis of 43,149 cases. J Bone Jt Surg Am. 2009;91(1):38-47.

[39] Lustig S, Scholes CJ, Oussedik SI, Kinzel V, Parker DA, Coolican MR. Robot-assisted total knee arthroplasty: a review of the literature. J Arthroplasty. 2016;31(11):2434-9.