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OsteoBridge™
Merete® Limb Salvage Systems

CASE STUDY REPORT

OsteoBridge™ IKA

Knee fusion for failed total knee arthroplasty with recurring infection

Dr. Chris Dangles

Dr. Chris Dangles attended Loyola University, Stritch School of Medicine followed by a residency in Orthopaedic Surgery at Cook County Hospital in Chicago, IL.

He has been practicing for over forty years in Illinois and is currently serving the rural community at a Critical Access Hospital, Gibson Area Hospital in Gibson City, IL. His current practice is limited to hip and knee arthroplasty.

Case Information

Age:	78
Sex:	Female
BMI:	41.2
Diagnosis:	Failed total knee arthroplasty with recurring infection and draining sinus
Joint:	Knee

Patient History

78-year-old female presented in February 2022 with a history of an infected total knee arthroplasty and an antibiotic spacer in place. She was requesting reimplantation of a total knee arthroplasty.

Table 1 shows the chronology of the patient's significant history.

Date	Events
9/15/2019	Primary TKA complicated by wound healing and hematoma.
7/26/2021	Linear, stable patella fracture from fall with large hematoma.
7/27/2021	Aspiration of knee, positive for enterococcus faecalis sensitive to cephlosporins.
8/4/2021	Explant of prosthesis, insertion of cement spacer and I.V. antibiotic RX.
9/2/2021	Failure of surgical wound healing and transfer to tertiary care for soft tissue coverage.
10/21/2021	New antibiotic spacer gastrocnemius flap and continued I.V. antibiotics.

Table 1: Chronology of the patient's significant history

Upon presentation, the spacer was broken, and knee was locked in 45 degrees of flexion (Figure 1).

The patient was wheelchair-bound due to pain. A draining sinus tracked to the spacer on exam. Comorbidities were significant for insulin-dependent diabetes, COPD with respiratory failure reliant on home-O2, lymphedema, colostomy due to previous bowel obstruction and morbid obesity.

The patient was on long-term chronic anticoagulation therapy currently and prior to her original surgery.

The patient was offered arthrodesis with the Merete® IKA System. The patient declined but returned five months later, having not been offered better solutions elsewhere.

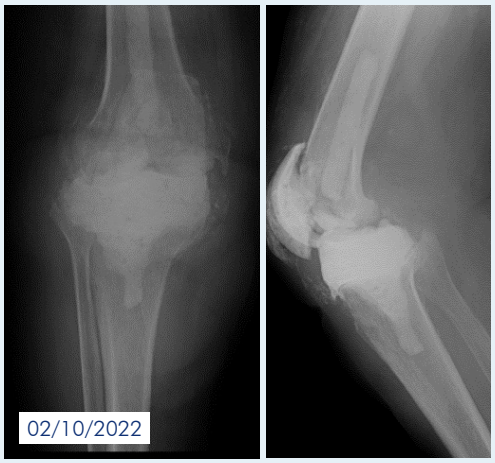

Figure 1: Radiographs at first clinic visit.

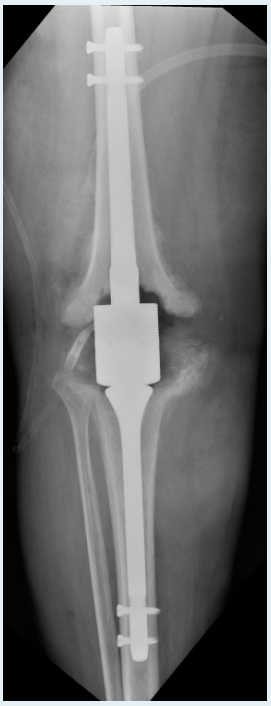

Figure 2: Post-Op fusion with Merete® IKA system

Management/Surgical Summary

Surgery was planned as removal of spacer, thorough debridement, insertion of a trial Merete® nail and closure. The patient was then transferred to a clean room for insertion of the final Merete® IKA System. A radiograph (Figure 3) was taken between room transfers to confirm proper sizing and position of the nail.

Operating Room #1:

Patient was taken to the operating room with spinal anesthesia in place. Leg draped in supine position with a tourniquet. Approach utilized the previous lateral incision with attention to avoid previous gastrocnemius flap. Patellectomy was performed and the spacer was exposed underneath the extensor mechanism. The cement spacer on the femur was found to be fractured and was removed piecemeal. Tibial spacer removed by drilling multiple holes into the cement and then was fractured with an osteotome. Dowels from the tibia and femur were removed with a Kocher once freed up by a small osteotome. Medullary canals were exposed and power reaming up to a 13 reamer on both femoral and tibial sides. Extensive debridement of necrotic tissue performed and irrigation proceeded with 3 liters of Betadine solution and 3 liters of saline solution. The space was then tediously crafted to allow for placement of a trial Merete® spacer using a 16 nail in the femur and a 12 nail in the tibia and the appropriate joining clamp was placed. Fondaparinux and a sterile lap were placed in the wound which was then loosely closed and wrapped with a compressive dressing and an antimicrobial adhesive drape. X-ray was completed to confirm proper placement of trial nail (Figure 3).

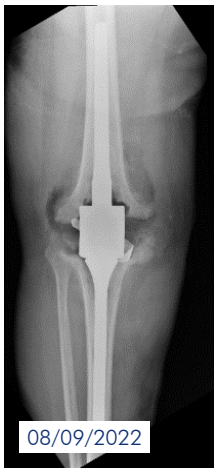

Figure 3: Radiographs of trial between procedures confirming fit

Operating Room #2:

The patient was re-prepped and re-draped, closure was opened and lap sponge removed. Trials were removed and the final nails were inserted and locking screws placed under fluoroscopic control. Femoral and tibial nails were joined together with the Merete® spacer, and a rigid, solid fixation was visualized and confirmed on radiographic exam. Complex closure was performed. Soft tissue perfusion where patellectomy was performed was questionable based on appearance but skin edges were bleeding. A deep drain was placed and negative-pressure incisional vacuum dressing was applied.

Cultures collected intraoperatively were eventually negative but the patient was placed on IV Vancomycin + PO Rifampin 300 mg BID at this time.

Implants Used

Merete® OsteoBridge™ Intramedullary Knee Arthrodesis (IKA) System

- Femur: 16mm x 200 mm Non-Collared Tapered Nail
- Tibia: 12mm x 200 mm Non-Collared Tapered Nail
- IKA Spacer: Fixed 10-degree angle, 40 mm length, 50 mm diameter
- 4 Interlocking/Transfixion Screws

Patient Outcome

The patient was able to tolerate early mobilization post-operatively with weight bearing as tolerated. The patient completed 6 weeks of IV antibiotics then transitioned to oral.

Due to continued draining sinus proximal to the gastrocnemius rotation flap, patient returned to the OR for irrigation and debridement, and wound VAC placement. Wound clinic managed the wound with progression to complete closure (Figure 4).

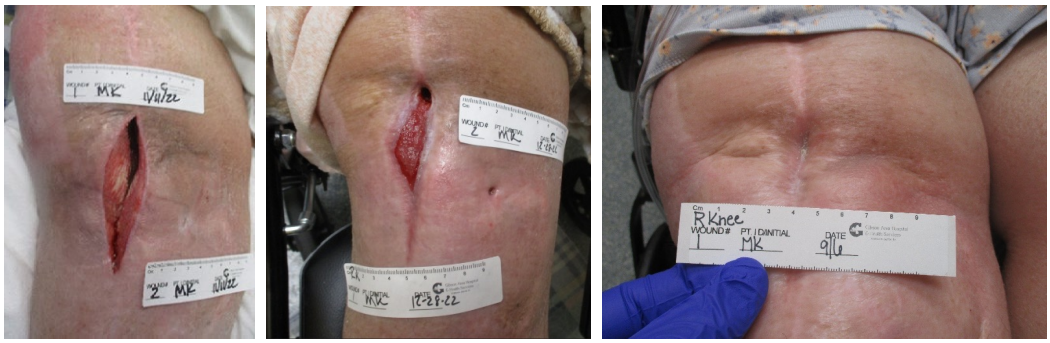

Figure 4: Wound healing progression post debridement and wound VAC placement.

Patient returned to the OR 7 month's status post-fusion to dynamize the nail. The most proximal and distal screws were removed with the plan that shortening and compression would facilitate wound healing. Even in the environment of a chronic PJI, the Merete® IKA nail was found to have solid bony integration with a stable construct. Dynamizing did not shorten the construct (Figure 5).

Patient progressed to ambulating pain-free on the fusion nail with a well-healed wound and the inflammatory markers have become normal. She is happy with the outcome (Figure 6, 7).

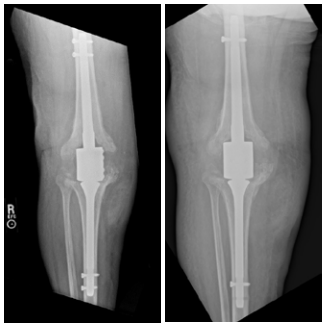

Figure 5: Pre- and post-dynamization of Merete® IKA System.

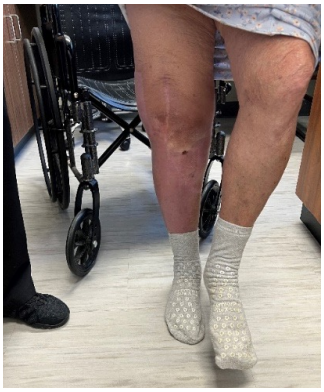

Figure 6: Standing on one leg, full weight bearing

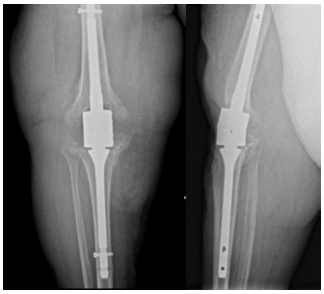

Figure 7: Patient now fully weight bearing, without pain, no draining sinuses, and no shortening after screw removal.

Case study worked on in conjunction with Erin Miller, MSPA-C.

Discussion

Fusion is a treatment option for the infected TKA determined to not be acceptable for reimplantation[1,2,3,4,5]. Amputation, resection arthroplasty and chronic antibiotic suppression therapy are other treatment options[5]. The ideal surgical technique and method of fusion is debatable and can depend upon patient factors[7,8,9]. Some techniques do not require boney fusion and rely on rigid mechanical fixation of the resected joint[9,10,11]. Bone loss, soft tissue integrity, an ipsilateral total hip and the patient's comorbidities are factors influencing the surgical plan.

The Merete® IKA system facilitates rigid fixation in the resection gap, the possibility of bone-to-bone fusion and fusion of host bone to the device. The insertion technique is compatible with an ipsilateral total hip and the predominant intramedullary location facilitates soft tissue coverage.

This patient was allowed immediate full weight bearing with no adverse sequela. The 7-month post-op removal of femoral and tibial screws to facilitate compression did not result in any shortening supporting the assumption there is both boney onlay and ingrowth to the device. There is no evidence of recurring infection.

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