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Articulating Knee Spacer for Infected Total Knee Replacement

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ABSTRACT

Background: *Infected total knee arthroplasty is a challenge to patient and surgeon alike. Two stage exchange is the universally acclaimed method to tackle this problem. Various spacer devices are available for the first stage surgery for local delivery of antibiotics. These spacer devices have a set of spacer related complications which we have tried to circumvent by designing knee spacer. Specific design features make it capable for local and deep delivery of antibiotics and almost negligible complications.*

KEYWORDS : Infected total knee replacement, knee spacer

Introduction

The infection rate after primary total knee arthroplasty (TKA) ranges from 0.5 to 2% and is a serious problem in current times [1]. Antibiotic-loaded bone cement spacers in the two stage re-implantation technique are the gold standard .They allow early joint and patient mobilisation, a shorter hospital stay and potentially a reduced rate of re-infection . We describe a technique of creating an innovative knee spacer to be used in initial stage of a two stage reimplantation in patients with infected knee arthroplasty. Here we are discussing usefulness of our innovative knee spacer in providing excellent mobility and stability to the knee joint with negligible spacer related complications.

Procedure

This knee spacer device has two components , an articulating femoral/tibial cement spacer and the attached stem . Both spacers and stems are made on table with bone cement (PMMA).

By medial parapatellar approach the knee joint is exposed. Knee components are removed and thorough debridement and lavage done. On table knee spacer **i**s prepared with high viscosity gentamicin loaded bone cement. Disposable syringes are chosen comparable to premeasured canal size. These are filled with high viscosity gentamicin bone cement which is allowed to cure. Syringes are slit to get solid cement stems. These stems are inserted in the femoral and tibial canals with one centimetre of their ends projecting into the joint. Cement in doughy form is layered on femoral and tibial side to make femoral and tibial spacer components .Cement prepared for femoral side is layered on the femoral surface and the projected stem to shape it like femoral condyles of desired thickness. A groove on the anterior surface of the spacer is made with the femoral component for better alignment of the patella. For tibial tray cement is placed on tibial surface in a doughy state and shaped into a spacer of desired thickness as determined preoperatively [Figure 1] . Flexion extension matching is done to confirm an optimum spacer thickness and provide a smooth knee range of motion [Figure 2] . Postoperatively antibiotics are started as per culture and sensitivity report of the fluid and tissue sent for culture perpoeratively and continued for three months. Serial ESR and CRP monitioring is done for status of inflammation. Physiotherapy is started by walker ambulation from 2nd day . Patients are discharged by 2 weeks and followed up regularly. Revision surgery is done about 3 months after complete subsidence of infection.

Discussion

Two-stage exchange arthroplasty with an antibiotic-impregnated cement spacer remains the standard treatment for patients with an infected TKR [3] . Spacers not only help in maintaining knee joint space but also act as a source of local antibiotic delivery. Nonarticulating spacersare useful in infected knees with substantial bone loss but present several disadvantages like knee immobility and subsequent stiffness, spacer dislodgement and bone erosion [4]. Scar formation, tissue adherence and quadriceps shortening make subsequent surgery a difficult one [5]. Temporary prosthesis is another technique that uses sterile prosthetic components fixed to underlying bone with antibiotic cement . But there is possibility of bacterial adhesion to surface of these components[6] and increased cost of management [7]. .

Commercially available prefabricated cemented articulating spacers are costly,nonmodular and sometimes have a size mismatch with the patient's knee. Spacer fixation to bone and its stability in the joint is largely compromised because of lack of intramedullary purchase in femur and tibia. In the present spacer stems not only provide sound anchorage but also act as a channel to deliver antibiotics deep inside the intramedullary canals.

Conclusion

The articulating antibiotic knee spacer as designed by us for management of infected TKR is cost effective, customised and easy to make with intramedullary stem providing stability and deep delivery of antibiotics.

Figure Legends

Figure 1 A Infected TKR, exposure and component removal, B Intramedullary femoral and tibial stems , C Our innovative knee spacer

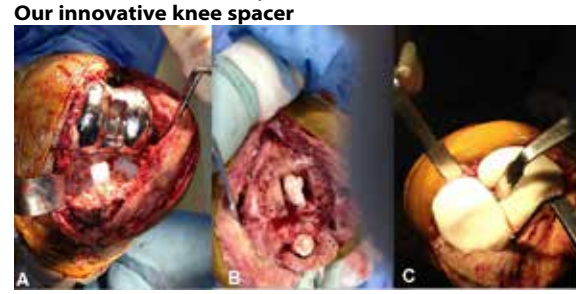

Figure 2 Postop X Rays of the patient with knee spacer

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