ARTICULATED VERSUS NON-ARTICULATED SPACERS IN TREATING INFECTIONS FOLLOWING TOTAL KNEE ARTHROPLASTY

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ABSTRACT
Periprosthetic infections following total knee arthroplasty (TKA) represent a serious complication due to the difficulty in their treatment, because the germs grow on the metal implants and the antibiotics can’t reach them. Actual data suggest that the two methods have the same efficacy regarding eradication of infection, but the functional results are better in case of articulated spacers. The mechanical complications are the same in both cases. Complications related to articulated spacers are less frequent than in case of non-articulated spacers.

INTRODUCTION
Periprosthetic infections following total knee arthroplasty (TKA) represent a serious complication due to the difficulty in their treatment, because the germs grow on the metal implants and the antibiotics can’t reach them. We present the advantages and disadvantages of articulated versus non-articulated spacers used in orthopedic practice in order to eradicate the infection.

METHODS
Once the germs reach the implants, they produce a biofilm on the surface of the implants that is very resistant to antibiotics and to the biological defensive system of the body. Beneath the biofilm, bacteria grow and form complex colonies. Although theoretically it is possible to drain and clean the articulation, in practice the solution is to extract the implants and to insert a spacer loaded with antibiotics. There are 3 methods used in the management of periprosthetic infections:

1. Debridement and lavage: it is used in the first month following TKA, in order to save the implants
2. Extraction of the implants and introduction of another implant (prosthesis or spacer)
3. Salvage procedures: arthrodesis, even amputation

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soft tissue, preventing collapse of the articular space and periarticular contractures. There have some disadvantages, represented by shortening of the evadrus capitis system, arthrofibrosis, alteration of the extensor mechanism, spacer migration, difficulties in daily-life activities due to the irreducible extension position of the knee.

Articulated spacers maintain the articular space, permit articular movement, does not affect the extensor apparatus, permit an easier revision and patient satisfaction is higher than in cases of non-articulated spacers due to joint mobility and total weight-bearing permission on the first postoperative day. These spacers are not indicated in case of destroyed extensor mechanism, massive bone stock loss, insufficiency of the collateral ligaments, morbid obesity or non-compliant patients.

There are 3 types of articulated spacers

Cement on cement: they have the advantage of an increased surface of antibiotic contact with thearticular structures, but are less stable and more susceptible to mechanical degradation

Cement on polyethylene: they are not used any more

Metal on polyethylene: introduced by Hofmann² and all in 1995, they have the advantage of a smooth articular surface that cause less pain during motion and increased mobility and mechanical resistance. The main problem is that in time, after the antibiotic was released from the cement, the stability of the implant decrease.

The articulated spacers predispose to some complications represented by spacer dislocation, arthrofibrosis, fractures around the spacer, alteration of the extensor mechanism, knee instability, delayed healing time of the wound, de-cementation of the components.

CONCLUSIONS

Due to antibiotic preloaded cement used during spacers implantation, these implants are very useful in treating periprosthetic infection. The type and dose of antibiotics can be choose according to the germ implicated. Actual data suggest that there are no differences regarding eradication of infection and long-term results between articulated and non-articulated spacers. Patient satisfaction is higher in case of articulated spacers and revision is easier than in cases of non-articulated spacers.

DISCUSSION

In general, complications related to articulated spacers are less frequent than in case of non-articulated spacers: Guild³ and all and all reported 16% rate of complications in the first case and 20% in the second one. Actual data suggest that the two methods have the same efficacy regarding eradication of infection, but the functional results are better in case of articulated spacers. The mechanical complications are the same in both cases.

Fehring⁴ and all showed that in cases of non-articulated spacers, at the revision time, the loss of periprosthetic bone sock was higher. Emerson⁵ and all reported increased flexion of the knee after revision when articulated spacers were used. Chiang⁶ reported increased wound length, increased soft tissue dissection and decreased mobility on short and long-term in cases of non-articulated spacers.

Regarding articulated spacers, Hofmann² was the first that used the same femoral implant that was resterilized and cemented associated to a tibial polyethylene implant and he reported very good results in eradication of infection. Studying three types of articulated spacers (cement on cement, metal on polyethylene with a resterilized femoral implant and metal on polyethylene with a new femoral implant), Kalore⁷ reported no differences in eradication of infection and long-term functional results.

Conflict of interest

The authors declare no financial interest or any conflict of interest.

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