Chapter 15
Management of Deep Infection

Deep infection after elective surgery is a serious complication. The problem is even more serious when a large foreign body, an implant, is an integral part of the original treatment.

In the management of deep infection after total hip arthroplasty the work of Buchholz and Colleagues has made an original and very valuable contribution: the use of antibiotic containing acrylic cement (ACAC). With time, increasing numbers of publications on the subject appeared in print. The method advocated by Buchholz and Colleagues, one stage revision, did not become readily accepted despite encouraging results. The reason is by no means clear. Was it the fear of exacerbation of the infection, the length of the operative procedure, or merely the lack of stamina on the part of the surgeon and the operating team?

One Stage Revision: The Principle [1–3]

Operative intervention in cases of infection, in any site, follows well documented principles: Removal of foreign material, if present, clearing of all infected tissues and exposing healthy deeper tissues – (as much as technically possible), application of local antiseptics/antibiotics, closure of cavities, ensuring mechanical stability, drainage of the site, rest for the patient as well as of the part involved, antibiotics. Thus the question whether the new implant is inserted has not been considered, it has been expressly implied as part of the accepted principles:

Local Antibiotics: ACAC filling the cavities thus ensuring largest possible surface area of antibiotic elution.

Closure of cavities – of the medullary canal and the acetabulum: Total hip arthroplasty components with ACAC offer not only the closure of the cavities but also stability to the site.

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To reach that stage clearance of both the foreign and infected materials becomes the most demanding part of the procedure – demanding of time and detailed performance.

The implantation of the new components becomes just another "primary" procedure – one of several on the particular operation day. In a study of 183 THAs revised for deep infection in a one-stage procedure, over 85 % of patients were free of infection at an average follow-up of 7.9 years [4].

Two Stage Revision

The principle of two stage revision follows the same operative routine up to but not including the implantation of the new components. It is at that stage that ACAC "spacers" are used to deliver local antibiotics. The spacers do not fill the cavities as intimately as fully pressurised cement can, neither do they offer stability to the "pseudoarthrosic" space.

Since the amount of antibiotic released is proportional to the surface area a "spacer" by its very surface configuration can offer only limited amount of antibiotic. In this context, injection moulded spacers is a misconceived concept. The glass-like surface of a mould injected ACAC spacer will only release antibiotic that is actually on the surface and that surface is reduced by the mould injection.

The second stage, of the two-stage revision, is carried out at a later date when infection is deemed to have been eradicated.

One or Two Stage Revision for Deep Infection?

Surgery of deep infection follows the basic principles: detailed debridement, closure of cavities and stabilization of the area. Two stage revisions aim to eliminate the infection before the arthroplasty is carried out at the second operation. It could be argued that if the first stage is unsuccessful, the second stage should not be carried out. If on the other hand the first stage is successful the second stage should not be necessary.

However, if one stage is considered as the first stage of a two stage operation then in over 80 % of cases the second stage would not be necessary. Each case must be treated according to the details: clinical radiographic, bacteriological.

The debate for one or two stage revision will no doubt continue. Resolution may come by force on economic rather than scientific evidence.

Early Indication of Outcome

Some indication of outcome of one-stage revision can be gained from very early clinical results. Freedom from pain is an excellent indicator and was found in 92 % of successful revisions. If the pain was relieved only partly some 48 % had a

successful result. Persistence of pre-revision pain meant invariable failure – infection was not eradicated.

Quality of the bone stock for component fixation had no effect on the infection; success or failure was independent of bone quality found at revision. Long term mechanical outcome was dependent on the quality of bone; poor quality bone for component fixation increased the incidence of component loosening.

The conclusion must be: one-stage revision carried out early offers the best chance of success.

The problem is infection – the arthroplasty is incidental.

References

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