W. J. Harrison · C. B. D. Lavy · C. P. Lewis

One-year follow-up of orthopaedic implants in HIV-positive patients

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Abstract We followed prospectively 38 orthopaedic implants in 36 HIV-positive patients. X-rays and clinical examination were used to assess union, and observation was made for early and late wound sepsis for 12 months from the time of surgery. Two patients died of causes unrelated to the implantation, two patients had implants removed for reasons other than infection and eight cases were lost to follow-up. Of the 26 cases that were reviewed at 1 year, no late sepsis was identified. All of the fractures, non-unions, osteotomies and arthrodeses united. The literature indicates that late sepsis following arthroplasty occurs more frequently in haemophiliacs who are HIV positive than their HIV-negative counterparts. It is still not certain whether or not such a risk also applies to HIV-positive patients who are not haemophiliacs and have undergone internal fixation of fractures or non-unions. This study increases the confidence that fixation in immune-compromised patients with intact skin is safe, at least for the time period that the implant is required. Further studies are required to know whether or not fixation implants should be removed.

Résumé Nous avons suivi de façon prospective 38 implants orthopédiques chez 36 malades HIV-Positifs. La radiographie et l'examen clinique ont été utilisés pour étudier l'évolution et ont été recherchées les infections précoces et tardives survenant dans l'année suivant la chirurgie. Deux malades sont morts de causes sans rapport avec l'implantation, deux malades avaient des implants

retirés pour des raisons autre qu'une infection, et huit cas ont été perdus de vue. Des 26 cas qui ont été examinés à une année, aucune infection tardive n'a été identifiée. Toutes les fractures, pseudarthroses, osteotomies et arthrodeses ont fusionnées. La littérature indique que les infections tardives après arthroplastie surviennent plus fréquemment chez les hémophiles séro-positifs que chez ceux qui sont séro-négatifs. Il n'est pas encore certain qu'un tel risque s'applique aussi à malades séropositifs qui ne sont pas des haemophiles. Cette étude augmente la confiance dans le fait que l'utilisation d'implants orthopédiques chez des patients immuno déprimés avec une peau intacte est sûre, au moins pour la période où l'implant est nécessaire. Des études supplémentaires sont nécessaires pour savoir si les implants de fixation devraient être enlevés ou non.

Introduction

Late sepsis around implants is well described for arthroplasties [4]. It has been reported that late sepsis occurs more commonly in patients whose immunity is compromised as a result of HIV disease [2, 7, 9, 10, 13]. Most such reports are based on follow-up of arthroplasties in haemophiliacs with HIV disease [7, 10]. Jellis also reported on late sepsis around fracture fixation implants [9].

Information about early sepsis after implant surgery is becoming available [1, 3, 5, 6, 8, 9, 11, 12], but evidence about late sepsis is required for appropriate decisionmaking. In the case of arthroplasty, the principal benefit may be lost if the implant is removed, whereas in the case of implants for fracture fixation or arthrodesis, removal after bony union has occurred is not detrimental.

Further questions to be asked are, if late sepsis does occur, how does it respond to treatment? Does infection settle upon removal of the implant?

W. J. Harrison (✉)
Beit Trust Cure International Hospital, College of Medicine,
Blantyre, Malawi
e-mail: harrisons@africa-online.net
Tel.: +2651-671840
Fax: +2651-674397

C. B. D. Lavy
Malawi Against Physical Disabilities, College of Medicine,
Blantyre, Malawi

C. P. Lewis
Wessex Region, UK

Table 1 Details of individual patients and outcomes

Patient No.	Gender	Age	Indication	Operation	CD4 count	Early infection	Outcome
1	M	27	Fresh fracture	Screw fixation distal humerus	172	No	Union, no problems
2	M	35	Non-union	Plate humerus	351	No	Union, No problems
3	M	54	Fresh fracture	Plate radius	264	No	Lost after 3 months
4	M	47	Inflammatory arthropathy	Screw ankle fusion	113	Mild, cleared with antibiotics	Bony fusion
5	M	43	Non-union	Plate humerus	566	No	Union, no problems
6	M	27	Non-union	Plate forearm	290	No	Lost after 3 months
7	M	25	Fresh fracture	Plate radius	1160	No	Union, no problems
8	M	38	Post-traumatic arthropathy	Screw arthrodesis ankle	311	No	Died >3 months after surgery
9	M	30	Fresh fracture	IM nail	128	No	Union, no problems
10	M	21	Fresh fracture	Screw fixation distal femur	860	No	Union, no problems
11	M	32	Non-union	Plate, humerus	121	No	Union, no problems
12	M	50	Non-union	Plate, humerus	NK	No	Union, no problems
13	M	40	Inflammatory arthropathy	Screw fusion, ankle	199	No	Died >3 months after surgery
14	F	37	Fresh fracture	Screw fixation acetabulum	931	No	Union, no problems
15	M	31	Non-union	Blade plate, femur	396	No	Union, no problems
15	M	31	Post-traumatic arthropathy	Plate fusion of hip	311	No	Union, no problems
16	M	38	Fresh fracture	Plate, ulna	235	No	Lost after 3 months
17	M	36	Fresh fracture	Wiring patella	213	Mild, settled with antibiotics	Union, no problems
18	M	24	Non-union	Plate, ulna	333	No	Lost after 6 weeks
19	M	38	Non-union	Plate radius and ulna	369	No	Union, no problems
20	M	36	Non-union	IM nail, femur	660	No	Union, no problems
21	M	21	Fresh fracture	Plate, ulna	336	No	Union, no problems
22	M	52	Non-union	Screws, proximal femur	50	No	Implant removed because of fixation failure
23	M	32	Fresh fracture	Wiring patella	115	No	Union, no problems
24	F	40	Non-union	IM nail, femur	102	No	Lost after 3 months
25	M	39	Fresh fracture	Plate, ulna	183	No	Union, no problems
26	M	23	Non-union	IM nail, femur	302	No	Lost after 3 months
27	M	39	Fresh fracture	Plate, radius	548	No	Union, no problems
28	M	47	Fresh fracture	Screw, tibial plateau	48	No	Union, no problems
29	M	44	Fresh fracture	Wiring, patella	378	No	Union, no problems
30	M	40	Fresh fracture	Wiring, radius	335	No	Implant removed, no problems
31	M	48	Fresh fracture	Screw, proximal femur	866	No	Union, no problems
32	M	38	Non-union	Plate, ulna	288	No	Lost after 3 months
33	M	33	Fresh fracture	Plate, distal fibula	59	No	Lost after 6 weeks
34	F	48	Avascular necrosis	Total hip replacement (L)	NK	No	Good function and XR
34	F	48	Avascular necrosis	Total hip replacement (R)	NK	No	Good function and XR
35	M	26	Fresh fracture	Plate, radius	290	No	Union, no problems
36	M	35	Non-union	IM nail, femur	177	No	Union, no problems

IM intra-medullary, XR X-ray.

Patients and methods

A prospective study of all patients requiring orthopaedic implant surgery in two hospitals in Blantyre was made between January and December 2000. One hundred eighty-two consecutive patients were studied. Patients entered the study after informed consent, and the study had full local ethical committee approval. The early results of the study have already been published [6]. All HIV-positive patients remained under prospective study for a period of 1 year from the time of surgery.

Thirty-eight implants in 36 HIV-positive patients were studied. Thirty-three were male and three female. The mean age was 37 years. Indications for surgery were as follows: 18 fresh fractures, 14 delayed or non-unions and six joint arthropathies. There were two total joint arthroplasties, and all other implants were internal fixation devices. CD4 counts were done as part of disease staging in all cases and are shown in Table 1.

Late sepsis was defined as discharge sinus 3 or more months from the time of surgery. Tenderness in proximity to the scar was considered to be related to sepsis until proven otherwise. At the time of review, clinical and radiological assessment was also made of bony union in those cases operated for fracture, non-union or arthrodesis.

Results

Results are summarised in Table 1. During the year of follow-up, two implants were removed, one following failure of fixation (in a femoral-neck fracture) and one because of irritation of overlying skin (a distal radius fracture). Two patients died of causes unrelated to the implant or surgery, and eight patients could not be contacted at their 12-month follow-up.

Twenty-six implants were still in situ in 25 patients under review at 1 year, and no case of late sepsis occurred in this period. Twenty-four cases involved internal fixation for fracture, non-union or arthrodesis, and all of these were clinically and radiologically united.

Discussion

This study is, to the authors' knowledge, the first prospective study evaluating union and late implant sepsis in HIV-positive patients. The findings lend further weight to the conclusions of the previous study [6] that it is safe to undertake orthopaedic implant surgery through intact skin, even when CD4 count is very low. Thirty-five percent of patients followed up had very low CD4 cell counts (less than 200/mm³); of these, one had a minor early infection, which settled with antibiotics, but none were subject to sepsis during the first year thereafter. Thirty-seven percent of the operations were for non-union, and in such cases, it is generally necessary to leave the fixation implant in situ for at least a year. No problems were seen to manifest in this timeperiod.

The study however, lacks the power to make definite predictions about long-term sepsis. This weakness arises because of loss to follow-up (21%) and limited length of follow-up (1 year). The only other study known to the authors that looks at late sepsis in fixation implants is by Jellis [9]. He noted late sepsis in ten such implants in HIV-positive patients. However, the data is retrospective, and no information is given regarding early wound healing or response to surgery after late sepsis. In his series, the early wound sepsis rate for HIV-negative patients was 12%, which suggests operative conditions may have been sub-optimal.

Other authors have looked at late sepsis around joint arthroplasties [7, 10]. All such cases have focused on haemophiliacs. Haemophiliacs may not be representative of the general HIV-positive population for a number of reasons. Haemophiliacs undergo regular injections of factor 8, which may be a source of bacteraemia. Furthermore, by the nature of the disease, haemophiliacs are more prone to bleeding; such bleeds in proximity to implants (particularly if they are loose) may allow bacteria to contact the implant and pre-dispose to late sepsis. Nonetheless, arthroplasty may still be beneficial in carefully selected cases [7].

The case for late sepsis around fracture fixation implants is still unproven. Further studies are required, particularly to guide surgeons as to whether and when removal of such implants may be beneficial.

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