Deep infection after primary hip arthroplasty: results after treatment of 10 patients*

Infection profonde de prothèse de hanche primaire

M. Breddam, T.B. Hansen and P.B. Thomsen

Department of Orthopaedics, Holstebro Central Hospital, DK-7500 Holstebro, Denmark

Abstract: In the period 05.06.79 – 31.12.91, 2037 primary total hip arthroplasties were performed, all in ultra-clean air, wearing body-exhaust system suits and all patients receiving Meticillin as prophylactic antibiotics. None of the non-cemented arthroplasties were infected and 0.61% of the cemented hip arthroplasties were infected giving a total incidence of deep infection after total hip arthroplasty in our clinic of 0.49%. The microorganism most commonly cultured was Staph. aureus, but in one hip Listeria was cultured, which is extremely rare. In the 10 patients with deep infection the infection recurred in 30%. Patients with a revision prosthesis in situ at follow-up, had an average Harris-hip score of 79, and radiographs showed no signs of loosening or persistant infection. The rate of deep infection and the patients’ condition after the revision procedures in our series are comparable to other published series.

Key words: Primary hip arthroplasty — Deep infection

Deep infection following total hip replacement is a dreaded complication resulting in increased patient morbidity and increased costs mounting $ 35,000 to 100,000 [6, 9].

Disposing factors are previous hip surgery, bone allografting, urinary tract infection, diabetes mellitus, obesity and rheumatoid arthritis [6, 7, 13, 19]. Charnley in 1969 estimated the incidence to be 9% [4], but use of prophylactic systemic antibiotics has reduced the incidence of deep infection to 2% [3].

The combination of prophylactic antibiotics and operation theatres with ultraclean air and body-exhaust system suits has further lowered the incidence to 0.2% [13, 14, 16, 19]. Several authors however states, that prophylactic antibiotics should be restricted to patients operated in a conventional operating theatre [7, 17], and Jösefsson [9] reduced the incidence of deep infection fourfold using Gentamycin-impregnated bone cement instead of systemic antibiotics.

The aim of this study was to reveal the incidence of deep infection in primary total hip replacement in our clinic, and to follow-up patients with deep infection.

Material and methods

In the period 05.06.1979 to 31.12.1991 a total of 2037 primary hip arthroplasties were performed – 1632 cemented and 405 noncemented. The operations were all performed in ultra-clean air wearing body-exhaust system suits. The surgical approach was anterior until 1988 and thereafter posterolateral. All patients received prophylactic antibiotics (Meticillin 500 mg peroperatively and after 6 hours).

Our definition of deep infection was a positive culture either peroperatively at revision or from aseptic joint aspiration in combination with pain, radiological signs of loosening (radiolucent zones, migration of the components), elevated ESR and major scintigraphic uptake. Patients without positive culture were considered infected if they had pain, major radiological signs of loosening, elevated ESR and major scintigraphic uptake.

All files concerning the 2037 hip replacements were retrospectively reviewed, and all the patients, who contracted a deep infection, had a follow-up examination, including x-rays and Harris-hip score evaluation.

Results

A total of 10 deep infections were identified (9 men and 1 female with an average age at the time of operation of 66 years (47–77)).

Thus the incidence of deep infection was 0.49%, but all infections occu-
red in patients, who received a cemented total hip arthroplasty (1632 hips) giving an incidence of deep infection in this group of 0.61%.

The average time from operation to infection was 52.2 months (7–130 months). In 9 patients a positive culture was obtained, but in one patient (patient number 3) a positive culture was never obtained.

The outcome of the 10 infected hips are listed in Table 1.

Eight of the 10 patients were treated in our department. Nine patients had a two-stage revision operation performed and one a resection arthroplasty only (patient number 7), because he refused further surgery.

In two of the patients, who had a two stage revision performed, the infection recurred.

In patient number 4 a two-stage revision was performed without success three times, and still having an infected draining hip after the third revision arthroplasty, a resection arthroplasty was performed as a salvage procedure.

In one patient (patient number 5) infection recurred 36 months after revision with the same bacteria (listeria), and a new two stage revision was performed.

One patient was operated at another hospital and was not available for clinical follow-up. He had a two-stage revision and had no signs of infection at the time of follow-up.

One patient had died of non-hip related causes without sign of deep infection.

In the patient, who only had a resection arthroplasty and never had the second stage of revision with implantation of a prosthesis (patient number 7), infection recurred after 36 months with the same bacteria (proteus).

### Discussion

The terms early and late deep infection were not used, as the definition of late infection is not exact. Pollard [17] defines it as infections commencing 6 months or later after surgery, whereas Carlsson [3] and Hill [7] use the term “deep infection commencing more than 2 years postoperatively”. The frequency of deep infection after primary hip arthroplasty in our department – 0.49% is fully acceptable compared to the literature [13, 14, 16, 19]. Especially as several authors require positive cultures in the definition of deep infection [3, 7, 20].

Recent studies concerning non-cemented arthroplasties have revealed rather low incidences of deep infection; 0.49% after 5 years [5], and 1.7% after 2 years [15]. In this study none of the 405 non-cemented arthroplasties were infected.

As for the cultured bacteria in our study, they do not seem to differ from the bacteria found in other studies; Staph. aureus being cultured most often, followed by Staph. epidermidis and the enterobacteria [6, 10-14, 18].

However one cultured bacterium - Listeria, has only once before been described as being the source of deep infection after total hip arthroplasty [1].

Regarding the follow-up of the 10 patients, who had a deep infection, a failure rate should be defined in order to make a comparison to other studies. At the time for follow-up, three patients had experienced a recurrence of the infection giving a failure rate of the first revision of 30%, well within the published range of 20–87% [2, 8, 9, 11, 14].

In conclusion it must be stressed, that deep infection after total hip arthroplasty still is a major problem regarding the level of function and quality of life of this otherwise healthy group of patients. Much effort should therefore be concentrated on the prophylaxis of this dreaded complication.

### References

3. Carlsson AF, Lidgren L, Lindberg L (1977) Prophylactic antibiotics against early and