Urinary catheterisation and deep wound infection after hip fracture surgery

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Abstract We have studied the incidence of deep wound infection after hip fracture surgery and its relationship to urinary catheterisation. Infection after hemiarthroplasty occurred in 16/949 cases and 10/1,143 sliding hip screw fixations. No cases of deep sepsis were seen for the 203 patients treated with an intramedullary nail or the 816 patients treated with parallel screws. The use of urinary catheterisation was compared with a control group of patients. In the sepsis group, 12/18 patients had been catheterised peri-operatively or within 24 h, as opposed to 18/36 patients in the control group; the difference between these two groups was not statistically significant ($P=0.38$). There was a statistically significant increase in the proportion of patients who had more than two urinary catheterisations (6/18 versus 3/36, $P=0.05$) or who had a long-term catheter (7/16 versus 3/36, $P=0.01$) in the sepsis group.

Résumé Le but de cette étude est de déterminer la fréquence des infections profondes après traitement chirurgical sur fracture de hanche et la relation de ces infections avec le sondage urinaire. Les infections après hémi arthroplastie sont survenues dans 16/949 cas et dans 10/1,143 cas de vis plaques en compression. Aucun cas d'infections profondes n'est survenu chez 203 patients traités par clous intra médullaires ni sur les 816 patients traités par vissage simple. L'utilisation du sondage urinaire a

également été comparée chez un groupe de patients contrôle. Dans le groupe des patients infectés, 12/18 ont été sondés dans les 24 h péri opératoires en opposition aux 18/36 patients du groupe contrôle, la différence entre ces deux groupes n'étant pas significative ($P=0.38$). Par contre, il existe une différence significative chez les patients qui ont eu deux, ou plus de deux sondages urinaires (6/18 versus 3/36, $P=0.05$) ou qui ont eu un sondage de longue durée (7/16, versus 3/36, $P=0.01$) dans le groupe des septiques.

Introduction

Deep infection in joint replacements such as hip arthroplasty is well documented with rates of between 0.3%–2% for primary hip replacement procedures [1, 2]. A recent paper reported a rate of 5.0% for wound infections after hemiarthroplasty [4]. In the medically frail elderly patients the consequence of a deep surgical site infection is usually one of significant morbidity with loss of mobility or in many cases mortality. A number of factors have been studied before and shown to reduce the incidence of infection such as a strict aseptic surgical technique and the design of operating theatres [3]. Many of these patients require catheterisation and it has been proposed that the introduction of urinary catheters is a potential for the release of bacteria and possible cause of deep infections in total hip arthroplasty [5]. This study was to investigate the relationship between urinary catheterisation and deep wound infection.

Patients and methods

Information of all hip fracture patients admitted to one institution from June 1994 to September 2004 was

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prospectively recorded. This information included the type of surgical procedure and the occurrence of deep wound infection. Follow-up of surviving patients was until 1 year from injury. Deep wound infection was defined as clinical evidence of infection below the deep fascia with or without microbiological confirmation. The occurrence of deep wound infection was related to the type of surgical procedure, and for each patient with deep wound infection, the next two patients admitted with a hip fracture that was treated with the same implant were identified. These patients were termed the control group.

All patients received three doses of antibiotic prophylaxis with cefuroxime at the time of surgery and in the postoperative period.

Patients did not receive prophylactic antibiotics as standard on insertion or removal of the catheter.

The notes for 18 of the 26 cases of deep sepsis were retrieved. The other notes were not available. For the control cases if the case notes of the selected patients were not available, the next patient on the database with a hip fracture treated with the same implant was used. From these records the microbiology for wound and urinary infections was recorded along with the use of urinary catheterisation for these patients. Statistical analysis between groups was with the Fisher exact test.

Results

Over the study period, 3,180 hip fracture patients were admitted. There were 26 cases of deep wound infection. The overall incidence of deep wound infection related to the type of surgical procedure was uncemented hemiarthroplasty (12/760), cemented hemiarthroplasty (4/189), total hip replacement (0/12), condylar plate (0/3), sliding hip screw (10/1,143), intramedullary nail (0/203), parallel screw fixation (0/816) and non-operative treatment (0/54).

Table 1 lists the characteristics of the cases of deep sepsis compared with the control cases.

No patients presented to the department with a catheter-in-situ.

The average length of time that the catheter was in-situ postoperatively was 6.9 days in the deep sepsis group, compared to 3.5 days in the controls.

The number of patients requiring a long-term catheter in the deep sepsis group was significantly higher than in the control group ($P=0.01$). A long-term use of a catheter was defined as either greater than 21 days, or in most cases the patients' were discharged home with a catheter-in-situ.

The causative organisms for the deep sepsis are shown in the Table 2.

The mortality rate for the deep sepsis group was 11% at 3 months and 33% at 12 months.

Table 1 Characteristics of patients with wound sepsis and control cases

	Deep sepsis	No sepsis
Number	18	36
Mean age (range)	79.8 (60–94)	81.9 (47–95)
Number male (%)	3 (16.7%)	7 (19.4%)
Mean mental test score	6.2	5.2
Mean mobility score	5.9	4.5
From own home (%)	14 (77.8%)	21 (58.3%)
Mean ASA grade	2.8	2.8
Mean admission haemoglobin g/l	124.6	123.9
Had urinary catheter peri-op or within 5 days of surgery	12 (66.7%)	18 (50%)*
Had more than two urinary catheterisations	6 (33.3%)	3 (8.3%)**
Long-term catheter	7 (38.9%)	3 (8.3%***)

*P value for difference between cases and controls =0.14

**P value for difference between cases and controls =0.05

***P value for difference between cases and controls =0.01

Discussion

The results of this paper suggest that urinary catheterisation, particularly long-term catheterisation, may play a significant role in the development of deep wound infections. Catheterisation is required for many of these patients. We would however suggest the importance of removing urinary catheters as soon as possible and the avoidance of multiple catheter insertions of long-term catheters. We would also suggest the importance of strict aseptic technique for catheterisation, as well as antibiotic cover. However, even for such a large series of patients as in this study the association and whether it is causal or association is difficult to prove.

There are few papers published in the literature looking at a relationship between deep sepsis in hip fractures and urinary catheterisation. A paper published in 1980 [5] did look at the association between urethral

Table 2 Causative organisms for hip infection

Organism isolated	Number of patients
Staph Epidermidis	1
Staph Aureus	7
MRSA	1
Staph Aureus and coliforms	2
Coliforms	3
No organism isolated	4

instrumentation and total hip replacement. This paper did suggest a deep sepsis rate of 6.2% in those patients who underwent urethral instrumentation. The organisms isolated from the hip replacement in this paper were similar to those in our study with the majority being Staph Aureus and Coliforms.

A recent study of surgical site infection after arthroplasty of the hip suggested that the risk of wound infection increased in hemiarthroplasty patients with increasing age, increasing BMI, and increasing ASA scores [4]. Unfortunately these are all factors that we are unable to influence in order to reduce the incidence of surgical site infections in the elderly hip fracture patients. Catheterisation has been previously suggested as a risk factor the rate of deep infection in total hip arthroplasty [5]. Therefore, the importance of monitoring surgical site infections in this at

risk group is vital if any possible causative factors that can be identified are to be eliminated.

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