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Wound complications in elective orthopaedics: are current British national data relevant?

DJ CLOKE, PF PARTINGTON

Department of Orthopaedic and Trauma Surgery, Wansbeck General Hospital, Ashington, Northumberland, UK

ABSTRACT

INTRODUCTION The UK Nosocomial Infection National Surveillance Service (NINSS) collects data on surgical wound infection in a variety of procedures, including arthroplasty, to allow comparison between institutions.

PATIENTS AND METHODS We have compared the results of a 6-month data collection by NINSS within our department with our own grading system of wound complications in elective arthroplasty surgery.

RESULTS In this period, NINSS has reported one wound infection in our patients. However, we have recorded five patients who were returned to theatre for wound debridement, and yielded positive cultures from multiple specimens. Seven patients received antibiotic therapy alone for wound problems.

CONCLUSIONS We present our wound grading system as suitable for the collection of data on wound complications in elective orthopaedic surgery.

KEYWORDS
Infection – Wounds

CORRESPONDENCE TO
DJ Cloke, 17 Windsor Terrace, South Gosforth, Newcastle-upon-Tyne NE3 1YL, UK
T/F: +44 (0)191 284 3872; E: clokes@talktalk.net

Wound complications in total joint arthroplasty represent a specific clinical entity, as the established infection within a joint prosthesis usually requires surgical debridement with revision of the components (often as a two-stage procedure) and prolonged antibiotic therapy. The burden to both patients and the health services of such management is enormous. Any clinical suspicion of infection or the potential for infection (*e.g.* haematoma has been identified as a particular risk factor) is, therefore, managed more aggressively than in surgery without prosthetic implantation. There is also evidence of an association between wound discharge and periprosthetic infection,[1–4] and this is often covered with antibiotic therapy if prolonged. Surgical management of suspected infection may include surgical debridement of the wound with retention of the implants (if within 4 weeks of implantation), together with microscopy and culture of multiple specimens for evidence of infection, and long-term (6 weeks) antibiotic therapy for any isolated organism. A 71% long-term success rate has been reported with this regimen.[5]

The Nosocomial Infection National Surveillance Service (NINSS) was established by the Public Health Laboratory Service (PHLS) in the UK in 1996 to provide information to help in the identification of, and reduction in, hospital-acquired infection.

Institutions participate on a (currently) voluntary and confidential basis, and information is collected using standard surveillance methods to provide national data to be used as a benchmark of performance.[6] Surgical site infections are classified as superficial incisional, deep incisional or organ/space infection according to PHLS criteria.

We currently collect data on our wound complications in elective hip and knee replacement arthroplasty for the purposes of internal audit.

The aim of this study was to compare our wound classification system with the collected NINSS data collected over a 6-month period.

Patients and Methods

Between October 2002 and March 2003, data were collected in our department for the purposes of NINSS. This was done on a ward basis by staff from the infection control

department, by daily case-note review of patients who had undergone hip or knee arthroplasty surgery, including both trauma and elective cases. The NINSS surveillance data sheet records demographic data, details of the surgical procedure, the patient's ASA score, wound classification (clean/contaminated/dirty) and operation duration. Details of evidence of any criteria for surgical site infection are also recorded (see below), along with any microbiological data.

The criteria for surgical site infection are based on those published by the US Centers for Disease Control (CDC) in 1992. Infections are classified as incisional (superficial or deep), or organ/space infection.

Superficial infection involves the skin or subcutaneous tissues within 30 days of surgery, and requires one of: (i) purulent discharge; (ii) organisms and pus cells from a swab or fluid/tissue; or (iii) a clinical diagnosis of superficial infection in the presence of pain, tenderness, swelling and heat.

Deep incisional infection requires one of: (i) purulent discharge from the deep incision; (ii) organisms and pus cells from a swab or fluid/tissue from the deep incision; or (iii) an abscess or an opened/dehisced wound in the presence of signs of sepsis (with positive culture).

Organ/space infection is diagnosed within 1 year of surgery if an implant is in place, and requires purulent drainage, positive cultures with pus cells or operative, pathological or radiological evidence of infection involving the organ/space.

Wansbeck Hospital orthopaedic wound complication data are collected independently by audit staff in our unit on an on-going basis during in-patient stay. This is done by case review of primary and revision hip and knee arthroplasty on the ward. Our classification system is:

Grade 1 Wound discharge of greater than 48 h duration postoperatively.

Grade 2 Antibiotics started on clinical grounds for wound problems (reasons include persistent discharge, or clinical evidence of superficial infection).

Grade 3 Patient has returned to theatre for wound debridement, but multiple culture specimens are negative.

Grade 4 Patient has returned to theatre for wound debridement, and there are positive cultures from multiple specimens taken in theatre.

Final grading is based upon the highest grading at 30 days postoperatively. The findings of the NINSS data collection were retrospectively compared on a case-by-case basis with our wound complication audit.

Results

During the study period, there were 94 elective total knee arthroplasties (TKRs), and 109 elective total hip arthroplasty operations (THRs). There were 42 hip hemi-arthroplasties performed for fracture; these were included in the NINSS data, but not our wound audit and were, therefore, excluded from this study.

Of this group of patients, one primary total knee replacement was classified by NINSS as a deep incisional infection. However, our wound complication audit identified the following wound grades:

Grade 1 11 THRs, 3 TKRs.

Grade 2 5 THRs (3 of which revisions), 2 TKRs.

Grade 3 1 TKR.

Grade 4 3 THRs, 2 TKRs (one of which identified by NINSS).

Therefore, none of the cases commenced on antibiotics on clinical grounds were classified by NINSS as infected.

Five cases were returned to theatre and classified by us as grade 4, but only one of these was classified as infected by NINSS. In the other patients, multiple specimens taken in theatre grew coliforms and coagulase-negative *Staphylococcus* spp. in one case, coagulase-negative *Staphylococcus* spp. alone in one, coagulase-positive *Staphylococcus aureus* in another patient, and *Proteus* spp. in the other. In all cases, pus cells were seen on microscopy. All were debrided and received 6 weeks of antibiotic therapy corresponding to the isolated organisms. The patient in whom coagulase-positive *S. aureus* was grown has been listed for revision surgery. All others show clinical resolution of infection at last follow-up (6–8 weeks).

Discussion

In our series, five elective arthroplasty cases were returned to theatre for wound debridement, pus cells were seen from samples taken, and there were positive cultures from multiple specimens. NINSS identified only one of these as a wound infection. Additionally, eight patients were commenced on antibiotic therapy postoperatively on clinical grounds for wound problems, but were not recorded as having wound problems by NINSS.

The definitions of surgical site infection used by NINSS underestimate the clinical burden of orthopaedic wound problems, as revealed by our wound grading scheme.

Conclusions

We believe that any attempt to quantify the burden of wound complications in the setting of elective orthopaedic surgery must take into account more factors than NINSS criteria. This is particularly important when these data are used to compare institutions on a national basis. With the introduction of the UK National Joint Registry, we propose

the use of our wound classification system to enable the accurate audit of wound problems in a manner sensitive enough for use in this setting.

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