

Risk Factors For The Development Of Deep Infection Following Hip Fracture Surgery: Analysis Of 2822 Consecutive Patients

Trauma / Hip & Femur Trauma / Complications

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Introduction

Periprosthetic (deep) infections occur following >1% of hip fractures treated surgically, resulting in return to theatre, patient distress, prolonged stay, increased morbidity and short-term mortality. These also translate to increased costs for surgery (doubled), investigation (tripled) and ward stay (quadrupled).

Objectives

Identifying risk factors is important in selecting and implementing prevention strategies. We have analysed the incidence and determinants of deep infection in a consecutive cohort of hip fracture patients over a six-year period at our institution, which treats >500 hip fractures annually in North East England.

Methods

Identifiers for patients admitted with hip fractures between January 2009 and June 2015 were linked to demographic and comorbidity data recorded on admission by hip fracture specialist nurses. All patients were followed up post-operatively by a nurse-led 'surgical site infection' (SSI) surveillance team. Deep (periprosthetic) infections were defined as per criteria provided by Public Health England. A stepwise multivariable logistic regression model was used to identify patient and surgical factors associated with increased risk of infection. Factors investigated included age, gender, ASA grade, and comorbidities, including (but not limited to) hypertension, atrial fibrillation, ischaemic heart disease, diabetes, rheumatoid arthritis, chronic obstructive pulmonary disease, smoking status, dementia and pressure sores). Patient co-morbidities with a p-value of <0.20 in the univariate analysis were included in the multivariate logistic regression model.

Results

Complete data were available for 2822 patients (2052 females, 770 males) who underwent surgery. The majority of patients were ASA grades 2 (n=663, 23%) and 3 (n=1521, 54%), with a mean age of 81.3 years (SD 10.3). The procedures included 1825 (65%) hemiarthroplasties and 997 (35%) internal fixations. Thirty-nine (1.4%) cases of deep (periprosthetic) infection were identified, including 35 hemiarthroplasties (1.9%) and four internal fixations (0.4%). The isolated infecting pathogens in pure mono-organism growths included: 1) coagulase-negative Staphylococcus (n=9, 23%), 2) methicillin-sensitive Staphylococcus Aureus (n=5, 12.8%), 3) Proteus mirabilis (n=4, 10%), methicillin-resistant Staphylococcus Aureus (n=2, 1.2%). The remaining

16 had mixed growths. An increased risk of development of deep infection was observed in patients who underwent hemiarthroplasty compared to those treated by DHS (odds ratio 4.97, 95%CI 1.74 – 14.2, p=0.003). Amongst patient factors, only the presence or development of pressure sores on or during admission was significantly associated with an increased risk of development of deep infection (odds ratio 3.40, 95%CI 1.44 - 8.01, p=0.005).

Conclusions

This study found: 1) a deep infection rate similar to that reported earlier from large number studies from the UK, 2) a five-fold higher deep infection rate in hemiarthroplasties, compared to internal fixations, and 3) a three-fold higher infection rate in patients who suffer concomitant pressure sores. The finding in hemiarthroplasties is also in agreement with similar large number studies, and is related, intuitively, to the longer surgical procedure and more extensive exposure in these operations. Pressure sores are witnessed in >4% of all hip fracture admissions and can lead to deep infection by both haematogenous spread and local infection propagation. Further work is now underway to reduce the incidence and progression sores at our institution.