

Fracture-related Infection operations after Internal Fixation of Ankle Fractures in England: a national 20-year study of 144,284 patients

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INTRODUCTION:

Ankle fractures requiring fixation can lead to long term complications, including infection and osteomyelitis. The rate of infection and the need for reoperation as a result for infection has not been examined on a national scale in England. We investigated the rate of ankle fracture related infection (FRI) after fracture fixation (ORIF) and the need for reoperation, using Hospital Episodes Statistics (HES) data for England.

METHODS:

HES data was obtained from NHS Digital and combined with Office of National Statistics (ONS) data. Age and sex standardised rates of surgery were calculated using Office for National Statistics (ONS) population data as the denominator and analysed over time both nationally and regionally by NHS Integrated Care Board (ICB). We included all adult patients who underwent an ORIF for ankle fracture from 2002-2022. Reoperation-free survival was calculated with Kaplan-Meier curve analysis. Cox proportional hazard modelling determined factors which increased the risk of reoperation for infection.

RESULTS:

We identified 144,284 eligible ankle fractures, of which 1,749 were open fractures. The rate of ankle ORIF increased by 50% over the 20-year study period, from 10/100,000 in 2002 (95% CI 9.7–10.2/100,000) to 15/100,000 in 2022 (95% CI 14.7–15.3/100,000). The overall rate of re-operation for infection in open fractures was 6.06% (95% CI 4.98–7.21%) versus 2.60% in closed fractures (95% CI 2.2–2.69%, Figure 1). The incidence of reoperation for infection after ankle ORIF increased four-fold from 0.3/100,000 in 2002 (95% CI 0.3–0.4/100,000) to 1.3/100,000 in 2022 (1.2–1.4/100,000 in 2022).

Open fractures had a higher risk of reoperation for infection. (HR 2.41 (95% CI 1.98 – 2.92). Female patients (HR 1.09; 95% CI 1.02–1.16), those in the lowest Index of Multiple Deprivation quintile (HR 1.16; 95% CI 1.05–1.27), those aged 20-39 years old (HR 1.36; 95% CI 1.21–1.53) and 40-59 years old (HR 1.19; 95% CI 1.06–1.34) had higher risk of reoperation for FRI.

We examined the 90-day complications following the reoperations for infection reasons. The mortality rate at 90 days was 0.44% (95% CI 0.4 – 0.47%) in the closed group compared to 2.1% (95% CI 1.47 – 2.89%) in the open fracture group.

DISCUSSION AND CONCLUSION:

This large national study shows that both surgical fixation of ankle fractures and subsequent fracture related infection (FRI) have significantly increased over a 20-year period. The infection rate is now double that seen in arthroplasty and often occurs in young people. With 1 in 37 patients now needing surgery for FRI, do we need to re-evaluate the place of surgery in closed ankle fractures and the infection prevention measures we have in place?

