**Title**

Antibiotic prophylaxis regimens in Shoulder Arthroplasty Surgery - Analysis from the Swedish Shoulder Arthroplasty Register

**Authors**

1. Anne Dettmer, MD, PhD student,

Department of Orthopaedics, Kalmar County Hospital, S-39185 Kalmar, Department of Biomedical and Clinical Science Linköping University, S-58185 Linköping, Sweden.

Email: anne.dettmer@regionkalmar.se (corresponding author)

1. Marcus Melander, medical student

Department of Clinical Science, Karolinska Institutet, Division of Orthopaedics, Danderyd Hospital, S-182 88 Stockholm, Sweden.

Email: marcus.melander@stud.ki.se

1. Hanna C Björnsson Hallgren, MD, Associate Professor

Department of Biomedical and Clinical Science, Linköping University, Department of Orthopaedics, Linköping University Hospital, S-58185 Linköping, Sweden.

Email: Hanna.Bjornsson.Hallgren@regionostergotland.se

1. Lars E Adolfsson, MD, Professor

Department of Biomedical and Clinical Science, Linköping University, Department of Orthopaedics, Linköping University Hospital, S-58185 Linköping and Department of Orthopaedics, Örebro University, S-70185 Örebro, Sweden

 Email: lars.adolfsson@regionostergotland.se

1. Björn Salomonsson, MD, PhD

Department of Clinical Science, Karolinska Institutet, Division of Orthopaedics, Danderyd Hospital, S-182 88 Stockholm, Sweden.

Email: bjorn.salomonsson@regionstockholm.se

***Aim***

The aims of this study were to investigate the use of prophylactic antibiotics in shoulder prosthetic surgery during the last decade in Sweden and if the reoperation rate due to infection varied depending on the antibiotic regimen given.

***Background*** Periprosthetic joint infection is a serious complication and reason for revision surgery after primary shoulder arthroplasty. The prophylactic antibiotics for primary shoulder arthroplasty predominantly used in Sweden and northern Europe the last decade have been cloxacillin or clindamycin. To address Cutibacterium acnes and with antibiotic resistance to clindamycin in mind, benzylpenicillin recently has been added to cloxacillin. However, it is still unclear which of the prophylaxis regimens is most effective.

***Method***

 Data was collected from the Swedish Shoulder Arthroplasty Registry 2013-2019. 10577 primary shoulder arthroplasties fulfilled the inclusion criteria with registered preoperative antibiotic prophylaxis until December 2019. The registry variables reoperation due to infection were analyzed in relation to the reported antibiotic prophylaxis in addition to subgroup analysis for age groups, sex and previous surgery with Kaplan Meier and Cox regression models. To verify the registry data on current used antibiotic prophylaxis a survey was sent to all departments performing shoulder arthroplasty surgery in Sweden 2019.

***Results***

A clear change in given prophylaxis appeared between 2013 - 2019, particularly towards the use of cloxacillin/benzylpenicillin combination, and moderate increase of clindamycin single prophylaxis. The reason for chosen prophylaxis was seldom scientific based according to the reports in the survey. The 1-year overall reoperation rate for infection was 0.5% (CI 0.30-0.70) and 5-year 1.2% (CI 1.00-1.40). No difference was seen related to the 3 different prophylaxis regimens at 1-year. After 2- and 5-years cloxacillin prophylaxis was associated with a higher reoperation rate, 1.3% (95% CI 0.91-1.69), 7% (95% CI 1.12-2.29) respectively compared to both combined cloxacillin/benzylpenicillin and single clindamycin.

The relative risk for reoperation due to infection after single prophylaxis with cloxacillin was significantly increased (Hazard ratio 2.40, 95% CI 1.35-4.25; p=0.003) compared both with the combination benzylpenicillin/cloxacillin and clindamycin (Hazard ratio 1.78, 95% CI 1.11-2.85; p=0.017).

***Conclusions:***

A large increase in the combined prophylaxis of benzylpenicillin/cloxacillin was found during 2013 to 2019. A small proportion of prostheses reported to the Swedish Shoulder Arthroplasty Register had been reoperated due to infection. A statistically significant lower reoperation rate was found in favor of the combined prophylaxis with benzylpenicillin/cloxacillin. Whether the addition of benzylpenicillin is of clinical value without added risks, needs further investigation.