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ACFAS Clinical Consensus Statement

American College of Foot and Ankle Surgeons' Clinical Consensus Statement: Perioperative Prophylactic Antibiotic Use in Clean Elective Foot Surgery



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ABSTRACT

Some controversy exists regarding the use of antibiotic prophylaxis in elective foot and ankle surgery. A task force was appointed by the American College of Foot and Ankle Surgeons (ACFAS) to provide a clinical consensus statement on this topic. The panel members performed a literature search and identified 6 studies that met the inclusion criteria. They then developed a list of 13 questions about which they attempted to reach consensus using a modified Delphi method. The questions were grouped into 4 categories: indications for antibiotic prophylaxis relative to surgical procedure; antibiotic prophylaxis in high-risk patients; antibiotic selection; and timing of antibiotic prophylaxis. Consensus was reached for all 13 questions. The panel members found that studies pertaining specifically to elective foot and ankle surgeries that were not level I evidence generally did not recommend prophylaxis. They also found that multispecialty guidelines, which reflect data that are stronger, tended to recommend routine prophylaxis, especially for surgeries involving hardware. In addition, many hospital systems support routine prophylaxis by surgeons. More high-level evidence is required to make a definitive determination about whether prophylaxis is necessary in elective foot and ankle surgery. Until that time, routine prophylaxis will likely be continued at most institutions, because few complications have been reported with the practice.

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This document was created to serve as a clinical consensus statement (CCS) of the American College of Foot and Ankle Surgeons (ACFAS). It is important to appreciate that consensus statements do not represent *clinical practice guidelines, formal evidence reviews, recommendations, or evidence-based guidelines*. Rather, a CCS reflects information synthesized from an organized group of experts based on the best available evidence, and it also may contain opinions, uncertainties, and minority viewpoints. A CCS should open the door to discussion on a topic, as opposed to attempting to provide definitive answers. Adherence to consensus statements will not ensure successful treatment in every clinical situation, and the physician should make the ultimate decision based on all available clinical information and circumstances with respect to the appropriate treatment of an individual patient.

Although routine perioperative antibiotic prophylaxis is common practice, empirical evidence in support of this practice is generally lacking and somewhat inconclusive. This is specifically true in elective surgery of the foot and ankle. The discussion in this CCS includes not only questions regarding the timing, duration, dosage, and microbial coverage during the pre-, intra-, and postoperative periods but also regarding the necessity of any perioperative antibiotic administration. As with any medical intervention, the potential benefits of a therapy, such as a reduction in postoperative infection rates, must be weighed against the possible adverse consequences, including allergic or other inflammatory reactions, higher health care costs, specific medication adverse effects, and emergence of drug-resistant organisms.

Definition of Surgical Site Infection

The Centers for Disease Control and Prevention (CDC) has established criteria that define surgical site infections (SSIs), and this definition represents the current national standard (1,2). The CDC defines an SSI as any infection related to an operative procedure that occurs at or near the surgical incision or within an organ space within 30 days of

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Table 1
Included studies involving prophylaxis and infection rates in foot and ankle surgery

Author	Level of Evidence	Surgery	Included Patients Preop Antibiotic/None	Infection Rates Preop Antibiotic/None	Conclusion
Zgonis et al (9)	III	Bone and soft tissue	306/249	1.6%/1.4%	Preop antibiotic not required
Palement et al (10)	II	Ankle ORIF	60/62	1.67%/4.83%	Preop antibiotic not required
Reyes et al (11)	IV	Bone and soft tissue	233/226	0.43%/0.88%	Preop antibiotic may be necessary with implants
Miller et al (12)	IV	Bone and soft tissue	0/1841	NA/2.2%	No specific recommendation

Abbreviations: NA, not available; ORIF, open reduction internal fixation; Preop, preoperative.

the procedure or within 90 days if prosthetic material is implanted at surgery. The definition of *infection* is based on the presence of purulent exudate from the surgical incision and/or a surgical site that requires reopening. SSIs are further classified as either superficial or deep. *Superficial infections* involve only the skin and subcutaneous tissue, whereas *deep infections* involve deep tissue spaces or organs.

Wound Classification for Surgical Patients

The National Academies of Science and the National Research Council define surgical wounds as follows (3):

1. *Clean wounds*: Uninfected operative wounds in which no inflammation is encountered and the wound is closed primarily
2. *Clean-contaminated wounds*: Operative wounds in which a viscus is entered under controlled conditions and without unusual contamination
3. *Contaminated wounds*: Open, fresh accidental wounds, operations with major breaks in sterile technique, or gross spillage from a viscus; wounds in which acute, purulent inflammation was encountered are also included in this category
4. *Dirty wounds*: Old traumatic wounds with retained devitalized tissue, foreign bodies, or fecal contamination, or wounds that involve existing clinical infection or perforated viscus

Although this classification scheme is widely used, in reality it is a poor predictor of overall risk of SSI. Other factors such as operative technique, length of surgery, and health of the surgical patient are as important as wound classification in predicting risk for SSI (4–7).

Current guidelines regarding the use of antibiotic prophylaxis in a variety of surgical procedures were proposed in a recent report by the American Society of Health-System Pharmacists (ASHP) (8). In addition, recommendations and guidelines set forth by the Surgical Care Improvement Project (SCIP) are widely accepted by regulatory agencies and are commonly part of health care system quality programs. The purpose of this CCS is to address the topic of prophylactic perioperative antibiotic use in clean elective foot and ankle surgery.

Materials and Methods

Creation of Panel

Members of ACFAS suggested that clinical consensus statements would be useful; therefore, ACFAS enacted an initiative to create such documents for foot and ankle surgeons. This initiative was

originally conceived to report on a variety of topics and take the place of previous clinical practice guidelines (CPGs). To move forward with this initiative, a formal consensus method (CM) process was undertaken. On April 18, 2014, experts in the field of foot and ankle surgery were sent an invitation by ACFAS to participate on a panel to develop a CCS on antibiotic usage. A 5-member panel was selected and tasked with providing opinions and suggestions about perioperative antibiotic usage. The panel was chaired by one of the authors (M.S.), and assisted by ACFAS members and staff. Over several months, panel members participated in e-mail dialog, several conference calls, and a face-to-face meeting. The panel’s stated goal was to examine the current literature relating to the use of antibiotics in elective foot and ankle surgery and to compile this information to provide direction in antibiotic usage in the perioperative setting. Panel members acknowledged the inherently limited number of published studies on this subject and established criteria for inclusion of studies in their evaluation. A literature search was undertaken to identify published studies. In addition, the panel reached a consensus on a series of questions relating to the use of perioperative antibiotics.

Literature Review

The search terms used in the formal literature search were *antibiotic prophylaxis, antimicrobial prophylaxis, surgical site infection, foot surgery, ankle surgery, podiatric surgery, orthopedic surgery, and bone and joint surgery* in which AND and OR were the Boolean operators used. These terms were searched using the Cochrane Database of Systematic Reviews, Pubmed, OVID, EMBASE, and Google scholar. In addition, panel members conducted a manual search of the literature from 1990 to 2014 for the following journals: *Journal of Bone and Joint Surgery, American Journal of Bone & Joint Surgery and British Journal of Bone & Joint Surgery (now Bone & Joint Surgery); Journal of Foot & Ankle Surgery; Foot and Ankle International; Journal of Pediatric Orthopaedics; Journal of the American Podiatric Medical Association; and Journal of Infectious Diseases*. Inclusion criteria consisted of studies evaluating clean elective surgery (including non-emergent, open reduction, and internal fixation of closed ankle fractures) that were either prospective or retrospective in nature. Exclusion criteria consisted of studies examining emergency surgery, open fractures, and surgery to manage infection. Originally, 52 studies were compiled for possible inclusion based on the initial search. These articles were evaluated by the panel chair and agreed upon by the panel members for final inclusion. Ultimately, 6 studies were retained for review: 2 prospective randomized trials, 1 prospective study of bone concentration of antibiotics, and 3 retrospective reviews (Tables 1 and 2) (9–14).

Table 2
Studies related to timing of antibiotic in LE surgery

Author	Level of Evidence	Type of Surgery	Antibiotic Before/After Tourniquet	Postop Infection	Conclusion
Akinyoola et al (13)	III	ORIF LE fracture	54/52	14.8%/3.9%	Antibiotic pre-tourniquet not better than post-tourniquet
Deacon et al (14)	II	Bunionectomy	25/0	NA	MIC90 in bone within 70 min of antibiotic infusion

Abbreviations: LE, lower extremity; MIC90, minimal inhibitory concentration that will inhibit growth of 90% of bacterial species in vitro; NA, not available; ORIF: open reduction internal fixation.

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