27 Prophylaxis in Head and Neck Surgery

27.A. One-day versus longer-course perioperative antibiotics: Impact on postoperative surgical-site infections

Jennifer J. Shin and Jonas T. Johnson

METHODS

A computerized PubMed search of MEDLINE 1966–December 2005 was performed. Articles that mapped to the medical subject headings “antibiotic prophylaxis,” “antibacterial agents,” “lactams,” “fluoroquinolones,” “macrolides,” or “clindamycin” were collected into one group. A second group was created by identifying articles that mapped to the medical subject heading “head and neck neoplasms,” cross-referenced with those mapping to the medical subject heading “perioperative care” or the subheading “surgery.” These articles were then reviewed to identify those that met the following inclusion criteria: 1) patient population undergoing clean-contaminated surgery for head and neoplasm, 2) intervention with 1-day versus longer-course systemic antibiotic therapy, 3) outcome measured in terms of surgical-site wound infections, 4) randomized controlled trials (RCTs). Excluded were data from articles in which only clean, noncontaminated wounds, distant infections, and non-head and neck surgery were evaluated. Also excluded were articles that compared one dose of antibiotics to a 1-day course, as well as reports comparing two longer durations of antibiotic use. The bibliographies of the articles that met these inclusion/exclusion criteria were manually checked to ensure no further relevant articles could be identified. Two articles were identified that reported similar results from the same ongoing clinical trial [1,2], so only the more detailed report was included in this review. This process overall yielded 7 RCTs [1–7].

RESULTS

Herein, we describe results of individual studies. In the subsequent section, please find results for the related meta-analysis.

Outcome Measures. The basis for the diagnosis of wound infection varied among studies. Wound infections were defined by purulent drainage or development of mucocutaneous fistula in four studies. In another study, wound infections were defined by an erythematous edematous wound or a pink wound with purulent drainage. The remaining two studies defined wound infection in terms of erythema, tenderness, purulent drainage, necrosis, wound dehiscence, and bacterial recovery of possible pathogens.

Potential Confounders. The antibiotic choice itself, extent of procedure, preoperative radiation, nutritional status, immune status, or predisposing comorbidities such as diabetes mellitus may all affect infectious outcomes. In addition, the type of reconstruction used (primary closure, pedicled flap, free flap) and the duration (hours) of surgery are both related to the observed incidence of postoperative infection. In many studies, the authors attempted to account for such potential confounders by either balancing them with randomization or eliminating them as a concern through exclusion criteria during subject selection. Another key issue is whether drains or other foreign bodies were still in place when antibiotics were discontinued. No reports comment on this issue.

Study Designs. All seven studies were RCTs which provided level 1 evidence comparing a 1-day course to a longer course of antibiotics. Four of these RCTs compared a 5-day course, whereas the other three compared a 3- to 4-day course. Blinded evaluation of outcomes was performed in the four RCTs that evaluated 1-day therapy group. Antibiotic regimens evaluated included cefoperazone, clindamycin, cefazolin, carbenicillin, and gentamicin with clindamycin. Wounds were evaluated daily in most cases, with follow-up times between 5 and 20 days. One study reported an a priori power analysis, and one reported a post hoc power analysis. The one publication that did include an a priori power analysis stopped subject accrual when annual review disclosed that differences between study groups were much lower than projected, so that additional accrual would be meaningless.

Highest Level of Evidence. All seven studies concluded that there was no difference in postoperative surgical-site infections when a 1-day antibiotic course was compared with 5-, 4-, or 3-day therapy for a clean-contaminated head and neck wound. All of the studies were in agreement on this topic, although only two studies either had the sample size necessary to achieve an 80% power or determined that additional patient accrual would not alter the results of a statistical comparison. If a study's power is not high enough, it may not be able to identify a difference that truly exists.

With this power issue in mind, we have performed meta-analyses to increase sample size and thus increase
the power of the overall data. These meta-analyses can be found immediately after the tables detailing the individual studies.

**Applicability.** The results of these studies apply to patients undergoing resection of head and neck neoplasms with creation of a clean-contaminated wound.

**Morbidity/Complications.** No instances of drug reactions were reported. There was a trend toward more hypokalemia in the longer-course group receiving carbenicillin in one study, but no significant difference was identified. One study also determined that 100% of patients who had been previously radiated developed fistulas once wound infection had occurred.

Please also see the associated meta-analysis after the adjoining tables which detail individual studies.