Antibiotic Prophylaxis for Preventing Surgical-Site Infection in Patients Undergoing Plastic Surgery

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Plastic Surgical Nursing (PSN), the official journal of the International Society of Plastic and Aesthetic Nurses (ISPAN), publishes this column to provide evidence-based answers to practice questions from plastic and aesthetic nurses.

Question: Should patients undergoing plastic surgery receive antibiotic prophylaxis?

Answer: The American Association of Plastic Surgeons (AAPS) evaluated the effectiveness and safety of antibiotics for preventing surgical-site infections in patients undergoing plastic surgery and developed evidence-based recommendations for antibiotic prophylaxis across different types of plastic surgery (Ariyan et al., 2015). To develop the recommendations, selected members of the AAPS with expertise in selected plastic surgical procedures as well as individuals with expertise in infection prevention, epidemiology, evidence-based medicine, and guidelines development were invited to participate. After reviewing the existing evidence and achieving consensus on best practices, the panel made recommendations regarding the use of antibiotic prophylaxis for several subtypes of plastic surgery. The recommendations are categorized according to the Centers for Disease Control and Prevention Surgical Wound Classification (Mangram et al., 1999). In this classification, surgical wounds are classified as follows:

• Class I/clean: An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or urinary tracts are not entered. Clean wounds are closed primarily and, if necessary, drained with closed drainage.

• Class II/clean-contaminated: Operative wounds in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination.

• Class III/contaminated: Open, fresh, accidental wounds, or incisions in which acute, nonpurulent inflammation is encountered; or, operations with major breaks in sterile technique or gross spillage from the gastrointestinal tract.

• Class IV/dirty or infected: Wounds with existing clinical infection or perforated viscera, and old traumatic wounds with retained devitalized tissues. This category presumes that the organisms causing postoperative infection were present in the operative field before operation.

The researchers considered plastic surgical procedures to be either Clean (i.e., Class I) or Contaminated (i.e., Class II, Class III, Class IV). Following are the recommendations of the consensus panel.

BREAST SURGERY: CLEAN

The authors found that antibiotic prophylaxis significantly reduced the risk of surgical-site infection in patients undergoing cosmetic breast surgery (2.5% vs. 11.4%; \( p = .01 \)). Preoperative antibiotic prophylaxis is recommended for patients undergoing clean cosmetic breast surgery (with or without implants).

HEAD AND NECK SURGERY: CLEAN

The authors found that antibiotic prophylaxis did not significantly reduce the risk of surgical-site infection in patients undergoing clean head and neck surgery. Preoperative antibiotic prophylaxis is not recommended for patients undergoing clean head and neck surgery.

HEAD AND NECK SURGERY: CONTAMINATED

The authors found that antibiotic prophylaxis significantly reduced the risk of surgical-site infection in patients...
undergoing contaminated head and neck surgery (16.4% vs. 41.9%; \( p < .0001 \)). Preoperative antibiotic prophylaxis is recommended for patients undergoing contaminated head and neck surgery.

**ORTHOGNATHIC/MANDIBULAR SURGERY: CLEAN**

The authors found no randomized trials for clean orthognathic/mandibular surgery. Preoperative antibiotic prophylaxis is not recommended for patients undergoing clean orthognathic/mandibular surgery.

**ORTHOGNATHIC/MANDIBULAR SURGERY: CONTAMINATED**

The authors found that antibiotic prophylaxis significantly reduced the risk of surgical-site infection in patients undergoing contaminated orthognathic/mandibular surgery (6.5% vs. 31.8%; \( p < .0001 \)). Preoperative antibiotic prophylaxis is recommended for patients undergoing contaminated orthognathic/mandibular surgery.

**SEPTOPLASTY/RHINOPLASTY SURGERY: CONTAMINATED**

The authors found that antibiotic prophylaxis significantly reduced the risk of surgical-site infection in patients undergoing contaminated septoplasty/rhinoplasty surgery (4.9% vs. 11.3%; \( p = .02 \)). Preoperative antibiotic prophylaxis is recommended for patients undergoing contaminated septoplasty/rhinoplasty surgery.

**HAND AND LIMB SURGERY: CLEAN**

The authors found that antibiotic prophylaxis did not significantly reduce the risk of surgical-site infection in patients undergoing clean hand and limb surgery. Preoperative antibiotic prophylaxis is not recommended for patients undergoing clean hand and limb surgery.

**HAND AND LIMB SURGERY: CONTAMINATED**

The authors found that antibiotic prophylaxis significantly reduced the risk of surgical-site infection in patients undergoing contaminated hand and limb surgery (5.1% vs. 7.7%; \( p = .04 \)). Preoperative antibiotic prophylaxis is recommended for patients undergoing contaminated hand and limb surgery.

**SKIN SURGERY: CLEAN**

The authors found that antibiotic prophylaxis did not significantly reduce the risk of surgical-site infection in patients undergoing clean skin surgery. Preoperative antibiotic prophylaxis is not recommended for patients undergoing clean skin surgery.

**SKIN SURGERY: CONTAMINATED**

The authors found no randomized trials for contaminated skin surgery. It is not known whether preoperative antibiotic prophylaxis reduces the risk for surgical-site infection in patients undergoing contaminated skin surgery.

**ABDOMINOPLASTY: CLEAN**

The authors found no randomized trials for clean abdominoplasty surgery. Preoperative antibiotic prophylaxis is not recommended for patients undergoing clean abdominoplasty surgery.

**FINAL THOUGHTS**

With the exception of cosmetic breast surgery, the results of the review showed that patients undergoing clean surgery receive no benefit from prophylactic antibiotics whereas patients undergoing contaminated surgery do benefit from prophylaxis. Because there is increasing concern that administering unnecessary antibiotics contributes to antibiotic resistance, best practice is not to administer antibiotics for patients undergoing clean surgery. The panel also recommended limiting the duration of antibiotic administration to a single preoperative dose because the evidence does not indicate any benefit from longer prophylaxis.

Notably, there were several important questions not addressed in the consensus statement.

**Which Antibiotic Should Be Used for Prophylaxis?**

The selected antibiotic should be effective against the microorganisms most frequently causing postoperative infections. In plastic surgery patients, these organisms are *Staphylococcus aureus* and streptococci; therefore, cefazolin is commonly prescribed. If the patient is allergic to cefazolin, clindamycin or vancomycin may be appropriate alternatives.

**What Is the Appropriate Antibiotic Prophylaxis for Patients Receiving Implants?**

The evidence regarding whether antibiotic prophylaxis should differ between patients receiving implants and patients not receiving implants is inconclusive and further research is warranted.

**What Is the Appropriate Antibiotic Prophylaxis for Patients With Dirty or Infected Wounds?**

There is no evidence regarding the use of antibiotics for patients undergoing surgery for infected wounds or infected implants. Given the recommendations for administering prophylactic antibiotics to patients undergoing...
contaminated procedures, prophylactic administration would seem appropriate; however, further research regarding the most effective antibiotic and dosing schedule is warranted.

**Centers for Disease Control and Prevention Recommendations for Antimicrobial Prophylaxis**

According to the Centers for Disease Control and Prevention, antimicrobial prophylaxis should be administered only when indicated on the basis of published clinical practice guidelines and timed such that a bacterial concentration of the agents is established in the serum and tissues when the incision is made (Berrios-Torres et al., 2017).

If you have a question about plastic and aesthetic nursing that you would like to see addressed in the *I Have a Question!* column of *PSN*, or if you would like to provide an answer to a particular practice question, please contact Sharon Ann Van Wicklin, Editor-in-Chief, PSN at saronwvrn@ispahn.org.

**REFERENCES**

