Article

Surgical and medical antibiotic prophylaxis

Antibioprophylaxies chirurgicales et médicales

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Summary

Surgical site infections are the leading cause of perioperative morbidity and mortality as well as increased costs following surgery. Among preventive measures, antibiotic prophylaxis, when indicated, significantly decreases these risks. Adult and pediatric guidelines have recently been published (1,2). Specific pediatric data are scarce, but adult recommendations can be used by extrapolation except for neonates.

For procedures that may warrant antimicrobial prophylaxis, agents of choice are frequently first-generation cephalosporins such as cefazolin, that are not currently used in curative treatment, with an appropriate dosage. Administration of an antimicrobial agent within 1 hour before surgery is often sufficient. Continuation for more than 24 hours is exceptionally advised.

Résumé

Les infections du site opératoire sont une cause importante de mortalité et de morbidité post-opératoire de même qu'elles engendrent un surcoût financier. Parmi les mesures de prévention, l'antibioprophylaxie quand elle est indiquée, diminue significativement ce risque. Des recommandations récentes ont été publiées chez l'adulte et chez l'enfant. Bien que les données pédiatriques soient rares, ces recommandations peuvent être majoritairement extrapolées à l'enfant à l'exception de la période néonatale. Pour les interventions justifiant d'une antibioprophylaxie, la molécule de choix est fréquemment une céphalosporine de première génération non utilisée en curatif comme la céfazoline avec un ajustement de posologie. Une injection per-opératoire est généralement suffisante et la durée de l'antibioprophylaxie ne doit pas dépasser 24 h sauf situation exceptionnelle.

Surgical antibiotic prophylaxis (ABP) reduces the risk of surgical site infection (SSI) in some indications (clean or clean-contaminated surgeries). It should always precede the surgical procedure, ideally 30 min before incision. However, difficulties in finding venous way in children or the use of vancomycin (for which infusion should not be shortened to less than 60 min) can increase this time, which should not, however, exceed 1.5–2 h. The administration has to be performed ideally during the anesthesia induction. The ABP should be brief, most often limited to the surgical period, sometimes to 24 h, exceptionally 48 h. In most cases, ABP are summarized to a single dose of antibiotic. The ABP injection should be separated by 5–10 min from anesthesia induction in order to distinguish each product in case of an allergic

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reaction. The slow intravenous injection is made with the patient awake (dilution in 50–100 mL of saline solution). The presence of drainage catheter at the surgical site does not influence the need of ABP. In cases of ambulatory surgery, the usual protocols are not modified. The unit dose is never less than the standard therapeutic dose. The first dose (or loading dose, often the only dose for most interventions) is usually twice the usual dosage in order to achieve sufficient tissue concentrations at the surgical site during the intervention. Reinjections may be necessary, generally when the duration of the intervention surpasses twice the half-life of the antibiotic used. Furthermore, some other situations such as substantial bleeding or extensive burns could also lead to reinjection due to the fact that the half-life of antibiotic could be shortened. On the other hand, situations in which the half-life is prolonged (e.g., renal failure, newborn), the spacing of additional injections can be increased (Table 1). ABP should not be prolonged if there is drainage, an open wound, or catheter. Patients treated by antibiotics before surgery do not need complementary ABP if the spectrum is adapted to the target bacteria and the administration schedule covers the surgical procedure time.

When *S. aureus* is the main bacterial species targeted by ABP and the patient is a carrier of a methicillin-resistant strain, vancomycin should be prescribed instead of cefazolin or clindamycin.

After surgery, ABP is generally not recommended, except for cardiac surgery, transplantation, cochlear surgery, or when infection is found during the surgical procedure. These ABP proposals are in accordance with the SFAR guidelines [1] and were adapted to pediatric patients by the GPIP in collaboration with surgeons, anesthesiologists, infectious disease specialists, microbiologists, and pharmacists (Table 2) [2-4]. The discussion of ABP protocols within each institution with all the care-givers involved increases their acceptability. The protocols should be validated by each hospital infection committee and each institution's drug or anti-infectious drug committee.

Table 1. Timing of additional dose administration

Drugs	Children	Newborns
Aminoglycoside	8 h	12 h
Ampicillin-Amoxicillin	4 h	≤1 week: 8 h ≥1 week: 6 h
Cefazolin	4 h	6 h
Cefotaxime	4 h	≤1 week: 6 h ≥1 week: 4 h
Cefoxitin	3 h	6 h
Clindamycin	4 h	Premature infant: 12 h Full-term infant: 6 h
Metronidazole	8 h	50 h
Vancomycin	6 h	10 h

ABP is part of hospital medical references and their use is regularly assessed. Short medical ABP has very limited indications in pediatrics (Table 3).

Disclosure of interest

The authors declare that they have no conflict of interest with the article.

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