Survey of surgical antimicrobial prophylaxis in Czech Republic

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Key words
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Abstract
Objective: To characterize the pattern of surgical antimicrobial prophylaxis in the Czech Republic.
Method: Cross sectional survey with a self-administered postal questionnaire. Data collected included use of antimicrobial prophylaxis, surgical site infection rate, pathogens causing surgical site infection and demographics of the institution. Descriptive and multivariate analyses were performed.
Setting: Hospital, surgical departments in the Czech Republic.
Main outcome measure: Prevalence of surgical antimicrobial use, factors associated with use, the profile of antimicrobial use, timing, route, dosage regimen and duration of initiated prophylaxis.
Result: The response rate was 55.5%. Surgical antimicrobial prophylaxis was used in 97.5% of departments, and 85% departments justified prophylaxis based on guideline. The timing of the first dosage was within 2 h of operation in 95.0% of departments and 36.7% of all departments administered more than 2 doses of SAP in operations that lasted less than 4 h of all respondents. The three most common prophylactic antimicrobial agent were cefazolin, co-amoxiclav and cefuroxime amongst the 26 single antimicrobial agents and 16 antimicrobial combinations. Penicillins and enzyme inhibitor was the most frequent class used. Surgical antimicrobial prophylaxis was administered intravenously in 82.3% of all cases. The regimen used varied markedly in dose and duration prescribed. The surgical site infection rate occurred. 1-5% in 71.7% of departments. Most departments identified the causative pathogen at all times. Staphylococcus aureus was the most frequent pathogen of surgical site infection and was detected in 90.8% of all departments. There was significant association between Pseudomonas aeruginosa with cefuroxime use and Bacteroides fragilis with co amoxiclav use.
Conclusion: This survey has identified several areas for improvement in surgical antimicrobial prophylaxis in the Czech Republic. Particular areas of concern include route of administration, duration and timing of first dosage of SAP, and the inappropriate use of broad-spectrum antimicrobials.

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Introduction
Surgical antimicrobial prophylaxis (SAP) involves the administration of a short course of an antimicrobial agent before an operation begins. Several studies indicated that appropriate surgical antimicrobial prophylaxis is effective in preventing surgical site infection. However, SAP should only be administered when indicated and selection should be based upon published recommendations for specific surgical procedures and known common pathogens. SAP is not indicated for an operation classified as contaminated and dirty, it is recommended for clean contaminated or part of clean procedures. The appropriate choice of antimicrobial agents, dosage regimen, timing, duration and use of intravenous route must be evidence based.

In most cases prophylaxis with a single preoperative dose is sufficient unless the surgery lasts longer than 4 h. Inappropriate prolonged administration of SAP can be associated with significant postoperative complications. The first dose of SAP is normally administered 2 h before surgery to reduce the risk of wound infection. Prophylaxis should be administered intravenously and started preoperatively in most circumstances, ideally within 30 min of the induction of anaesthesia. The normal timing of dose administration may be altered for example in high-risk caesarean section, in this situation SAP should be administered immediately after the umbilical cord is clamped to prevent the drug reaching the neonate. In contrast, in elective colorectal operation SAP should be administered orally in divided doses on the day before operation.

Although guidelines for antimicrobial prophylaxis are used in most hospitals, some studies have shown that a large number of surgical patients receive inappropriate SAP. Policies for antibiotic use in the Czech Republic were first compiled about 30 years ago, with many large hospitals having antibiotic committees. After 1989, the position of those committees was partly diminished and since 1994, antibiotic policy has been partially set up in the market economy.

Objective
The objective of this study was to characterise the pattern of surgical antimicrobial prophylaxis in the Czech Republic.

Method
A cross sectional survey was conducted in October 2003 and involved sending a self-administered postal questionnaire to all surgery departments in the Czech Republic. Pre-testing of the questionnaire showed that SAP was not used in ambulatory surgical departments. These departments were therefore excluded from this study. A reminder was mailed to the non-responders after 4 weeks.

The questionnaire was designed to collect information regarding: size and type of hospital, number of surgeons, surgical procedures per month, antimicrobial prophylaxis use, type of guidelines used, antimicrobial prophylaxis indication based on surgical wound classification, timing of first dose, SAP dosage in surgical procedures that lasted less than 4 h, the antimicrobial choice, route, dosage and duration of antimicrobial prophylaxis by type of surgery, prevalence of surgical site infection (SSI), frequency of pathogen detection, and the pathogens causing surgical site infection. The original questionnaire (in Czech version) is available from the authors on request.

Descriptive, univariate and multivariate analyses were carried out using SPSS 11.5 version. Univariate