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## **Efficacy of management for rational use of antibiotics in surgical departments at a multi-disciplinary hospital: Results of a 7-year pharmacoepidemiological research**

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### **Abstract**

Background. Irrational medicine use including excessive use and abuse of antibiotics remains a crucial problem for the healthcare systems. < In this regard, studies examining approaches to improving the clinical use of medicines are highly important. Aim: to assess the efficacy rate of management for the rational use of antibiotics in surgical departments of a multi-disciplinary hospital. Material and methods. The intervention complex combined the research, educational, and methodological activities: local protocols for perioperative antibiotic prophylaxis (PABP) for various surgical departments were developed; local PABP protocols were discussed with the physicians of specialized surgical departments; official order on implementation of PABP was issued; the list of drug prescriptions for registration of the first pre-operative antibiotic dose was changed; audit and feedback processes were introduced as well as consultations of a clinical pharmacologist were implemented. We assessed the efficacy rate of the interventions basing on the changes in consumption of antibiotics (both quantitatively and qualitatively) at surgical departments of a hospital using ATC/DDD methodology. Comparison of the studied outcomes was performed before and after the intervention implementation and between the departments (vascular and abdominal surgery). The consumption of antibacterial agents (ATCJ01) was measured as a number of defined daily doses (DDD) per 100 bed-days (DDD/100 bed-days, indicator recommended by the World Health Organization, WHO) and DDD per 100 treated patients (DDD/100 treated patients). Results. From 2006 to 2012, a decrease in antibacterial consumption in surgical departments by 188 DDD/100 treated patients was observed. We obtained the opposite results when using an indicator of DDD/100 bed-days (increase by 2.5 DDD/100 bed-days) which could be explained by the dependence on indices of overall hospital work and its changes during the examined period. Observed changes in antibacterial consumption varied in different surgical departments. The most pronounced positive changes were noted in the department of vascular surgery: decrease in total antibacterial consumption by 298 DDD/100 treated patients, decrease in the use of cephalosporins of the III generation from 141 to 38 DDD/100 treated patients. These positive changes were accompanied by the same (low) level of consumption/use of reserve antibiotics. In the department of abdominal surgery, there was no decrease in total antibiotic consumption, as well as in consumption of broad-spectrum cephalosporins of the III generation and fluoroquinolones, and we observed an increase in the use of reserve antibiotics (carbapenems) during the study period. Positive changes in antibiotic consumption were associated with the positive attitude of the manager/head of the department towards interventions: we observed the most pronounced decrease in antibiotic consumption straight after the publication of the administrative order on perioperative antibacterial prophylaxis. Conclusion. The combination of scientific, educational,

and methodological interventions is effective for improving antibiotic application. The study results provide the rationale for analyzing the drug consumption using the DDD/100 treated patients measure in addition to the WHO-recommended indicator of DDD/100 bed-days which depends on overall hospital performance.

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## Keywords

Anti-bacterial agents, Drug utilization evaluation, Health services research, Humans, Pharmacoepidemiology

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