Antibiotic prescription in a teaching hospital: a brief assessment

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SUMMARY

Objective: Antimicrobials are used interchangeably in medical practice, contributing to the emergence of resistant microbial strains. **Methods:** This study describes the antimicrobial audit performed by forecasting analysis of medical records of 846 patients at the Hospital Santa Cruz, Santa Cruz do Sul - Rio Grande do Sul - Brazil. **Results:** Of the patients studied, 134 (15.8%) received antimicrobials. The audit was conducted interactively, with intervention and discussion with the prescriber. Considering the presumptive diagnosis and prescribed drug, it was verified that 74.6% of patients on antimicrobials received what was considered the first choice treatment. Inadequate antimicrobial agent for clinical diagnosis (5.2%) and lack of adjustment for renal function (43.7%) were the most frequent errors. **Conclusion:** A strategic plan aimed at the rational use of antimicrobials based on educational and interventionist practices can help the infection control professional to adjust the routines to improve healthcare quality.

Keywords: Clinical audit; infection control services, hospital; hospital infection control program; anti-bacterial agents.

INTRODUCTION

Antimicrobials are agents that can suppress the growth of pathogens or destroy them. Use of these drugs in clinical practice has changed the natural course and improved the prognosis of infectious diseases. They can be used as prophylaxis and therapeutics, but their increasing and indiscriminate use is the main contributor to the emergence of resistant microbial strains[1]. The use of appropriate and inappropriate, both prophylactic and empirical subtherapeutic doses and prolonged duration, and indication for fever of unknown origin without a defined diagnosis and viral infections are common misconceptions that result in bacterial selection and increased bacterial resistance[2,3]. In the hospital setting, antimicrobials also affect the hospital microbial environment, in addition to affecting the patient receiving it. Abusive use contributes to increased morbidity, mortality, prolonged hospitalization and increased costs of treatment. The use of measures aimed at reducing the use of antibiotics is accompanied by a decrease in resistance rates, but the real challenge is to promote changes in medical prescription practices[3].

Considering this situation, the Ministry of Health made it mandatory for the Hospital Infection Control Committees (HICC) develop programs to rationalize the use of antimicrobials, aiming at increasing healthcare quality regarding infection prevention, according to the criteria recommended by the World Health Organization[4]. In addition to decreasing the selection/induction of multidrug-resistant strains, the creation of this program aims at optimizing the therapeutic effects and minimizing the undesirable consequences of these drugs, especially toxicity.

In this context, the guide for the development of a program to rationalize the use of antimicrobials in hospitals, developed by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America, indicates the prospective audit of antibiotics with interaction, intervention and feedback to the physician who prescribed the drug as an important strategy to promote adequate use[5].

Therefore, it is appropriate to carry out a prospective audit of antibiotics used in hospitals in order to evaluate prescription indications regarding the appropriate use of antimicrobial agents, thus improving the quality of care provided to patients.

METHODS

We performed a cross-sectional study using prospective analysis of medical records of patients admitted to Hospital Santa Cruz (HSC), between July 10 and 18, 2009. The hospital is located in Santa Cruz do Sul, state of Rio Grande do Sul, Brazil, and has 180 beds in seven wards, with two of these units (17 beds) being of Intensive Care (adult and pediatric).

The study included a sample of 846 medical records of adult and pediatric patients hospitalized in clinical-surgical wards, excluding the two intensive care units during the reported period. The study included all patients who, at some time during their hospitalization, received antimicrobial treatment. Data were collected with the help of a semi-structured audit questionnaire.

The International Classification of Diseases (ICD) was the parameter used for the grouping of diagnoses. The therapeutic rationality of the prescribed medications was compared with treatment recommendations from an antimicrobial reference guide[6] therapy, based on patient diagnosis.

RESULTS

Medical records of 846 patients were analyzed in order to verify the use of antibiotics during hospitalization. Of these, 134 had received antibiotics, representing 15.8% of patients. The pediatric age group (0-10 years) and the elderly (60-99 years) were the most frequent ones, accounting for 39 (29.1%) and 40 (29.8%) individuals, respectively. The mean age was 39.5 years (± 10.6) and 75 (56.0%) cases were males. The mean overall hospital stay was 5 days (± 2.1). In patients who used antibiotics, hospital stay duration was 10 days (± 3.2).

The main indications for the use of antimicrobials were lower respiratory tract infections in 55 (41.0%), prophylaxis in 31 (23.1%), surgical therapy in 14 (10.4%) and upper airway diseases in 12 (8.9%) patients, totaling 83.4% of the causes. Prophylaxis was used in 12 (38.7%) orthopedic procedures, 10 (32.2%) surgical and 9 (29.0%) gynecological/obstetric procedures. Of the 64 patients for whom there was indication of microbiological examination, only 37 (57.5%) underwent the assessment. The clinical diagnosis was confirmed by the laboratory in 54 (40.3%) cases. Only 6 (4.5%) patients had acquired the infection in hospital environments, and it was possible to associate it with urinary catheter use in 89 (66.4%) cases.

When antibiotic prescriptions were confronted with the antimicrobial therapy guide suggestions[6], it was observed that 100 (74.6%) of patients received the recommended treatment of choice. Monotherapy was prescribed in 110 (82.1%) cases; however, 20 (14.9%) patients received treatment adjustment regarding drug class. Of these, 7 cases (35.0%) were due to inadequate indication and in 13 (65.0%) the adjustment was made according to the cultures. It was observed that 4 (3.0%) patients had therapy indicated with disregard of the pharmacodynamics/kinetics of the drug. The medical infection control assessment was requested for 6.0% of the sample.

Duration of antimicrobial therapy was on average 9 days (± 2.1) and of the prophylaxis, 2 days (± 1.2).

Regarding the adjustment of antibiotics to renal function, it was observed that 9 of the 16 patients who needed this adjustment (56.2%) received the corrected dose. The mean last creatinine measurement before the first infusion of antimicrobial drugs was 2.4 (± 0.6) mg/dL. In the subgroup that did not have doses adjusted for renal function, 5 (71.4%) were males. Of the total, 4 (57.1%) patients were diagnosed with urinary tract infection, with prolonged urinary catheterization being associated with 2 (50.0%) cases. Of these, the mean age was 67 years (± 4) and the prescribed antimicrobial was of aminoglycoside class in 4 (100.0%). The diagnosis of the other 3 (42.9%) patients in this subgroup was community-acquired lower respiratory tract infection with a mean age of 79 years (± 3), and the antimicrobial drug class prescribed was quinolone in 3 (100%) patients.

First-generation cephalosporins and quinolones were the prescribed drugs in 30 (22.4%) and 27 (20.2%) cases of all antibiotics used during the study period, respectively.

Discussion

This study demonstrates that most hospitalizations occur due to complications of non-infectious chronic diseases. We found a antimicrobial drugs prescription frequency of 15.8%, lower than that expected and reported by Vlahovic-Palcevski et al.[7], which ranged from 20% to 50% It was observed that the pediatric age group, as well as the population older than 50 years, had a higher indication for antimicrobial therapy, resulting from the immunological status and associated comorbidities. No significant difference was found between the use of these drugs between the genders. However, length of hospital stay was longer in the subgroup that used antimicrobials.

The prescription of antibiotics to treat respiratory tract infections and their use in surgical procedures is the main indication in the hospital environment. The practice of the prophylactic use is extensive, and it is observed in more than 90% of surgical procedures[8]. However, the success of surgical prophylaxis is directly related to compliance with the pre-established principles and indications[9]. In this context, it was observed that all patients taking prophylactic antibiotics had received the first-choice drug, according to the reference guide and the adopted audit program[5]. Monotherapy was used in most cases, being the antimicrobial control program goal. The antimicrobial association is related to false protection. The simultaneous use of drugs is recommended in specific situations, in order to increase the antimicrobial spectrum. However, when used inappropriately, it is associated with the risk of toxicity, resistant pathogen selection and increase in institutional costs[10].

The lack of detection of laboratory microbiological confirmation has also been observed by other authors[9,11,12], who correlated this fact to the incorrect choice of empirical antimicrobial. We emphasize the relevance of cultures, as they favor the development of local/sectorial prevalence and initial regimen protocols, with a smaller range of action and greater degree of resolution. The inappropriate use of anti-infectious drugs is listed as a key contributor to increased resistance[13].

The detected hospital infections were due particularly to invasive procedures performed during hospitalization. Urinary tract infections are cited as the most prevalent ones, accounting for 40% of all infections acquired in hospitals and they were the most incident in this sample. Surgical wound infections increased costs and length of hospital stay, with the majority of them being of endogenous origin and associated with the length of hospital stay, with prophylaxis being one of the tools used for its prevention[14]. Time of antibiotic use was in accordance with the antimicrobial control program proposed by the institution, with some acceptable variations.

This study demonstrated the importance of continuous educational actions directed at undergraduate students of medicine, residents and chief-residents, regarding drug adjustment for renal function, especially in cases where an infectious process contributes to the decrease in blood volume due to fluid loss into the third space, as a result of increased vascular permeability. The most characteristic was the use of nephrotoxic drugs without adjustment for renal clearance, especially among the elderly, one of the vulnerable subgroups.

Cephalosporins were the most commonly used drugs during the study. This drug use profile is expected, as it is an antimicrobial drug class with low toxicity and high safety[10]. In spite of being associated with bacterial resistance[3], their prescription was considered necessary due to the main diagnoses found.

We emphasize the importance of developing programs that promote the rationalization of antibiotic therapy, influencing the decrease in hospital costs. Strategies depend directly on the care profile, investment in human and technological resources and the expertise of the team responsible for the program. The educational rationalization program implemented by the institution, coordinated by the infection control committee and supported by the institutional board can prioritize an effective strategy favoring antimicrobial consumption control and interventions with pro-active interventions with interaction, intervention and feedback to the prescribing physician[5]. The prospective audit reduces inappropriate antimicrobial use[3]. It is essential that the developed control activities be not understood as restrictive, but as responsible for the professional qualifications and must be conducted in an integrated manner with the other members of the clinical team [15,16].

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