Antibacterial Use in Admitted Patients of a Super Speciality Hospital in Western India

Sir,

Antimicrobial agents (AMA) are one of the most widely prescribed drugs in hospitals. The general perception is that super specialty hospitals have high prescribing trends of AMA, adding to the cost of the treatment and burden of antimicrobial resistance.[1] Hence, it was worth studying the trend of AMA use in a super specialty hospital in Western India. In this context, a point prevalence survey (PPS) was carried out on a single day, in the month of January 2019, at a 600-bedded super specialty hospital. Ethical clearance was obtained from the Institutional Ethics Committee before conduct of the survey.

The PPS was adapted from the European Center for Disease Control guidelines.[2] The survey was carried out to include all patients in the hospital wards and those who were prescribed with antibacterial agents for more than a day. Those on chronic treatment with anti-tubercular drugs or chemoprophylaxis for repeated urinary tract infections were excluded from the study. The data were obtained from the case sheets and the inpatient hospital record forms. Wards included were intensive coronary care unit, cardiothoracic-vascular surgery intensive care unit (ICU), respiratory ICU, cardiology, respiratory, and oncology. A total of 107 patients were surveyed. Among them, 47 patients were found to be prescribed with antibiotics on the day of the survey (43.9%). More than 60% of the patients surveyed were above the age of 50 years. Of these inpatients, 41 were male (87.2%). The system wise diagnoses of patients prescribed AMA and combination antimicrobials are tabulated in Tables 1A and 1B, respectively. On the day of survey, a total of 12 samples (sputum-4, urine-4, blood-2, cerebrospinal fluid, and wound swab – 1 each), were sent to the laboratory for bacterial culture and antibiotic sensitivity. All 12 of the clinical samples did not show bacterial growth on culture. The antibiotics prescribed to the 47 patients were hence empirical and not definitive. In our study, clinical specimens for the pathogen identification were sent to the laboratory for only around 25% of the patients prescribed empirical antimicrobial therapy. As per the guidelines, clinical specimens should always be sent for microbial culture before starting with AMA. Further, with no isolation of pathogens in any of the empirical use of antimicrobials, a detailed antibiotic prescription analysis and clinical audit by the hospital infection committee is a felt need Figure 1 depicts the distribution of AMA prescriptions according to antibiotic classes (total 77 prescription counts). The injectable AMA comprised 55.8% of the total AMA prescribed on the day of PPS. Twenty patients were prescribed more than one AMA. Eight of these patients (40%) were prescribed antibiotics for surgical prophylaxis and 35% for lower respiratory tract infection (LRTI). The usage of combination antimicrobials has been highlighted in Table 1B. This usage is in conformity to the Indian Council of Medical Research (ICMR) guidelines in 9 out of 20 total cases.

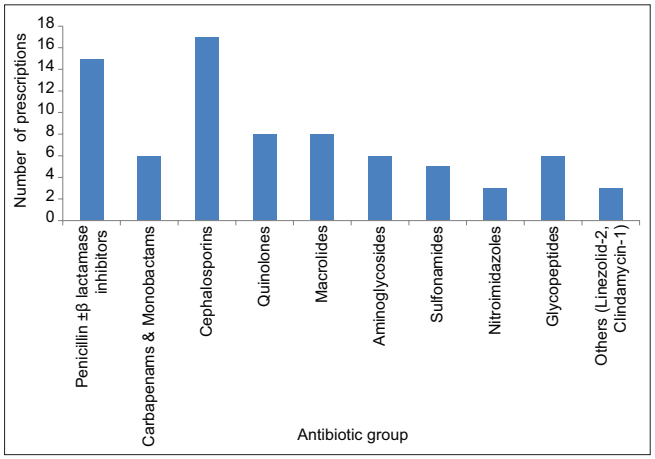

Figure 1: Pattern of antimicrobial agents usage on day of point prevalence survey

PPS is an effective method to study antibiotic prevalence and consumption in any health-care institution (HCI). In a snapshot study at the HCI, the adherence to national or regional antibiotic policy can be commented upon. This is important and needs to be carried out periodically to prevent overuse or misuse of AMA to prevent the emergence of antibiotic resistance. The World Health Organization (WHO) has grouped the antimicrobials into Access, Watch, and Reserve classes, which should be adhered to, as far as possible.[3] The WHO model list of essential medicines safeguards against rampant use of AMA, especially as the empirical treatment of infections. The third-generation cephalosporins, macrolides, and quinolones have been placed in the Watch group, whereas carbapenems form the Reserve group of AMA.[3] The highest consumption of AMA in our study was for surgical prophylaxis and of 3rd-generation cephalosporins (prescription counts of cefotaxime and cefuroxime– 6 each, cefoperazone– 4 and ceftriaxone-1). The recommendation for surgical prophylaxis of clean wounds is no AMA at all or a single dose of cefazolin/cefuroxime.[4] A need is, therefore, felt to improve the hospital infection control practices to avoid the use of preoperative AMA prophylaxis. In any case, cefazolin and cefalexin, being Access group of anti-infectives, should be encouraged as empirical AMA therapy.[3]

Respiratory tract infections are still a cause of concern in both well to do and developing nations. In fact, lower

Table 1: Antimicrobial agents prescribed on day of point prevalence survey

A: Clinical diagnosis of patients prescribed antimicrobial agents ($n=47$)

Clinical diagnosis	AMA prescribed	Number of patients
Surgical prophylaxis	Amoxicillin+clavulanic acid, metronidazole, amikacin, cefuroxime, teicoplanin, cefotaxime, meropenem, cefoperazone+sulbactam	21
GIT infections	Cefuroxime, azithromycin, metronidazole	1
Respiratory infections	Linezolid, piperacillin+tazobactam, teicoplanin, levofloxacin, clarithromycin, azithromycin, colistin, cotrimoxazole vancomycin	17
Urinary tract infections	Co trimoxazole, amikacin, teicoplanin	2
Skin and soft tissue infections	Amoxicillin+clavulanic acid, metronidazole	2
Surgical site infection	Colistin, meropenem, teicoplanin, ceftriaxone	3
Others (PUO)	Azithromycin	1

B: Combination antimicrobial agents prescribed empirically and adherence to ICMR guidelines

Indication	Antibiotics combination used	Adherent to ICMR guidelines (yes/no)
Venous ulcer	Amoxicillin - clavulanic acid+metronidazole	Yes
Surgical prophylaxis	Cefotaxime+amikacin+metronidazole	No
Acute enteritis	Amoxicillin - clavulanic acid+azithromycin	Yes
LRTI	Piperacillin - tazobactam+teicoplanin+levofloxacin	No
Surgical prophylaxis	Teicoplanin+amikacin	No
Surgical prophylaxis	Meropenem+colistin	No
Surgical prophylaxis	Meropenem+teicoplanin+amikacin	No
Surgical prophylaxis	Meropenem+teicoplanin+amikacin	No
Surgical prophylaxis	Meropenem+metronidazole	No
LRTI	Amoxicillin - clavulanic acid+clarithromycin	Yes
LRTI	Piperacillin - tazobactam+levofloxacin	No
LRTI	Amoxicillin - clavulanic acid+azithromycin	Yes
LRTI	Cefotaxime+levofloxacin	No
LRTI	Piperacillin - tazobactam+clarithromycin	Yes
AML	Cefoperazone - sulbactam+amikacin	Yes
AML	Azithromycin+cotrimoxazole	Yes
Renal cell carcinoma	Cefoperazone - sulbactam+azithromycin	Yes
Diffuse large cell lymphoma	Meropenem+levofloxacin+vancomycin+cotrimoxazole	No
LRTI	Teicoplanin+levofloxacin+meropenem	No
Surgical site infection (post CABG)	Amoxicillin - clavulanic acid+amikacin	Yes

AML=Acute myeloid leukemia, LRTI=Lower respiratory tract infection, AMA=Antimicrobial agents, CABG=Coronary artery bypass graft, PUO=Pyrexia of unknown origin, ICMR=Indian Council of Medical Research, GIT=Gastrointestinal

respiratory infections and tuberculosis figure as the 5th and 6th most common cause of death in India.[5] The ICMR recommends ceftriaxone/cefotaxime/amoxycillin-clavulanic acid/piperacillin-tazobactam along with macrolide/doxycycline and avoiding fluoroquinolones, as empirical therapy for hospitalized patients suspected of community acquired pneumonia.[4] Use of fluoroquinolones as empirical therapy in our patients of LRTI needs re-assessment of treatment protocols in the hospital.

The PPS carried out by us in a super-specialty hospital emphasizes the need to optimize the use of antibacterial, especially as preoperative prophylaxis and choice of empirical therapy.

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Conflicts of interest

There are no conflicts of interest.

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