



A multidisciplinary antimicrobial stewardship programme safely decreases the duration of broad-spectrum antibiotic prescription in Singaporean adult renal patients

Yiying Cai^a, Pui Ying Shek^a, Isabelle Teo^a, Sarah S.L. Tang^a, Winnie Lee^a, Yi Xin Liew^a, Piotr Chlebicki^b, Andrea L. Kwa^{a,c,d,*}

^a Department of Pharmacy, Singapore General Hospital, Singapore 169608, Singapore

^b Department of Infectious Diseases, Singapore General Hospital, Singapore 169608, Singapore

^c Emerging Infectious Diseases, Duke–National University of Singapore Graduate Medical School, Singapore 169547, Singapore

^d Pharmacy, Faculty of Science, National University of Singapore, Singapore 117546, Singapore

ARTICLE INFO

Article history:

Received 13 April 2015

Accepted 30 October 2015

Keywords:

Chronic kidney disease

Antimicrobial stewardship programme

Appropriate antibiotic use

ABSTRACT

Patients with chronic kidney disease have increased risk of infections. Thus, physicians may favour prolonged broad-spectrum antibiotic use. Studies focused on antimicrobial stewardship programmes (ASPs) in renal patients are currently lacking. Here we describe the role of a multidisciplinary ASP and the impact of ASP interventions in renal patients. A multidisciplinary ASP was initiated at a tertiary hospital in Singapore. Patients prescribed broad-spectrum parenteral antibiotics were identified daily and were subjected to prospective review with immediate concurrent feedback. ASP data from January 2010 to December 2011 were analysed for all renal patients. Outcome measures included the duration and appropriateness of antibiotics, intervention acceptance rates, cost savings and safety outcomes. A total of 2084 antibiotic courses were reviewed, of which 24% were inappropriate, with meropenem most commonly prescribed inappropriately (31.0%). The commonest reasons for inappropriate use were wrong choice (51.0%) and wrong duration (21.4%). In total, 634 recommendations were made, with high acceptance rates (73.3%). Recommendations to discontinue antibiotics (33.4%) and to optimise doses (17.2%) comprised the bulk of ASP work. A mean reduction of –1.28 days of antibiotic use was observed among patients with interventions accepted versus those rejected ($P < 0.001$), with direct cost savings of SGD\$90,045. No difference in 30-day mortality ($P = 0.91$) was observed between the accepted and rejected intervention groups. In conclusion, a multidisciplinary ASP resulted in a shorter duration of antibiotic use without compromising safety in renal patients. Continued effort is needed to produce a long-term impact on antibiotic prescription and resistance.

© 2015 Elsevier B.V. and the International Society of Chemotherapy. All rights reserved.

1. Introduction

In the past decade, antimicrobial resistance among Gram-negative bacteria (GNB) has emerged as a major healthcare concern [1]. This phenomenon has been associated with antimicrobial exposure. Antimicrobial stewardship programmes (ASPs) have been identified as a key strategy in reducing inappropriate antimicrobial use. In Singapore, multidisciplinary ASPs have been implemented in most major hospitals since 2008. These hospitals employ a multipronged strategy, including a prospective

audit/feedback approach, formulary restrictions, and use of guidelines and computerised clinical decision support systems [2,3].

To date, several studies have shown that ASPs can improve the appropriateness of prescribing [2,4]. However, most of these studies reported the impact of ASPs across several disciplines and did not focus on a single patient group. In Singapore, patients with chronic kidney disease (CKD) are of particular concern as kidney disease has reached pandemic proportions [5]. Because of alterations in immune response and frequent healthcare exposures, patients with kidney diseases have an increased risk of infections [6]. Thus, clinicians may favour early empirical prescription of broad-spectrum antibiotics, which can translate to an increased misuse of antibiotics. Unfortunately, to date there is no study describing the role and impact of ASPs in renal patients in an inpatient setting.

* Corresponding author. Present address: Department of Pharmacy, Block 8 Level 2 Singapore General Hospital, Outram Road, Singapore 169608, Singapore. Tel.: +65 6326 6959; fax: +65 6227 2780.

E-mail address: andrea.kwa.l.h@sgh.com.sg (A.L. Kwa).

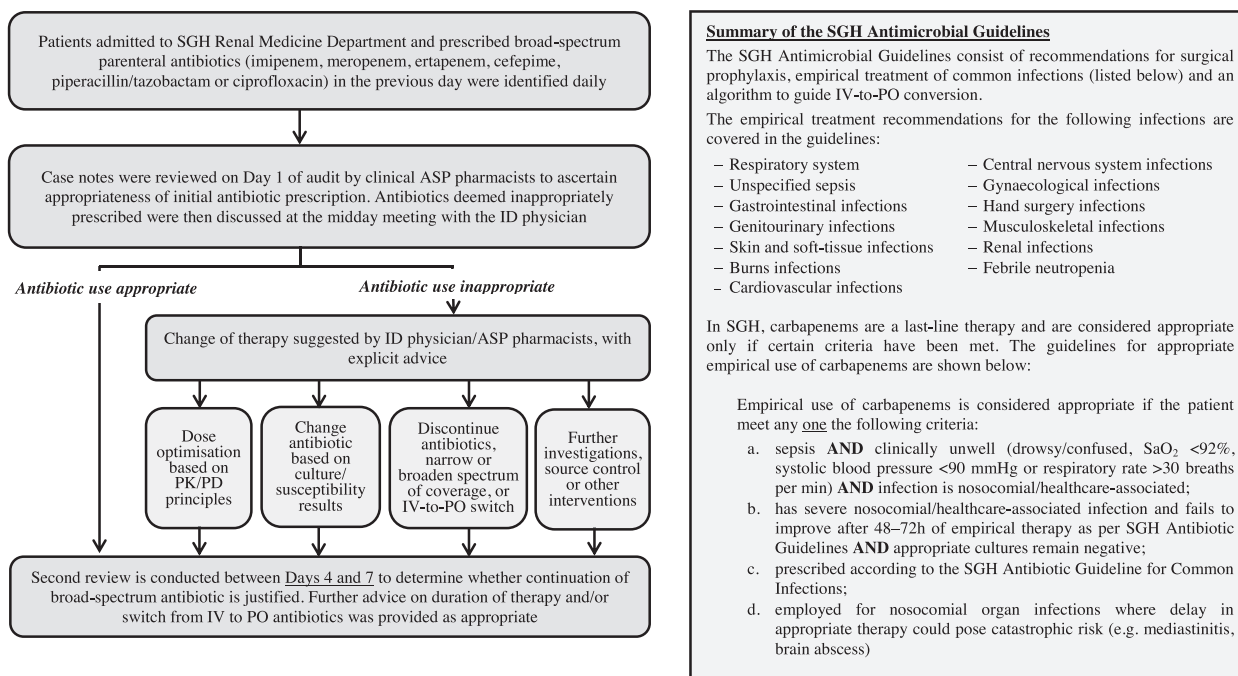


Fig. 1. Schematic diagram of a two-stage prospective audit with immediate concurrent feedback in a renal medicine ward in Singapore General Hospital (SGH) (left), and summary of the SGH antibiotic guidelines (right). ASP, antimicrobial stewardship programme; ID, infectious diseases; IV, intravenous; PK/PD, pharmacokinetic/pharmacodynamic; PO, oral; SaO₂, oxygen saturation.

In Singapore General Hospital (SGH), a hospital-wide ASP has been in place since 2008. In this study, the role of the ASP team was examined specifically in renal patients in SGH, and the impact of the ASP on antibiotic prescription and on patient outcomes was evaluated.

2. Methods

2.1. Study setting

This was a retrospective review of all patients whose broad-spectrum antibiotic prescription was audited by the ASP team in the Renal Medicine Department of SGH, a 1600-bed acute tertiary care hospital in Singapore, from January 2010 to December 2011. The SGH Renal Medicine Department has the most comprehensive nephrological service in Singapore, admitting patients with CKD, end-stage renal disease (ESRD) and those requiring renal transplantation. During the audit period, patients in the Renal Medicine Department occupied 70,246 bed-days from 10,157 admissions.

2.2. Programme structure

The multidisciplinary ASP consisted of an infectious diseases (ID) physician, a clinical microbiologist and clinical ID pharmacists, and employed a two-stage prospective audit with immediate concurrent feedback (Fig. 1a). Prior to initiation of audit, institutional antibiotic guidelines were created and disseminated. The guidelines included recommendations for surgical prophylaxis, empirical treatment of infections, intravenous-to-oral (IV-to-PO) conversion and appropriate carbapenem use (Fig. 1b). The prospective audit focused on fostering appropriate prescription of antibiotics with broad-spectrum activity against GNB, as the rising resistance rates in GNB are a concern in SGH. The full programme structure has been described in a previous study [2].

Patients prescribed parenteral imipenem, meropenem, ertapenem, cefepime, piperacillin/tazobactam (TZP) or ciprofloxacin on the previous day were identified daily. Primary

reviews were performed by clinical ID pharmacists, who screened cases for appropriateness and made therapeutic recommendations such as discontinuation/de-escalation, IV-to-PO conversion, and dose optimisation based on pharmacokinetic/pharmacodynamic (PK/PD) principles. Complicated cases with antibiotics deemed inappropriately prescribed were discussed at the midday meeting with the ID physician, and written interventions were made to discontinue, change or de-escalate antibiotics where appropriate.

2.3. Data collection and outcomes

All data were extracted from the SGH ASP database. Adherence to or rejection of the ASP team's recommendations was assessed by clinical ID pharmacists 24 h and 48 h post-recommendation as part of the ASP workflow. If recommendations were rejected, the reasons for rejection were sought. Process indicators collected included appropriateness of antibiotic use and intervention acceptance rates, which was stratified according to timing of interventions. Outcome indicators collected included unadjusted and adjusted days of antibiotic therapy, presence of 30-day crude and infection-related mortality, presence of 14-day all-cause and infection-related re-admission, and presence of 14-day re-infection. Outcomes were compared between patients whose ASP interventions were accepted and those whose interventions were rejected. Patient outcomes were also compared. Cost savings based on patients' out-of-pocket expenses were calculated if an ASP intervention resulted in a cost reduction in the antibiotic regimens.

2.4. Definitions

The term 'appropriate antibiotic use' was defined as: (i) correct choice and duration in accordance with SGH's antibiotic guidelines; (ii) correct dose, adjusted to patient's renal, hepatic and haemodynamic status; and (iii) correct route, in accordance with SGH's guidelines for IV-to-PO conversion. 30-day all-cause and infection-related mortality was defined, respectively, as all-cause and infection-related mortality occurring within 30 days from the

Download English Version:

<https://daneshyari.com/en/article/3358492>

Download Persian Version:

<https://daneshyari.com/article/3358492>

[Daneshyari.com](https://daneshyari.com)