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Efficacy of early switch from intravenous to oral antimicrobials in patients with aspiration pneumonia: A prospective observational study

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ABSTRACT

Background: Previous reports have documented the efficacy of an early switch from intravenous to oral antimicrobials in community-acquired pneumonia, but not aspiration pneumonia. Therefore, we assessed the feasibility and efficacy of these newly developed criteria for community-acquired pneumonia in patients with aspiration pneumonia.

Methods: This prospective observational study included consecutive patients admitted with aspiration pneumonia over a 10-month period at St. Luke's International Hospital; we excluded patients that required intensive care. The criteria for an early switch were stability of vital signs (temperature $\leq 38\,^{\circ}C$; respiratory rate ≤ 24 breaths/min; pulse rate ≤ 100 beats/min for >24 h) and a successful swallow evaluation (repetitive saliva swallowing test score ≥ 2; modified water swallowing test score ≥ 4). Our primary endpoint was successful completion of antimicrobial treatment 30 days after the switch, without reversion to intravenous antimicrobials. Our anticipated success rate was set as 60–75%, based on a previous study.

Results: Of the 70 patients admitted with aspiration pneumonia, 32 (45.7%) were excluded, and 38 (54.3%) met the inclusion criteria. Of these 38 patients, 29 (76.3%) met the switch criteria. The median duration of hospital stay for the included patients was 16 (5–30) days and 30 (12–68) days, respectively ($P=0.03$). Among patients who met the switch criteria, 26 (89.7%) completed oral treatment successfully while 3 (10.3%) reverted to intravenous antimicrobials.

Conclusions: Approximately 75% of patients met the switch criteria; of these, nearly 90% underwent safe conversion to oral therapy. These results demonstrate the efficacy and feasibility of our switch criteria.

1. Introduction

Aspiration pneumonia (AP) has a high incidence and mortality, and is associated with prolonged hospitalization; as such, it is a major concern for clinicians, especially those in developed countries [1]. The majority of elderly patients with pneumonia are at risk of aspiration due to dysphagia, which may be secondary to various comorbidities, including dementia and cerebrovascular disease. The majority of these patients are diagnosed with AP, unless the apparent route of infection is identified [2–5]. However, there are currently no standardized treatment protocols for AP. Compared with non-AP, AP is generally associated with a poorer prognosis [6,7]; as such, patients with AP receive antimicrobial treatment over a longer period. Given that the number of patients with AP has increased, in parallel with the increasing elderly patient population, the management of patients with AP has become one of the most important issues faced by treating physicians.

The efficacy of an early switch from intravenous (IV) to oral antimicrobials in patients with community-acquired pneumonia (CAP) is well documented in previous studies [8,9]; the protocol for conducting this switch is currently widely used in clinical practice. However, there are no previous reports that assess the efficacy of an early switch from IV to oral antimicrobials in patients with AP.

The majority of patients with AP are advised to undertake a fast, which includes cessation of all oral medication, in order to avoid further aspirations; as such, these patients receive IV antimicrobials. Use of IV antimicrobials increases the treatment burden, makes daily activity even more difficult, and may result in increased morbidity, associated with prolonged hospitalization. A lack of appropriate assessment of the severity of AP may contribute to difficulties in terms of clinical decision-making; some patients with relatively good swallowing ability may not require long-term fasting and IV antimicrobials. We hypothesized that an appropriate evaluation of swallowing ability, and a conventional risk assessment strategy, may assist physicians in determining which patients do not require long-term IV treatment, thereby circumventing unnecessary hospitalizations and potential comorbidities.

Therefore, we developed novel antimicrobial switch criteria for patients with AP by using conventional tests to check swallowing abilities, and we prospectively assessed the feasibility and efficacy of this approach in patients with AP.

2. Patients and methods

2.1. Patients

We prospectively studied consecutive adult patients (aged ≥ 20 years), of either sex, who were admitted to St. Luke's International Hospital in Tokyo, Japan with AP that required treatment with IV antimicrobials, over a 10-month period. Follow-up continued until death or the first post-discharge outpatient clinic visit. The diagnosis of pneumonia was based on evidence of pulmonary infiltration on chest radiography, and the acute onset of symptoms of a lower respiratory tract infection. In patients with dysphagia, and those at risk for dysphagia, we diagnosed AP based on radiographic evidence of infiltration in the posterior segments of the upper lobes, or the apical or basal segments of the lower lobes [10,11]. Patients with episodes of apparent foreign body aspiration received a diagnosis of aspiration pneumonitis, and were excluded from our study [12]. We also excluded patients who met any of the following criteria: recent hospitalization within 14 days of the current hospitalization; A-DROP score ≥ 4, requiring ICU care [13]; positive test on the rapid urinary antigen test for *Streptococcus pneumonia*; currently fed via a nasogastric tube.

We recorded the following baseline characteristics for each patient: age, sex, instrumental activities of daily living for food, Eastern Cooperative Oncology Group performance status, current medical history, recent administration of antimicrobials, daily vital signs, regular laboratory results (arterial blood gas on admission, daily scores for 2 swallowing tests, repetitive saliva swallowing test (RSST) [14], and modified water swallowing test (MWST)) [15], A-DROP scores (age ≥ 70 years for males/ ≥ 75 years for females; clinical signs of dehydration or BUN ≥ 21 mg/dL; respiratory rate [≥ 30 breaths/min, SpO_2 < 90%, or PaO_2 < 60%]; disorientation; systolic blood pressure < 90 mmHg) [13], pneumonia severity index [16] on admission, route of antimicrobial administration (IV or oral), number of days to switch from IV to oral antimicrobials, number of days to meet the switch criteria, length of hospital stay, 30-day mortality rate, and adverse effects. We defined 30-day mortality as the death rate within the 30 days after the initiation of antimicrobial treatment.

Our study was performed in accordance with the Helsinki Declaration and approved by the Ethics Committee of St. Luke's International Hospital (Approval #:12-J004, approved August 29, 2012). All patients provided written informed consent during admission and prior to participation in this study.

Abbreviations: ADL, activity of daily living; AP, aspiration pneumonia; CAP, community-acquired pneumonia; IV, intravenous; MWST, modified water swallowing test; RR, respiratory rate; RSST, repetitive saliva swallowing test

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