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Scoring System Development and Validation for Initial Treatment Failure in Suppurative Kidney Infections

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Abstract

Background: Suppurative kidney infections (SKIs) have potentially lethal implications and a high incidence of treatment-related morbidity and death. Until this point, there has been no study that has derived a prognostic model for adverse early outcomes in SKI. Therefore, our aim was to derive and validate a simple scoring system of early treatment failure in SKI.

Methods: Logistic regression and bootstrap methods were used to create an integer score for estimating the risk of early treatment failure using patient characteristics, severity of disease, bacterial etiology, type of pathology, initial antibiotic therapy, and early urologic procedures.

Results: This study included 92 adult patients with 104 SKIs. Early treatment failure was observed in 57 patients (54.8%). The length of the hospital stay and the treatment complications were significantly longer and more common, respectively, in patients with early treatment failure. The factors associated most strongly with early treatment outcome were whether there had been an early complete urologic procedure, the adequacy of early antibiotic therapy, and the presence or absence of sepsis syndrome. The total possible score ranged from 0 to 22 points, with a cut-off value of 5 points. A score of ≤ 5 points identified early success correctly in 85.3% of patients, whereas a score > 5 points correctly identified early failure in 93.2%. The scoring system retained its predictive ability on the validation set.

Conclusion: A scoring system was created to predict early treatment failure for a given patient with SKI. Although the system has good performance characteristics and provides a possible intervention measure, further studies should be performed before widespread implementation.

SUPPURATIVE KIDNEY INFECTIONS (SKIs) have potentially lethal implications with a high incidence of treatment-related morbidity and death. The management of SKI has evolved substantially over the past decade as a result of improvements in systemic therapies and advances in imaging technology, as well as in minimally invasive drainage procedures [1–5]. However, there are conflicting results on the prognostic value of various factors in purulent renal infections. Taking into account their low incidence, the great heterogeneity of patient characteristics and pathological processes, and the large number of possible therapeutic approaches, it is not surprising that knowledge of the prognostic factors in these disorders is not well defined.

The distinction between early and late treatment failure was first made in community-acquired pneumonia (CAP) [6], which showed that initial appropriate treatment correlated with a favorable clinical response. These studies have enabled the identification of risk factors for treatment failure and the design of different strategies for these patients [7,8]. Moreover, early treatment failure increases the need for microbiological and diagnostic tests, with a resulting longer hospital stay and higher cost.

Several tools have been developed for severity stratification in infectious diseases. They include biochemical markers, imaging methods, and prognostic models or complex scoring systems, all of which aim at early detection of severe infections. For most infectious diseases, prognostic estimates of

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