

Analysis of the Drug Prescribing Patterns of Physicians in Patients with both Cardiac and Renal Failure

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Cardiac and renal functions are physiologically related through interactions between systemic circulation regulation by the heart and extracellular fluid volume control by the kidney. Due to the increase in the number of patients with hypertension and/or diabetes, the incidence of coexistent cardiac failure and renal failure is increasing. However, evidence for the establishment of guidelines for treating patients with coexistent cardiac and renal failure is currently insufficient because patients with such complications are generally excluded from clinical trials. As a result, such patients are generally treated on an empirical basis.

In the present study, we analyzed clinical data to clarify the current medical treatment process in hospital. We evaluated the medical records of patients with cardiac failure from the database of The University of Tokyo Hospital. We modeled a series of treatments by physicians using the Markov decision process (MDP), wherein the laboratory data of the patient were employed as the state and the following drug prescription by the physician was employed as the action.

We identified the prescribing patterns of physicians according to the cardiac and renal state of the patients. Moreover, we also determined the overall trend of the subsequent state as a result of each prescription. Although most drugs were used under the recommended conditions according to the package inserts, these guidelines were not followed for certain other drugs. Only the present and subsequent states were considered in this study, but we are planning to perform further studies to identify more specific prescribing patterns according to the series of past states and changes in the trend of states.

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