Application of a prescription drugs database in medical informatics:
Construction of this database as a search system for similar and comparable drugs

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Abstract

Objective : Information of similar and comparable drugs can provide high-use on from both a clinical perspective, and from the perspective of medical cost and insurance when examining and assessing a change from original to generic drugs in deciding what drug to adopt, or proposing an alternative drug to a physician at times when there are concerns over the use of a particular prescription drug. Searching for relevant publications, however, requires a considerable amount of time and the process itself is relatively incomplete and renders it unsuitable for use as a cross-section search. Classification by the Japan Standard Commodity Classification Number (commonly referred to as the Therapeutic Classification Number) also involves drugs with the same therapeutic value which are classified together, such as the calcium antagonist nicardipine hydrochloride covering the hydrochloride hypertension drug number 214 and nifedipine covering the vasodilator 217. This means that many drugs are simply lumped together and classified as "Other" in many classifications, resulting in an insufficient and incomplete search being carried out. It is with this in mind that we set out to construct a database of similar and comparable drugs in the hope that incorporating the latest information technology into a database system would provide a search capability that was both rapid and comprehensive.

Methods : The basic information of approximately 18,000 Japanese prescription drugs, such as individual drug codes, product names, product specification and drug prices were collated, organized, and then identified as being a generic drug or not. Taking all of the drug package inserts, including the combination drugs, we then extracted 3,647 different active components. Active components that expressed similar properties were then grouped together with other similar components, and their basic information was assessed. After constructing a hierarchical structure to categorize similar and comparable drugs thought to be necessary from the clinical aspect, the drugs were catagorized based on their therapeutic value identifiable by a therapeutic category number, and the active component was defined accordingly. For this database we added several additional components, such as databases for indication, side effects, and identification data for various drugs. This allowed creation of a search system with the following three functions: 1) a search function for similar and alternative drugs; 2) a search capability for drugs by therapeutic value name; and 3) a check for overlapping therapeutic effect.

Results : The finished search system allows users to conduct a search using various criteria, including the drug's brand name, generic name, identification data, and therapeutic value. The search criteria can also be applied to allow users to enter filters such as [Search all], [Uniform component], [Uniform format], and [Uniform standards] to narrow their search field. Users can further narrow their search field by applying additional criteria, such as their relevant drug having any indication or side effects. The subsequent drug names that are generated by a search can then be examined in a convenient list format, a comparative chart of indication, and information regarding package inserts. Users of this system can take advantage of the system's multi-faceted perspective, using the full scope of its digital system.

Conclusion : Our recently developed search system that can quickly and comprehensively collates information regarding similar and comparable drugs. Here we report on the examination of a database that considers drugs from the perspective of identification data, indication, and side effects. In the future we hope to connect this database to other similar systems, adding further drug classification and categories, and further expand the system's application, such as being part of a hospital information system, where it can be utilized even more efficiently. To fully realize such a useful database, however, will require clinical demonstration of this system.

Key words: Medical informatics, Drug information system, Drug database, Comparable drug, Similar drug