An XML-based Integration Method for Different Types of Patient Data in Cardiology.

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Abstract

Clinical data consist of a wide variety of information. Database software that covers all types of clinical data is ideal. Patient data in cardiology were converted into an XML-format by tags that cardiologist selected. The structure of the database was comprehensible to the cardiologists. The arbitrary queries to the database from the end-users were captured with a resultant high satisfaction.

Introduction

In daily clinical practice, physicians assemble tons of data, such as basic patient information, laboratory data, and images. Database application that enables to integrate these data and query for all of them cross-sectionally is generally desired as the key to better quality of clinical care and substantial improvements in research productivity. However, it is difficult for clinicians to obtain such a database application that an end-user customizes at will except when dedicated developing staff collaborate.

Extensible Markup Language (XML) is a simple and flexible text format, which allows users the definition of a set of tags. Here we converted the different types of clinical data to XML format. This XML-based integration provides a user-friendly database.

Methods and Results

The clinical data were retrieved from the patients who admitted to Department of Cardiovascular Medicine at Tohoku University Hospital in Japan between 2002 and 2006. Total number of the patients was 2878. Most of the patients underwent a variety of examinations, including laboratory test, chest X ray, electrocardiogram, echocardiography, computed tomography (CT), magnetic resonance image (MRI), nuclear scintigraphy, coronary angiography and ventriculography. These data consist of image data in DICOM format and text data including pdf, csv, and simple text format. We extracted all text data tagged by cardiologists. For instance, <LVG_EF>65</LVG_EF>; LVG_EF means ejection fraction (EF) measured by left ventriculography (LVG). Tagging by cardiologists provided the arbitrary structure which was obviously comprehensible to themselves and still kept an robust XML data structure. The total number of tagged data was about 5300000. We used Shunsaku (Fujitsu, Japan) as a search engine. The XML-based database was capable for capturing a variety of queries from cardiologists cross-sectionally, such as comparison of coronary stenosis with laboratory data and time course of cardiac function among patients those underwent new devices. This approach could benefit the data mining to design novel clinical studies.

Conclusion

In this report, we presented the integration of clinical data tagged by cardiologist preference in XML format. All data of clinical examination in cardiology were restored. Since the cardiologists decided its structure to be comprehensible, the database application enhanced the satisfaction of the end-user. In addition, the database was not only limited to personal use but can be applicable to standard format, such as HL7.

References