Chapter 9

Incorporating Radiological Patient Data Acquired at Other Hospitals into the Local Workflow

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ABSTRACT

Patient data are increasingly distributed between hospitals using CDs instead of physical films. This introduces problems because different viewers from different vendors are provided, and sometimes viewers are unusable because local software installation is not allowed. In 2004, we started to facilitate the incorporation of image data from CDs into the normal workflow of the hospital by using commercially available software to perform patient reconciliation based on the DICOM modality work list. In the years after the first introduction, a more comprehensive software system was developed which allows for the fast upload of large amounts of patient image data into the normal workflow. Although direct network connection between institutions is currently being developed and deployed, in the next decade CDs will remain to be used and the integration of the data into the normal workflow is a must. Literature shows that other institutions also started to handle the CDs similarly.

INTRODUCTION

Transfer of radiological image data between different institutions is an important issue in the diagnosis and treatment of patients. The reasons for the transfer of radiological image data can be for the radiologist to perform a second opinion consult or to have old image data readily available for comparison with new image data acquired at the own institution. Furthermore, the image data can also be relevant to other physicians outside radiology to obtain relevant prior clinical information about a referred patient without having to redo examinations. With the advance of digitalization of radiology departments, the interchange of radiological image data between

institutions is shifting towards shipment of CDs instead of physical film. Frequency of the transfer of image data strongly depends on the activities of the institution and the experts employed by the institution. A large university hospital with many referrals and many experts whose expertise is requested for second opinions will have a relatively higher throughput of radiological image data from outside than a small community hospital.

Although the shift from physical film towards CD for the transfer of radiological image data is a positive change in terms of costs and ease of shipping, it also has its disadvantages. One of the main problems is how to integrate these CDs into the normal workflow. Although most CDs are equipped with a dedicated viewer, these viewers are different per vendor and thus, users have to learn to operate many different software packages at a sufficiently high level. Furthermore, some of the software packages also require software installation on the local workstation, which is not always possible because of restrictions on software installation, imposed by the local IT department for security reasons. Sometimes, the CDs even do not contain any viewing software at all and only hold the DICOM images either with or without a proper dicomdir file.

The aim of this chapter is to provide insight to the reader about the current practice and possibilities in inter-institutional image data exchange. This concerns enormous amounts of image data that have to be transferred back and forth between institutions on portable media. In the near future, this will increasingly shift to the use of secure data transmission over the ever present internet, possibly in combination with large data centres containing regional or even nation-wide PACS archives of all patients. However, these initiatives are still sparse and most of them are not developed for the large amounts of data exchange as required in day-to-day radiology. Therefore, the main data transfer in radiology both for clinical and scientific applications is still done using portable media such as CD or DVD.

The possibilities and the advantages and disadvantages that come with image data transfer on portable media will be covered, based both on our own experiences in a large university hospital in the Netherlands and on the current status in literature and technique. Furthermore, a look into the near future will be made to explore the possibilities that are emerging in secure data exchange using so-called tele-medicine solutions.

BACKGROUND

In the majority of the hospitals the handling of the CDs is a major concern. Large amounts of CDs are shipped on a daily basis and they all have to be read by the receiving physician. Recently, Onken et al. reported on the situation concerning the exchange of radiological images on DICOM CD in Germany (Onken, 2007). In their paper they describe the test protocol they used to determine whether DICOM CDs provided by German radiologists comply to the DICOM and IHE rules or not. To achieve this they devised a three-stage testing protocol which can be found on the website of the initiative (www.dicom-cd.de. Using their, very restrictive, testing scheme they showed in a study of 65 CDs from 27 different vendors and 44 different products and versions that 74% presented with a violation of the specifications and 5% was defective or did not contain any DICOM files at all. Only 9% complied with all requirements, and 12% was usable but not fully compliant. Although the requirements set forth by this initiative are very restrictive and maybe not representative for the situation or requirements outside Germany, the study does show that the usability of CDs with radiological images can be a major problem. Especially since the results state that of the 80% of CDs failing the tests, the majority did not fail a test requirement, but failed to conform to the DICOM standard.

Besides the non conformance to the standards, reading CDs in a clinical setting can be hampered

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