FAST AND EFFICIENT SERIAL TUMOR ASSESSMENT WITHOUT THE NEED FOR DICTATION

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PURPOSE:

• Serial tumor assessment is tedious and time-consuming when processing multiple exams containing numerous lesions.

• Human and/or transcription error introduced during dictation may result in the reporting of incorrect measurements and/or image locations.

• To improve efficiency and eliminate error, we interfaced an interactive multimedia reporting system to a PACS so that DICOM images and measurements can be transmitted directly into a report **without the need for dictation.**
METHODS:

An interactive multimedia reporting system was developed that works as follows:

1. Record key images and dictate descriptions of baseline findings
2. Tag baseline findings with metadata using natural language processing (NLP) referenced to an ontology to define anatomy and pathology
3. Assemble multimedia report with related data linked in timelines for disease response calculations

Step 1: Record images/voice

A metastasis is identified in liver segment 4.

Step 2: Tag with metadata

Disease metrics and series/image numbers are transmitted automatically using PACS API.

Step 3: Assemble multimedia report
METHODS:

• Originally, radiologists dictated image metrics and series/image numbers that were processed by NLP.
• To improve efficiency and accuracy, a PACS application-programming interface (API) was incorporated to transmit DICOM images and data directly into a report as tumors are measured.
• Reporting system logic recognizes types of metrics, what metrics are associated with which findings, and when metrics are modified.
METHODS:

• Each finding in a baseline exam is annotated with metadata describing anatomy and pathology using NLP.

• Links between serial exams are achieved by the following steps:

  1. Radiologist “activates” a prior annotated finding by clicking on it in edit mode.
  2. Radiologist measures a corresponding “new finding” in the PACS display.
  3. The radiologist presses a speech microphone function button to record the new finding and initiate the transfer of imaging data that is linked to the prior finding.
  4. Metadata from the prior finding is transferred to label the new finding, and automated text is generated to indicate the event.
  5. Repeat for each finding being evaluated.
Link findings without dictation:

**Step 1:** Activate prior finding

**Step 2:** Measure “new finding”

**Step 3:** Press microphone button

**Step 4:** Transfer metadata via PACS API

**Step 5:** Repeat for each finding
RESULTS:

• Unnecessary redundant dictation is eliminated unless a radiologist wants to describe additional details.

• Sans dictation, automated text is generated to describe the event.

• The disease metrics are displayed in graphical timelines.

• Findings designated as Target lesions in the multimedia report are used for disease response calculations (e.g., RECIST, irRC).
RESULTS:

• Substantial time-savings (~10 sec/finding) is achieved using the automated process by eliminating unnecessary redundant dictation.

• The time-savings is cumulative depending on the number of findings in a report.

• The system facilitates the capture of more findings per report which can create new disease insights.

• Direct transmission of DICOM data promotes safety by eliminating human and/or transcription errors.

How long does it take to repeatedly dictate?

There is a 10 x 20 millimeter metastasis in liver segment 6 on image 50 of series 3.
CONCLUSIONS:

The use of interactive multimedia reporting with a PACS interface allows for more efficient reporting of serial tumor assessments and eliminates the potential for human and/or transcription errors.