Prototype Integration of Protein Electrophoresis Laboratory Results In an Information Warehouse to Improve Workflow and Data Analysis

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Abstract: This poster demonstrates our efforts to enhance workflow and clinical analysis of protein electrophoresis (PEP) data through integration with the Information Warehouse (IW) at The Ohio State University Medical Center (OSUMC). A new desktop application has been developed with the aim of enabling more efficient and accurate gel analysis by clinical pathologists. This tool gives the pathologists the ability to perform their analysis conveniently from anywhere on the OSUMC network along with the aid of numerical analysis algorithms, image enhancement techniques, and access to historical PEP results for the given patient.

Existing Process: Technicians carry out electrophoresis laboratory studies that produce one or more gels to be interpreted by a pathologist through direct examination on a light-board in the laboratory. Each gel contains a number of results. Pathologists interpret results in the context of correlative data, including protein fraction data and information on clinical context. (These correlative data are obtained from a combination of paper and electronic records.) The pathologist then enters his diagnosis and interpretations into a text-based terminal. Gel images are not captured electronically so retrieval of historical results requires physical retrieval of the gels.

New Workflow: An automated process now sends PEP images and data to the IW repository. Another tool displays the gel images and associated data.

Historical Data Retrieval: Results from laboratory procedures can now be retrieved electronically. Pathologists no longer need to obtain the physical gel to see trends or changes in a patient. Electronic access also enables the ordering physician to examine the raw data even at the patient’s bedside, with the intent that this will help reduce the possibility of diagnosis errors.

Data Storage: Historically, PEP images and data are kept in the workstation that operates the instruments. To re-examine historical data, one has to perform data restoration from backup to the same workstation. With the automated process of transferring data to the IW, all images and data are available all the time and are protected from disk failures and natural disasters.

Conclusion: With the simplified workflow, the potential for human error due to misreading or mismatching patient-image data is minimized. The integration of electrophoresis data capture and image analysis capabilities promises to provide a substrate for follow-on development of computer aided electrophoresis methods. Efforts are underway to further streamline the workflow by direct interface with the Laboratory System, to further develop and test computer aided analysis of electrophoresis data, and to make density curve features searchable.

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