

GJNH echo-image acquisition and transfer (SCOUT +) project

Background:

Assessment and optimisation of donor organs are essential for successful transplant. GJNH joined the SCOUT project in April this year. Transplant fellows cover the 24/7 on call service but don't necessarily have the cardiology experience to assess echo images of donor hearts. Scouts were trained to acquire diagnostic imaging echocardiography (TOE) studies which are comparatively small in "data" size and a platform to transmit them to GJNH for review was built.

Project outline

Image Acquisition

To carry out this function securely we put a remote device onto the hospital's network using a Virtual Private Network (VPN). None of the portable ultrasound systems on the market support VPN access or have a 3G connection and it would invalidate the CE marking of the system to install this software directly onto the ultrasound system. To relay the study to GJNH we required to add in a portable computer that could act as a bridge between the scanner and GJNH.

Image transfer

This laptop had to run a DICOM broker capable of receiving and sending studies. It also had to be able to connect to the VPN and have a mobile data connection. GJNH eHealth department had already established a reliable and robust VPN system to allow remote working. A mobile data connection was then used to connect the laptop to the VPN. The hospital has a local DICOM archive (GE enterprise archive 4.0 with centrality web viewer 3.0 option) capable of storing and reviewing studies via a webpage.

Medical physics designed an interface between the ultrasound system and a DICOM transfer package: vDicomRouter (freeware). Once the study had been acquired on the echo machine and transferred to the vDicomRouter software, a mobile data connection on the laptop relayed the images to the hospital VPN. This connection "tunnels" into the hospital network and so closes down any other network interfaces on the mobile computer (meaning no more studies can be sent once the VPN connection is established). The VPN assigns the mobile device a static internal IP address required by the GE enterprise archive to authenticate as a DICOM client. The vDicomRouter software automatically pushes the study across to GJNH's Enterprise Archive when the connection becomes available. This setup also has the advantage that if the mobile data signal drops both the VPN and the vDicomRouter software will resume the sending without the need for user input.

On/Off-site review

Once the study is on GJNH's Enterprise archive it can be reviewed onsite by cardiologists and cardiac surgeons. Functionality was then further enhanced by allowing remote access via tablet PC's. The tablet needs Microsoft internet explorer as the centrality web viewer requires activeX components. Although centrality is a web based viewer the studies are downloaded and cached on the local device, the playback framerate available is then determined by the unit's processing speed. The current Windows Surface Pro clocks at a frame rate of 56fps which is more than adequate for a review.

Picture transfer

In the future, photographs of the organs could be included in the study sent back for review, this could be added to the U/S study as it passes through the vDicomRouter software as an addition.

It would also be beneficial to integrate with the current electronic offering system currently used by transplant co-ordinators across the country (EOS).