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Enabling Access to Patient Data

Ensuring True Mobility in Imaging

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Mobile imaging is not new; for over ten years, it has been used in several areas, including the transmission of trauma CT scans for on-call reporting by radiologists at home or for emergency referral to a tertiary centre. It has also been used to enable smaller hospitals in remote areas, often without radiological cover, to transmit x-ray images to a major hospital for a second opinion, to enable optimum patient management.

Constraints on the transmission of images have changed significantly. Ten years ago, a standard telephone line was capable of transmitting only at speeds of around 2.4kbps and is nowadays still restricted to around 56kbps. The introduction of ISDN improved transmission speeds to 128kbps; but with multi-slice spiral CT, the size of the data sets increased to the order of 500-700 slices, with the result that transmission time significantly increased and became an even greater issue.

Broadband ADSL, operating at up to 8Mbps, has had a huge impact in alleviating this problem; however, the benefit is in one direction only. The download to a remote computer has improved; but any upload from a computer to the internet is slower.

Security Risks

The impact of moving data around by mobile technology means that security and patient confidentiality are of paramount importance. Issues are similar whether images and patient data are being transmitted around the UK or overseas. Whilst VPNs offer a degree of security, they are expensive and exclude the ability to send data for a specialist second opinion.

Companies are working on the application of resilient encryption technology which enables data files to be sent across intranets and the internet with a high degree of security and in such a way that only the authorised recipient can decrypt the data, even if it is stored in encrypted form on a remote computer.

Viewing Needs

One of the greatest challenges of going mobile is the quality of the receiving viewing unit. In comparison to a basic computer which can achieve resolution of 1280 x 1024, many mobile devices such as PDAs, have a resolution below 480 x 640. Although it is possible to view images in quadrants with roam and zoom, this is neither ideal nor clinically acceptable. Mobile access can be provided to image data for a user without the need for dedicated mobile equipment; for instance using a PC connected to an intranet or the internet. Also, laptop computer systems while not as portable as PDAs offer screens with better resolution and higher processing power.

Data access over an intranet, the internet or VPN can work in different ways. Firstly, where the remote user downloads images onto their own system. Here the issue of the security of the data on the remote machine becomes important, and issues such as who has access or how long data is retained must be controlled.

Alternatively, remote users can access and view image data which is held on a central server. In such cases, the speed of the connection is important in defining response time for any manipulation carried out by the user on the data. On large data sets these time delays can pose a

problem.

Technology Trends

To achieve a viable, lightweight device for mobile applications, there is a need to develop lightweight and high power displays and increase processing power, memory size, and battery power. One of the greatest problems is current battery technology. To get an operating time of several hours, batteries are bulky, and even then, need frequent access to mains power for recharging. This is an issue which seriously needs addressing if we are to achieve true mobility in imaging.

As imaging develops, challenges increase. Both data sets and the complexity of data manipulation required has increased. The ability to fuse or compare image studies and rotate images in real time requires significant computing power, which is a problem with compact mobile devices. Whilst these facilities are not required in all cases or applications, they often add significant benefit for patient management.

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