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Cardiology Requirements for PACS: Defining Future Needs

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The Robert Bosch Krankenhaus was opened in 1973 and has created a worldwide reputation in medical and surgical care, for pioneering the practical application of innovative IT solutions to improve healthcare delivery. In my position as "Oberarzt", a function that is somewhere between consultant and registrar, I am responsible for our ten-bed intensive care unit, in particular our Cardiac Magnetic Resonance (CMR) unit, which performs 1,500 CMR procedures each year. CMR imaging has emerged as a new non-invasive imaging modality providing high-resolution images of the heart in any desired plane.

In our department we have 80 beds, operate three echography machines, one magnetic resonance and two angiography units. We perform 3,500 coronary angiographies, 1,500 percutaneous transluminal coronary angioplasty (PTCA) interventions, and over 6,500 echocardiographies on an annual basis.

Current PACS in Our Department

The leading system, as in most medical facilities, is the Hospital Information System (HIS). Our current HIS is made by ISOFT. This enables us to have one convenient front-end for patient history, images and all other patient data, avoiding time loss in searching for one patient through different systems. While it is of core importance that cardiology PACS should be enterprise-wide and integrated, presently we have a separate PAC system in our department for echography, angiography and CMR and use a blend of service providers to meet our needs.

We also have a local echography PACS with three echography machines and a workstation. Using this set-up, images can only be reviewed at the workstation. Our web-based CMR PACS, in use since four years ago, is made by Heart IT. Images can be reviewed on all PCs in the hospital. For echography we use GE Vingmed solutions with a workstation using a system called ECHO-PAC. For angiography, we have local workstations but not a real PACS, using two Siemens cath-labs with local workstations from Siemens. For radiology our hospital has been using a PACS for the last two years made by Image Devices.

Benefits of Integrated Cardiology PACS

The benefits of integrated PACS in cardiology departments, surprisingly, has little to do with gains in time, which are only marginal. Recently, as part of our drive to re-evaluate our current system, a consultant assessed possible improvements in real terms. What he found was that while gains of time are only marginal, the improvement in image quality may be considerable and is certainly enough to make an integrated system an essential addition. The main vendors of cardiology PACS on the European scene for standalone solutions presently, are GE, Philips and Siemens. For integrated solutions Agfa and Medcon (McKesson) are proving to be leading providers, while in the future Heart IT, Witt working in partnership with Philips, and of course Agfa are shaping up to take the pole positions.

The presence of a comprehensive support solution is a vital part of our decision. In our own case, final decisions on which vendor to purchase new IT solutions from are made by both management and staff, and our chosen vendor must provide back-up consultation services. Future IT upgrades for our department's cardiology PACS, will be based on the need for a web-based system, which can be used on every PC in the hospital to view all cardio exams. The other main criteria is speed as well as image quality.

An Integrated Approach

With systems of the future, the electronic health record will enable referring physicians to view their patient's cardiology studies in an integrated and accessible way. Currently with CMR, we are able to give every outpatient a CD with exam results stored on it. In the future we hope to develop a more comprehensive IT solution for the department that sees it integrated with the HIS rather than as a stand-alone system. Deploying this kind of holistic approach is tricky, not least because although DICOM is an invaluable protocol for the transmission of image data, the proprietary formats such as for echography are an obstacle to a wholly integrated solution. That is why most vendors of cardiology PACS enable sending of images not in DICOM but as mpg4 or animated .gif files. No vendor with pure DICOM viewers can be fast enough.

Challenges Particular to Cardiology PACS

Cardiology departments in hospitals have been far slower to adopt PACS than radiology, purely because there are by necessity far more images

and data produced per case. Also, the multimodality nature of cardiology brings specific challenges in synchronising information on a PACS. For example, until two years ago it was not possible to convert our echo loops into DICOM. ECG has yet another format and is difficult to store. Of course there are technical differences in requirements between radiology and cardiology PACS, particularly in the different frontend systems needed in each case. The absolute basic IT infrastructure I consider essential for a department considering purchasing a cardiology PACS, is a deep archive with a long- and short-term storage, PCs and a 100MB net.

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