

Differences in digital picture and film documentation for various ultrasound methods

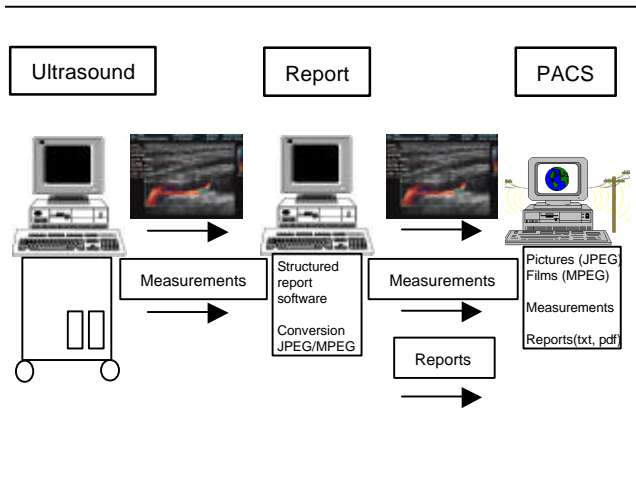
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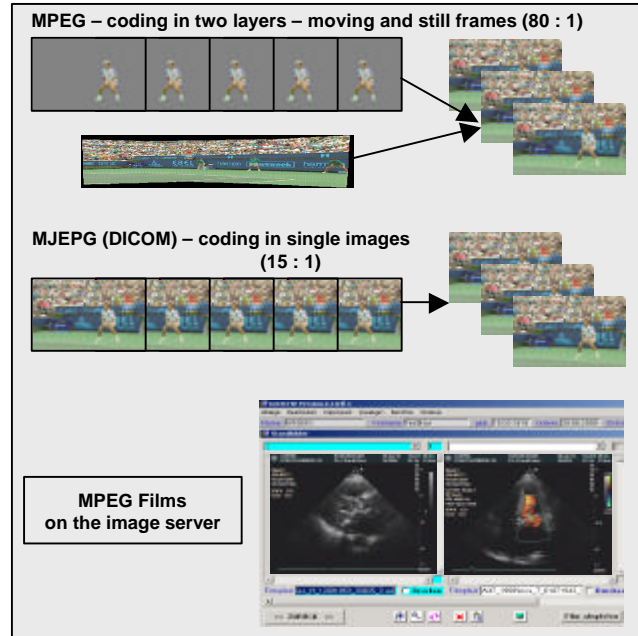
Background:

With today's computer technology the routine use of a complete digital echocardiography laboratory with recording of still images and video loops is feasible. The storage of uncompressed video data would be too voluminous. We report our experience using a digital documentation for various ultrasound procedures applying the MPEG-4 compression standard of the international Moving Picture Experts Group (MPEG).



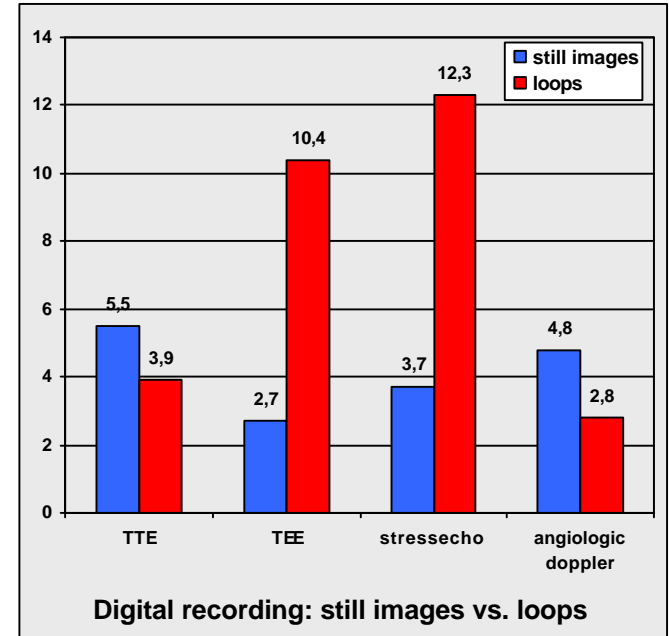
Methods:

In addition to the documentation on videotape and videoprinter a digital acquisition of pictures and films was made possible on the three ultrasound machines in our department. This was done either with a frame grabber card via a computer mounted on the ultrasound machine or using the DICOM (Digital Imaging and Communications in Medicine) interface of the ultrasound system. All still images were converted in the JPEG (Joint Photographic Experts Group) format and all films in the MPEG-4 standard. The reports of the examinations were documented with a structured report system using an ORACLE® database.



Results:

From 1 January 2001 to 31 December 2002 the opportunity of an additional digital recording of still images and loops was used with 16674 of 22474 examinations (74%). With 14654 transthoracic echo examinations a mean of 5,5 still images and 3,9 loops were digital recorded, with 1053 transoesophageal examinations 2,7 still images and 10,4 loops, with 217 stressechos 3,7 still images and 12,3 loops and with 6162 angiologic doppler exams 4,8 still images and 2,8 loops. The mean compression rate compared to uncompressed data was 14:1 with still images (90 kilobytes), 102:1 with loops (2 seconds, 422 kilobytes) and 24 :1 for the fingerprint images (36 kilobytes) of the loops. The storage volume for the 202600 images and loops would be uncompressed 2628 gigabytes, with JPEG and MPEG-4 compression we needed 33 gigabytes, adequate to a overall compression rate of 79:1.



Conclusion:

The freely available opportunity of digital picture and film recording was used in a different extend for each ultrasound modality.

Transthoracic echo uses more still images than loops due to M-mode measurements. For transoesophageal and stress echo mainly film recordings were applied. In angiologic Doppler twice as much still images than films were taken. The design of a digital report and picture archiving system should take the different requirements into account.

The digital documents were frequently used in conferences, for planning of invasive procedures, on the ward as part of the electronic patient record and in teaching sessions.