

Multimedia Electronic Textbook: The Way From Clinical Information to Education

Kocna Petr, MD. Ph.D.

*Laboratory of Gastroenterology & Department of Medical Informatics,
1.st Medical Faculty & Faculty Hospital,
Charles University
Prague, Czech Republic*

Abstract

The multimedia electronic textbook, hypertext, fulltext searches, images processing and digitalized video sequences on CD-ROM as well as accessed by Internet coming now as new tools in the education process. The program GastroBase is described that primary serves for documentation in gastroenterology ambulance and endoscopic workplaces. The last version of the program GastroBase makes possible to include also image documentation and serves as the PACS. This IS - GastroBase is now running more than six years in daily routine and the database contains > 75.000 medical records and 3000 images. In this paper we would like to present the way from electronic-patient-record, in the information system GastroBase-II, to the multimedia, electronic textbook on CD-ROM.

Introduction

Electronic-patient-record (EPR) system GastroBase-I has been developed in 1990 as a FoxBase+/LAN application and the last version (GastroBase-II) written in C-language including a graphic library has been incorporated into a clinical-information system (CIS-ComSyD), which is under developing at the University Clinic in Prague. The GastroBase system has been developed as a full structured text editor, suitable for documentation of gastroduodenoscopy, ERCP, colonoscopy, proctosigmoidoscopy, including all therapeutic techniques, ultrasonography, laparoscopy as well as to describe histology, X-ray and surgical reports in connections with hematology and clinical chemistry laboratories. This system is now running on Btrieve data manager (Novell NetWare 3.12) and it is routinely used at our clinic as a clinical information system - incorporating patient identification, medical records, images, laboratory data, patient history, physical examination and other patient related information. A graphic library developed in the past years and graphic modules with a special video-card enables to store, archive and link different images to the electronic patient-medical-record. The multimedia, electronic textbook entitled "Endoscopy methods - ERCP and colonoscopy" on the CD-ROM was published in 1996.

GastroBase-II description.

Medical-records in GastroBase are written and stored by using of the standardized texts/codes (minimal data set) covering the whole range of the gastroenterology, developed at our department in two years. These codes are constructed in general rules as abbreviation (codes for tumors start with "t" etc.) and are composed by a combination of the proper code, numeric parameters (size, distance) and anatomical localizations. Examination reports are typed quicker, in a standardized form and can be easily searched and evaluated, by our code-structure, compared to free-text form. This type of report-input has been described also in the overview in Endoscopy (Classen 1991, Endoscopy 23: 29). A full-text-form of the reports is displayed and printed in connection to additional code-text databases. An expert system is used to check and control data input as well as to analyze medical reports. An automated accounting system for health insurance companies has been de-

veloped by using national specific rules and coding database. Separate routines involve screening, prevention and follow-up for colorectal cancer and a national registry of the familial polyposis of the large bowel.

Images (real time screen pictures) from videoendoscopy, ultrasound, endosonography and X-ray contrast pictures (ERCP) could be stored and retrieved as a part of patients' documentation. These images are captured on-line by video-cards connected to PC in the PC-network, processed in true-color Targa (TGA) format and archived after compression to the standard GIF (Graphic Interface Format). Microimages - 'thumbprints' for each image 120 x 120 pixels are stored in the graphic library. These microimages could be easily retrieved and linked to a medical record and serves as a summary of the whole medical procedure. Different microimages (endoscopic, X-ray, ultrasound) could be previewed on the true-colour display. An off-line digitalization procedure by using color-scanner (A4 form, 600/1200 dpi) could be used for another pictures, not available on-line at this time.

Graphic library and multimedia

The graphic-library modules of GastroBase system could be easily used for educational purposes. Searching by keyword enables us to demonstrate specific procedure, individual stages of this procedure, relation to different examination techniques (i.e., combination of endoscopy with X-ray or with ultrasound) or a specific diagnosis or pathological result. This image-data is used for pre-graduate as well as post-graduate educational activities. Our teaching and seminar room is now equipped with modern computer presentation unit including LCD panel projection with Cyclop option.

The multimedia electronic textbook on CD-ROM has been developed for post-graduate education. The user interface programme is written in Visual Basic for Windows environment (Windows 3.1x, Windows 95). The CD-ROM contains video sequences (cca 30 minutes; speech-commented by specialists), more than 400 images (endoscopic, X-ray, ultrasound), tables, schemes, hypertext links, indexes and full-text search functions.

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Biography

Petr Kocna M.D.,Ph.D., born March 1955 in Prague. Graduated at Medical Faculty of Charles University in 1981 and post-graduated with thesis "Isolation and characterization of „gliadin and their proteolytic fragments" in 1989. Since 1990 he is working at this position as scientific worker participating on the project of the markers for colorectal cancer screening, as well as developing of a computer assisted documentation. At the Medical Faculty he is lecturing the clinical chemistry and medical informatics. E-mail: kocna@mbox.cesnet.cz