SOFTWARE CORNER

Radiology Review: A Modifiable Computer Program for Practice and Review in Differential Diagnosis

Spencer B. Gay and Laurence R. Watson

RADIOLOGY REVIEW is a text-based computer program designed to allow radiologists to review differential diagnoses quickly and easily. Acquiring skills in differential diagnosis is an important goal of radiology training; perhaps in no other residency is the physician expected to be versed in such a wide range of topics. To this end, a comprehensive and concise body of factual information is invaluable for study and review. Moreover, its value is enhanced if it can be frequently reviewed and revised. Conventional publications are of limited use in serving these needs, but personal computers can fulfill them admirably. More sophisticated computer programs than this—known as "expert system" software—are available or are in development.[1,2] These programs attempt to relate statistical and clinical data to decision trees and may even critique the user's decision.

This program gives the radiologist quick and ready access to a core of data. Some 400 radiological entities are covered, presented as lists of differential diagnoses with occasional comments. In the current version of the program, a Topic Finder option allows the user to search any section, or the entire data base, for occurrences of a word or phrase; the name of a syndrome, for example, could be entered so that radiological manifestations of that syndrome in any of the sections could be revealed. A printout of any or all of the sections may be obtained for review away from the computer.

A significant feature of our program is that the data presented may be modified and expanded by the user; the program is in fact a functional carrier for these data. It is our hope that the useful life of the program will be determined by its inherent simplicity of operation combined with a commitment by users to maintain the data.

PROGRAM OPERATION

In operation, the program proceeds simply through three levels. At the first level, the main menu, the user can select which section (pediatrics, neuroradiology, etc) to review. At the second level, the user may browse through, then select from, a list of the topics or diagnostic entities covered in that section. At the third level (Fig 1), a list of differential diagnoses and, where pertinent, comments and mnemonics are then displayed for that topic. Topics may be selected at random or, since the program keeps track of which topic was last selected, the entire section may be worked through methodically. The program will return to the main menu automatically if the keyboard has not been touched for 5 min; this feature lends itself to continuous running of the program from an unattended console, where a "disembodied" screen of text might dissuade potential users from sitting down and using the program.

Two additional options are available from the main menu. First, a "free text" search of the data base may be performed, for which the user enters a word, phrase, or a word stem. The user then elects to perform the search on a single section or on all sections. At each occurrence of the search-term, the associated page of text is displayed and the corresponding line or lines flagged. Second, a neatly-formatted hardcopy version of the data may be obtained from the printer. One or all of the sections may be selected for printout.

In addition to use in training programs, the program would be useful for the radiologist in the reading room who might want to check pertinent differential diagnoses while interpreting films. In teaching programs, discussion of the differential diagnosis of lesions might be enhanced by having all entities readily available on screen or paper.

From the Department of Radiology, University of Virginia Health Sciences Center, Charlottesville, VA.

Address reprint requests to Spencer B. Gay, MD, Department of Radiology, Box 170, University of Virginia Health Science Center, Charlottesville, VA 22908.

0897-1889/91/0402-0008$03.00/0

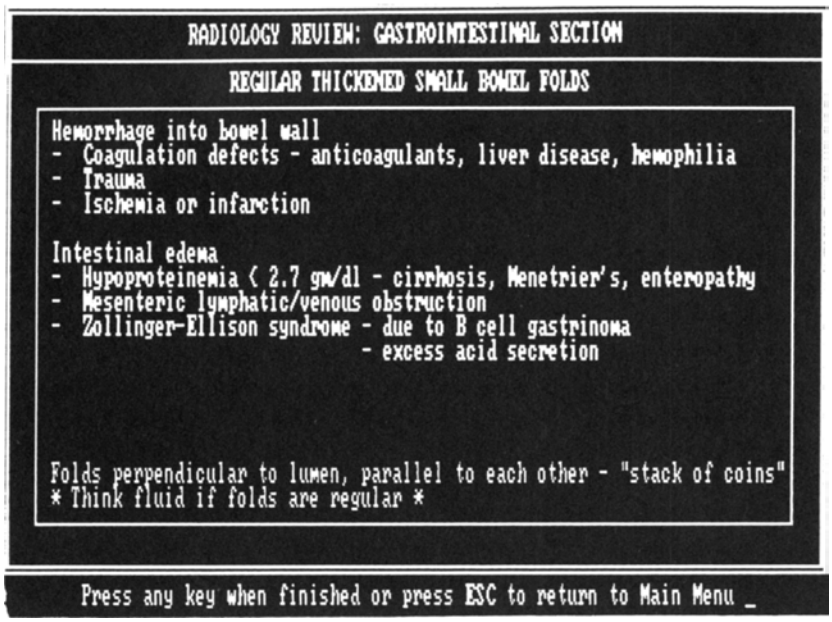

Fig 1. Differential diagnoses. Sample screen showing list of differential diagnoses of a chosen topic. Additional comments are displayed at the bottom of the screen. To view an extensive differential list, the screen may be scrolled up and down.

TECHNICAL DETAILS

Radiology Review was written in QuickBASIC 4.5 (Microsoft Corporation, Redmont, WA) for the IBM (Boca Raton, FL) series of microcomputer. The program itself is a stand-alone, executable file requiring no other program for its operation. Approximately 100 kbytes of available random access memory are currently required for operation of the program. If, however, the data files significantly increase in size as a result of user-supplied additions, this memory requirement may become greater. The program may be run from a floppy-disk although, for speed, installing it on a hard-disk system is preferable. Color is used in the various screen displays, but a monochrome computer system will function equally well.

The overall structure of the program itself cannot be modified by the user, but its design allows the user to alter the differential diagnosis data and all associated information. The program design also allows the user to add or delete sections. Any word-processing package or text-editor may be used to amend, add to, or delete the current data. Details of the conventions to be observed when editing these files are displayed at the end of the reference section of the program. *Radiology Review* is available from the authors on various disk media for a cost-of-distribution charge of $10.

REFERENCES

1. Greenes RA: Computer-aided diagnostic strategy selection. Radiol Clin North Am 24:105-120, 1986

2. Swett HA, Miller PL: ICON: A computer-based approach to differential diagnosis in radiology. Radiology 163:555, 1987