Educational Software For Teaching: Neuromonitoring In Anesthesia And Critical Care

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Abstract

NEURALIS is a specific interactive, multiple-choice educational software package for neuromonitoring in anesthesia and critical care. The system runs on Windows 95, 98 or NT 4.0. The system is based on a databank consisting of a presentatio n module and a question-answer module. Both components contain texts, diagrams a nd bit maps. The contents are organized in six categories for users to assess th eir knowledge. The question blocks contain a variable redundancy mechanism and t he individual questions can be configured in an increasing order or randomly. NEURALIS was evaluated by 108 participants at three international postgraduate workshops for neuromonitoring. On a scale of one to five (1 = excellent, 5 = poo r), the average score was 1.13. This indicates a very good acceptance of this ed ucational tool by users.

INTRODUCTION

The use of computer-assisted learning is increasing rapidly in undergraduate and postgraduate medical education. NEURALIS, developed in 1995 and updated regularly, is one of the first comprehensive medical educational software packages. It was developed with a multiple-choice mode for postgraduate training in neuromonitoring in anesthesia and critical care and is also being used for training medical students.

METHODS

NEURALIS was developed with the CBT tool BD EXPERT to run on Windows 95, 98 or NT 4.0. The educational objectives are organized in blocks on electrophysiology in anesthesia and critical care, electroencephalogaphy, evoked potentials and technical and clinical methods.

With automatic statistical evaluation, both the student and the teacher can evaluate the answers to individual questions as well as knowledge in the different subject blocks. Then a training program can be planned. In the question module the user can chose an adaptable redundancy mechanism and an increasingly consistent question mechanism as well as a subject-oriented or random query mode. The answer module contains a correct-incorrect evaluation as well as an evaluation compartment. The system can be expanded with animations and video clips.

To evaluate the acceptance of NEURALIS as a postgraduate teaching tool, the system was evaluated by 108 anesthesiologists, critical care specialists and biomedical engineers on a five point scale

(1 = excellent, 2 = good, 3 = satisfactory, 4 = fair, 5 = poor).

RESULTS

The following figures are examples from the question – answer module from different subject groups.

Fig 1 a,b – 4 a,b: NEURALIS-examples.

Figure 1

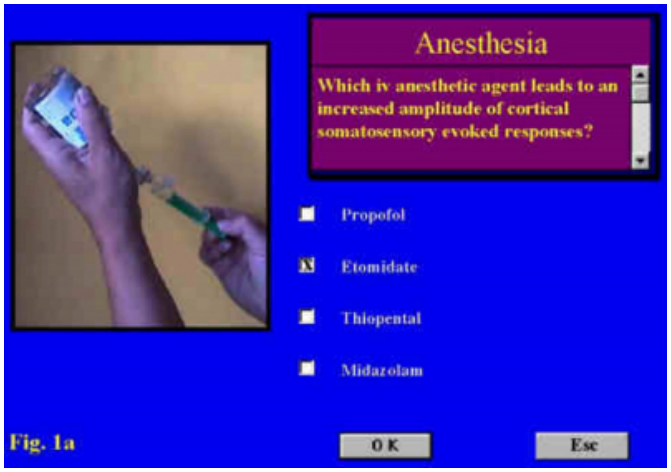


Figure 2

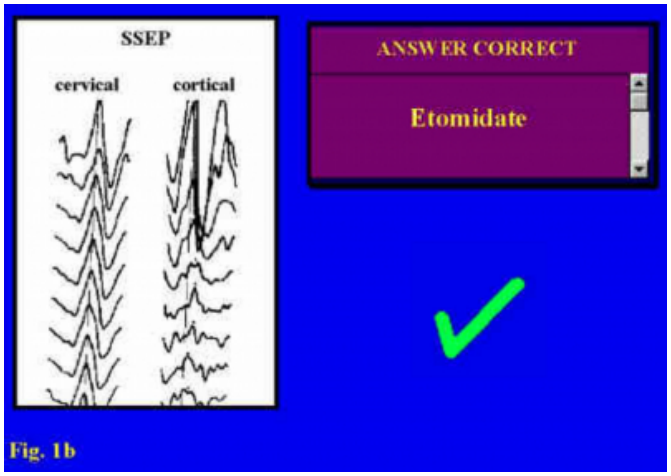


Figure 3

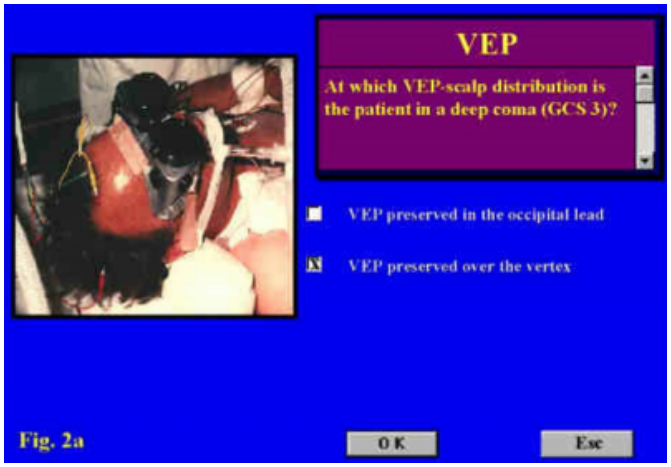


Figure 4

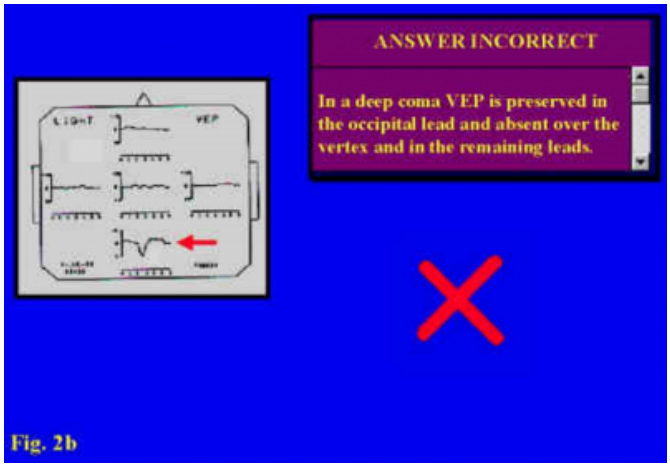


Figure 5

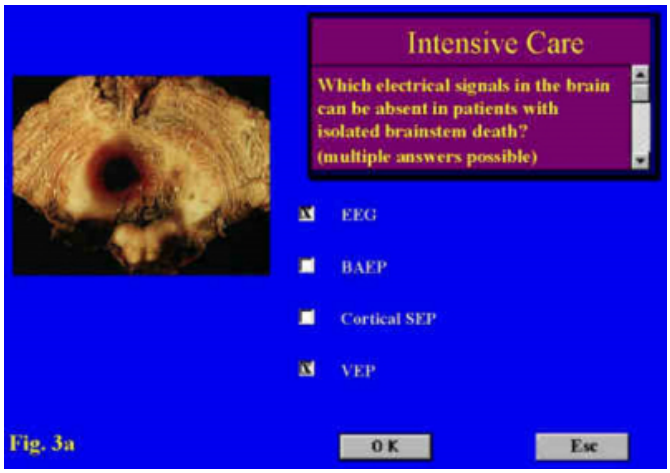


Figure 6

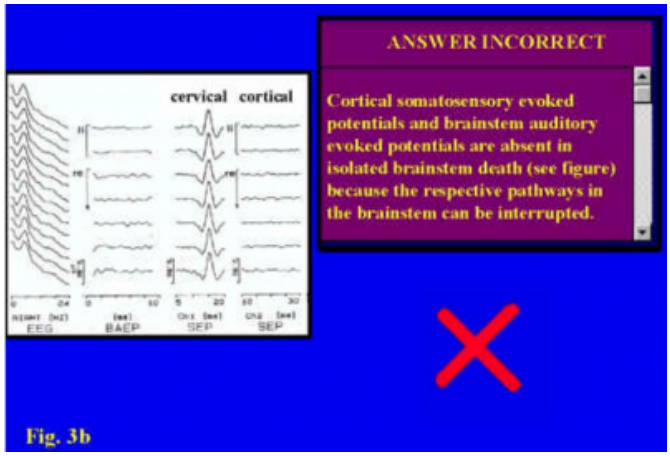


Figure 7

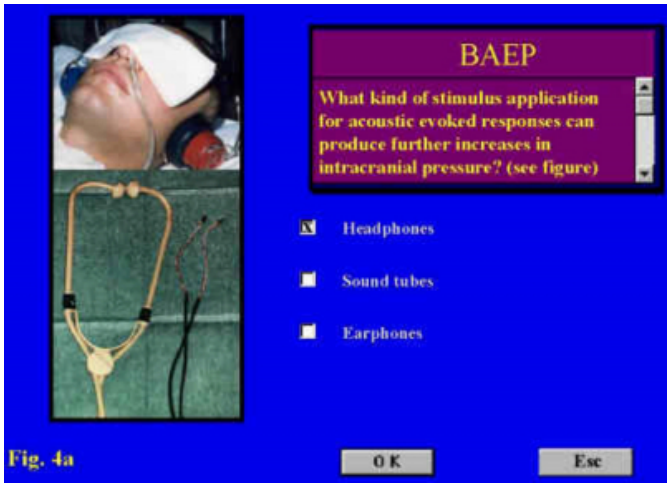
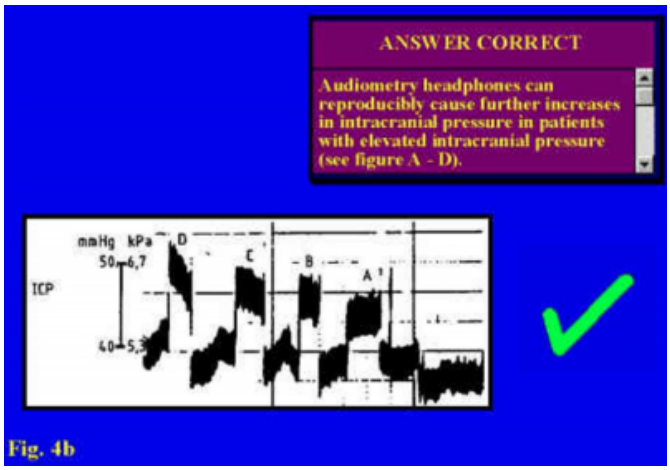


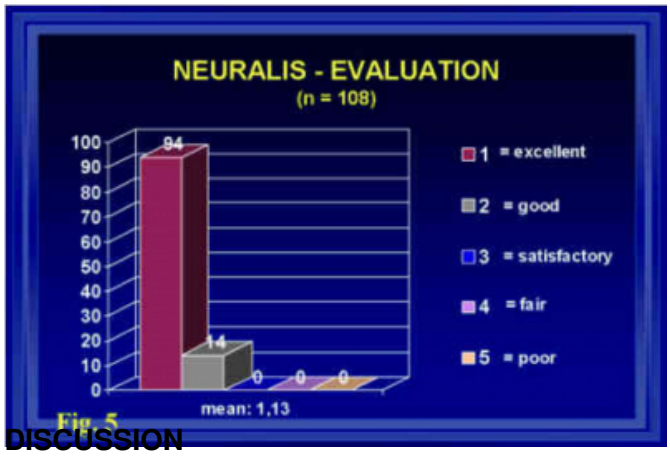
Figure 8



The mean score in the evaluation of NEURALIS by 108 postgraduate users was 1.13 (Figure 5).

Figure 5: Statistical analysis of NEURALIS acceptance.

Figure 9



DISCUSSION

Technological advances have been quickly translated into educational tools. These range from an electronically-controlled, pneumatically-driven pulse simulator in cadavers for teaching peripheral nerve block techniques [1] to human patient simulators [2]. Manufacturers provide a range of product information software for neuromonitoring equipment [3,4,5]. In contrast, there are comparatively few commercially available software products for the specialized and complex subject matter of electrophysiology for anesthesia and critical care, e.g. [6]. We developed an interactive multimedial expert system called BRAINDEX for computer-assisted documentation and decision support for brain death [7], which includes various topics of neuromonitoring in brain death, too.

We have used NEURALIS since 1995 and presented the system in 1997 [8]. The system has been updated repeatedly to keep pace with advances in neuromonitoring and has been used with high acceptance (Fig. 5) in postgraduate training [http://www.anaesth.med.tu-muenchen.de/neuro.html] as well as in the education of medical students. Up to now the software is only designed for german language and is used as a part of the postgraduate training. It is not commercially available at the moment.

References

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