Role of computers in postoperative care

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With the advances in technology and the remarkable achievements of computers in other areas of science and industry, physicians are tempted to utilize computers in medicine and specifically in the intensive care units and other areas where the patient's status changes quickly and often dramatically and where repetitive measurements of various physiologic functions take place.[1] However, we believe that the caliber of patient care in the intensive care unit is not as dependent on fancy monitors and sophisticated computerization as on two other factors: the presence, round-the-clock, of intensivist physicians who know the problems of these patients and who are able to respond quickly and accurately to subtle changes in the status of the patient; and the availability of well-trained, dedicated nurses at a favorable nurse to patient ratio. The spectrum of available hardware is substantial. We attempt to identify the more common uses of computers in the postoperative area.

Desk top minicomputers

These can be used as sophisticated programmable calculators for handling complex calculations, or as decision-making devices through availability of conditional branching capabilities.

Discrete, specific function devices either analog or digital

Examples of such devices are the arrhythmia-detecting devices, computerized electrocardiographic interpretation, cardiac output measurements by integrating area under the systolic portion of the arterial pressure wave form, and small computers used in calculating area under the dye dilution curve or cardiac output by thermodilution techniques.

Sophisticated digital computers programmed to provide the following functions:

Physiological signals. Examples of such functions are integration of variables and parameters to define trends that may be helpful in defining therapy or prognosis; open-loop systems defining lines of management on the basis of manual or on-line data acquisition from various measuring devices or laboratory data. A human being then implements the decision defined by the computer thus closing the loop, and finally, closed loop, negative feedback systems as described above, except that the program actuates a device to implement computer decision without human interference.

Several problems exist in the use of such systems. The most important problem is software formulation. Logic used in constructing algorithms is often deficient because of lack of pertinent variables. Also, logic used to define the conditional branching is almost always unsubstantiated and unproved.

Medical record information. This is perhaps the most promising and justifiable aspect of computerization of intensive care units or postoperative areas with a massive influx of unharnessed data and information. Such computer function requires three steps: input or initial capture of information, storage, and retrieval and display.

Finally, we strongly believe that a most important prerequisite for future successful implementation of sophisticated computerized systems is that a problem must exist and that people involved must identify that problem and be actively seeking a solution to it.[2] It is also important to recognize that the power of a device such as a computer does not reside in the hardware as much as in the ingenuity of planning the software. It is also important that such systems be cost-effective in terms of improving mortality/morbidity or reducing costs to the consumer.[3]

References

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