Cardiology in the 21st Century. Is PDA an Indispensable Tool for the Practice?

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The current advance of medicine and the need to continuously keep pace with new medical developments have led to the use of technologies compatible with these discoveries. Medical doctors can be classified into three categories with regards to their ability to use such technologies.

The first group includes physicians who acquired the knowledge mainly based on previous personal experience. However, medical literature lacks sufficient reports about this because of limitations in technology and also because the access to information was either the privilege of only a few professionals or it was difficult to attain. The second group, in which I am included, consists of those professionals who considered computers mainly as time-saving devices to perform repeated tasks. And, finally, the third group includes physicians who, at a very early stage of their basic medical education, or often before that, were already familiar with a certain level of updated medical technology.

Another aspect in this transition to technology use refers to the access to medical reference information, which in the past would be available only at university libraries or on personal computers (which often had poor connections). The best examples of such advances are PDAs (personal digital assistants), also known as handheld computers, palms, palm tops, palm pilots, pocket pcs, etc.

The PDAs are small, compact, light-weight, wireless devices that can be conveniently carried in a pocket or purse. They help the clinician access medical information from any location and at any time - a feature which has generated a new term: mobile computing.

It is worth mentioning that the accessibility at the point-of-care itself represents a revolution on how medical knowledge becomes available. In addition to being a decision-making tool in the clinical setting, this device is highly useful in the medical field as it provides instant access to essential information wherever it is needed.

Generally speaking, PDA medical applications can be grouped into the following categories: as a decision-making tool in the clinical setting, as a tool for administrative support, documentation, education and research activities, as well as an organizer of daily professional activities. Clinical studies have shown PDAs can help practitioners reduce medical errors from the diagnosis stage through to prescribing treatment[1-3]. Medical PDA software that provide full descriptions of signs and symptoms are capable of predicting the likelihood of a person to develop an illness. Medical calculators perform calculations as simple as the determination of body mass index, as well as the most complex formulas.

Prescription-specific software (*ePhysician*, *iScribe* and *PatientKeeper*) provide detailed information about drugs and their side effects. Another important technological resource, telemedicine, allows an electrocardiogram to be stored in one PDA and to be downloaded into another cardiologist's PDA for analysis and prescription of treatment[4]. Among the resources available, the most widely used medical applications are: drug database (*ePocrates*), medical text books (*POEMs and Skyscape)* and medical calculators (*MedCalc* and *MedMath*)[5, 6].

The advantages of PDAs in the health care setting are: cost reduction, teaching support, time saving, error reduction, potential improvement in productivity and improved quality of the health care provided[7-10]. PDAs support the use of all necessary technological tools without the need for any other equipment. It is worth mentioning the fundamental role these resources have on the implementation of evidence-based medicine and in continuing medical education[11]. Medical guidelines are constantly being updated and sometimes are obsolete by the time they are published. For this reason, physicians need to be able to access more recent studies until these guidelines are updated. In 2004, the National Library of Medicine (NLM) updated PubMed for handheld computers (http://archive.nlm.nih.gov/proj/pmot/pmot.php). For those interested in expanding their knowledge on the subject, we suggest reading the review paper by Yen-Chiao Lu et al[7]. The paper suggests that the large-scale adoption of mobile computing has the potential to improve access to information, optimize the workflow process and improve the practice of evidence-based medicine.

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The following links can be accessed to download software and search information using the word "cardiology": www.handango.com; www.healthypalmpilot.com; www.mdnetguide.com; www.medspda.com; www.palmgear.com; www.pdamd.com; www.skyscape.com; www.epocrates.com; www.meistermed.com. Most medical software programs are developed in English, which may be a problem for some users. For a large number of physicians, the organizer feature alone is a strong enough reason to justify the purchase.

In cardiology, mainly in the acute coronary syndrome, there is an explosion of new therapies and interventions being developed. In order to help clinicians become familiar with the best evidence available and readily access appropriate treatment options, a few *Palm* software programs have been developed: "TIMI risk calculator", "cardiac checklist" and "ACS Trials in your Palm"[12]. Programs for the interpretation of electrocardiograms can reduce the time to reperfusion therapies. The National Heart, Lung and Blood Institute (http://www.nhlbi.nih.gov/health/prof/other/index.htm) provides interactive tools to access guidelines to control blood hypertension and cholesterol levels, among other things. The European Society of Cardiology (http://pocketgram.net/escardio), as well as the American College of Cardiology (http://www.acc.org/clinical/palm_download.htm) provide the appropriate guidelines on *Palm* devices.

Currently, any tool that enables ready access to the best available medical information is mandatory. Moreover, the learning process in the medical field is becoming increasingly complex and intensive, which means that students require more than ever to be able to quickly access the reference sources. Teachers are also under increasing time pressure to perform supervision and teaching duties. This has virtually turned the use of PDAs into a must in medical schools, both in Brazil and worldwide.

There are many different kinds of PDAs available in the market. They can be classified according to their operational systems. The two most popular ones are PalmOne (*Palm*) and Windows CE (*Pocket PC*). The differences between them are the processing speed, cost, memory size and the number of programs available. I have a PalmOne, with an additional memory card, which I chose due to its good cost-benefit. It is a personal choice, but I would suggest that the best PDA options available are those with color screens, the best resolution available and the largest memory size. Some PDAs have either a photo camera or a telephone built-in, or both. PalmOne offers a few models ranging from the simplest ones (lower processing speed and smaller memory size) with prices starting as from R$ 350,00 (Palm Zire 21), intermediate R$ 800,00 (Tungsten E2) to R$ 1.600,00 (Tungsten T), up to the most expensive ones (with cellular phones) and prices over R$ 2.400,00 (Treo 650).

With an eye to the future, the *Sociedade Brasileira de Cardiologia – SBC* (Brazilian Society of Cardiology) has taken steps forward and provided free courses on access to the Internet and reference sources[13] during the past five annual meetings, which has been done also by other medical associations. This has enabled more than 2.000 cardiologists to develop or expand their knowledge of the digital world, and made information and knowledge available to all of them. Besides the Great Studies and all SBC's Guidelines which are already being offered for the Palm systems, SBC will provide through its website two other products developed by its Technology Management Department. These are: the Digital Office System, which will allow SBC members to administer their offices either locally, through the Internet or their *Palm*; and SBC's Personal Scientific Programming System, which will enable participants in the annual meetings to tailor the entire scientific program of the meeting according to their needs, through the Internet or via *Palm*.

From my point of view, technology will continue to advance, with the development of increasingly faster and smaller PDAs. Most probably, *Palm* as well *Pocket PC* will continue to exist in the next five years, and there will be a market for both. Also, there should be a greater overlap of technology between cellular phones and PDAs. Continued medical education will advance further and will be available through PDAs or cell phones. In the next decades, wireless technology will expand further both in terms of speed and remote access services, which will reduce costs, as has happened with current computing.

My main concern is that this technology may lead some physicians to merely repeat the results of clinical studies. Such physicians may often try to avoid their obligation to examine the patient and rely instead on statistical information. It is fundamental that any prescription of treatment be based on acurate diagnosis, which requires examining, auscultating and listening to the patient.

This subject is too broad to be entirely covered here. I hope to have conveyed some of my enthusiasm to those colleagues who already use PDAs, as well as stimulated the curiosity of those who have not yet adopted these tools and encouraged them to pursue the technology. It is a must in the day-to-day routine of medical doctors and an indispensable tool for cardiologists.

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