A Virtual Ambulatory near the Patient: A Little Bag as Diagnosis and Digital Echography

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1. Purpose

To produce a medical system and equipment that is able to satisfy at home the needs of healthcare from an increasing elderly people with chronic pathologies and alone.

2. Materials and Methods

In Italy, the oldest country in the world (\textsuperscript{1}), over 60 years is 24.5\%, where the elderly people, with chronic pathologies needs of healthcare in different ways of Telemedicine (\textsuperscript{2}), and the emergency for Elderly alone need new professional roles of healthcare at home, as “social healthcare keeper”\textsuperscript{(3)}, and many applications of Tele-healthcare and Tele-diagnosis (4). We introduce an Ultrasound System (USy): a modular integrated system diagnosis in a PC for images diagnosis, acquisition and transmission signals within the healthcare assistance (Fig.1); 128 channels of digital real-time, high resolution ultrasound imaging; probes and software are from Terason Inc. (USA), while ECG, Spirometry and Pulse-Oxymetry are from QRS Diagnostic Inc (USA). It is a general purpose echo-graphic on outside the PC in Windows; the size is like the mobile phone; the sensor system is complete: linear plane, convex, endo-cavity, phased array. The most innovative feature is the micro miniaturized chip (Fig.2): high weight, costs and power waste reduction. The multifunction integration on a PC platform is under construction by Prisma Imaging Western Europe (Italy) and the modules in diagnosis can be integrated in desktop and laptop, in palm also for EDP (Fig.3). The software is compatible Microsoft Win2000 or XP OS and consequently it is easy to use, also it includes a dedicated Electronic Patient Folder.
3. Results

The Doctors demand medical systems and equipment easy to-use, low prices and modern technology in EDP and IT for acquisition and examination signals. *Diagnostic application fields: Radiology department-* the USy allows the to effectively and quickly provide expert diagnostic advice to other departments throughout the hospital without to move equipment, patients and physical records. *Cardiology:* the USy supports the diagnosis as a screening and diagnostic tool for carotid artery and other cardiac disease assessments. *Family Practice* or private Internal Medicine where is often not able to provide immediate ultrasound diagnostic services, due to the cost involved and complicated exam set-up processes inherent in traditional ultrasound equipment. Patients are often referred to hospitals. *The advantages:* the USy move data not patients! *The benefits:* minimizes ultrasound referrals, maximizes reimbursements; cost justified for the private practice. Cost reduction is mainly concentrated on transportation costs and social costs that are incurred when very young or elderly people have to be moved for diagnosis process: in these cases one operator can cover 8 patients per day. The operators are coordinated by the Telemedicine Centre and they work though organized and optimized “runways”. Referring to other existing equipments and tele-diagnostic systems, this is the one integrating morphologic (ultrasound images) with functional information in connection on-line with the Family Doctor and Hospital in a single, user-friendly, multimedia context. This multifunction diagnostic system works as the best ambulatory equipment. Tele-diagnostic systems already on the market are monitoring more than diagnostic tools. The Prisma Multifunction includes standard high capacity archives for images and signals (DICOM format) and more the transmission tools in a tele-radiology context. The Patient receives at home: *an ambulatory in a little bag* and many applications of diagnosis. The network connectivity is available to everyone, simple, reliable, low cost and high capillarity.

4. Conclusion

There are in Italy different projects in many healthcare companies (ASL), but few experiences have been consolidated in normal activity. In the future or already now it’s possible to use a monitoring system multi-parametric 24 hours with automatic identification of alarms and significant events for patient assisted at home by *an ambulatory in a little bag*

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6. References


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