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Remote Follow-up of Liver Transplant Patients: a Telemedicine Implementation Project in Latin America

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Abstract

The follow-up of patients with liver transplant is a complex task for any multidisciplinary team. Such complexity grows when patients live far away from the healthcare center area where this procedure was performed. In order to provide a greater quality of care for our patients, our primary objectives are the creation of an academic community network to improve the interaction between our transplant team and the remote care provider, and the creation of a clinical data repository using telemedicine. We developed a web based system, used by follow-up physicians to improve the quality of care and the follow-up of transplanted patients.

Keywords:

telemedicine, liver transplantation, follow-up

Introduction

The Hospital Italiano of Buenos Aires is internationally recognized among health care organizations as a care giving leader, and a referring educational and research center in Latin America.

625 liver transplants have been performed, transforming this hospital into a national and international center of reference.

It's a well known fact that the follow-up care of the patients with liver transplant by a multidisciplinary team is a daily complex task to deal with. This complexity increases considerably if the patient does not live in the city where the procedure was performed [1, 2].

This project aims to improve the quality of the care of our patients, through the interaction between our transplant team and follow-up professionals in charge, allowing referring doctors, during the monitoring, to access medical data of their patients. There is clear evidence of the effectiveness of telemedicine in improving the health of patients, giving support to their referring physicians, mainly when the geographic distances matter [3].

Materials and methods

By the end of 1999 the Hospital Italiano of Buenos Aires started the development of a Health Information System (HIS), and its most emblematic product is its Electronic Health Record "Itálica" [4, 5], which allowed the centralization of all the health care information of our patients. It's on our HIS where we set the basis to implement this liver transplanted patient follow-up system.

In addition, the Hospital has a very well trained multidisciplinary team that provides comprehensive care to each patient, from the evaluation visit through the transplant procedure and postoperative period. In this follow-up instance is where required learned skills are difficult to transmit to a third-party team.

Finally, we have a network of teams, each one conformed by physicians located outside the area of Buenos Aires, which refer us the patients. These associated providers continue monitoring the evolution when the patients return to their home places.

We have decided to develop a web based system, supported by the data modeling established in our HIS, to allow the referring physicians, in different cities, to access all the health care information of their patients, as well as to update it.

Liver transplant program processes

Including a patient into our liver transplantation follow-up system is not a complex task. The system has a representation of the stages which a liver transplanted patient must pass through. It consists of five stages: (1) Patient Enrolling, (2) Aptitude Evaluation, (3) Pre-Transplant Waiting List, (4) Transplant, (5) Post-Transplant Follow-up List.

Local data registry system

The system was designed to represent all the stages in the liver program; in addition it incorporates one more instance that allows the referring doctor's office to record what happens in the follow-up visit.

Enrollment of patients refers to the capture of certain administrative data (for example the allocation of the med-

ical team that will continue with the monitoring) and medical data (diagnosis pre-evaluation, etc.). The data is required by the Liver Program, supported by our Hospital Master Patient Index [6], based on CORBAmed [7, 8].

All data is loaded by physicians of our institution, registered in our HIS, and then, associated with other patient's medical data in the Electronic Health Record (EHR).

Remote visualization and data registry system

Once data is generated, referring doctors may visualize this information along with the rest of the patient's EHR data, from their offices via Internet. They access the system through a connection established on a VPN (Virtual Private Network) [9].

The remote data entry module is used by the referring physicians, and allows them to record any medical events during the period between Hospital Visits. They may also load results of complementary studies, either by typing or by digitalization of all the information that the patient can require.

For this last issue we had to develop an archive storage system (text documents, images, videos, etc.) that includes a viewer of JPEG images and DICOM files, which allows us to reproduce a CT scan or MRI console in practically any PC used as Workstation.

Technological requirements

We have developed our system under the security standards established by Windows XP SP2, and we considered necessary, for an optimal performance, a Pentium IV with a 512 Mb RAM. The minimum connection requirement is at least 256 Kbps of broadband connection.

Results and discussion

Today we have connected two distant monitoring medical teams of our patients, one within the province of Buenos Aires (República Argentina) and other one in Montevideo (República Oriental del Uruguay). The team at Montevideo is monitoring 78 Uruguayan patients transplanted in our Hospital. At the closure of the present work, we have 410 enrolled patients in the Transplant Program.

We have reviewed some experiences using telemedicine to follow-up and to assist patients [10], but we have not found references in the literature about the use of these applications for the remote monitoring of patients with liver transplant. We hoped that the implementation of this type of solutions can settle an improvement in the quality of the care of our patients, bringing assistance to distant doctors thanks to new TIC's.

On the other hand, we are in an experimental stage, running the program in a pilot level and still we know that we depend on the interaction and commitment of the distant medical team, nevertheless we clearly believe that this tool will contribute much to fulfill one of our main institutional objectives: the continuous search for the best quality of patient care.

There is no way to believe that the system will replace contact between the referring doctors and our local transplant team, but is a complement for the daily transdisciplinary work.

We expect to generate an academic and clinical community, which allows care givers access the patients' medical records with this remote data entry module. Today we have been using it in the follow-up of patients with liver transplant; but we think that it might be able to support any kind of patients. We state for sure that it could be the beginning of the remote consultation to the EHR of our patients.

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