Chapter 32
Endoscopic Imaging Results: Web-Based Solution for Video Diffusion with Real-Time Assistance

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ABSTRACT

The technological evolution seen in the past years led to an increase in the number therapeutic and diagnostic tests. In this paper a new solution for storage, diffusion, and real-time remote assistance in endoscopic exams is presented. The aim is to solve the problem of endoscopic examinations not being archived and easily accessed anywhere within a health care network by authorized health care professionals and researchers. Solving that problem avoids unneeded repetition of unpleasant exams and allows the comparison of video segments with future procedures. The presented solution also allows the streaming and real-time remote assistance of exams being carried out. This way health care professionals can contribute with their expertise even if they cannot attend onsite.

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INTRODUCTION

Therapeutic and diagnostic tests play a key role in health care delivery, helping the physician validate the diagnostic hypothesis (Bickley & Szilagyi, 2012). Nowadays and with the technological evolution seen in the past years, the number of therapeutic and diagnostic tests prescribed/performed is growing increasingly (T. L. de S. Pereira, 2011; Pisco, 2007). Frequently the knowledge resulting from every medical practice and/or from therapeutic and diagnostic tests is not reused. This can be related to how the information is stored (e.g. paper, CD/DVD) or simply due to forgetfulness of its existence. These two reasons, occasionally contribute to an unnecessary repetition of therapeutic and diagnostic tests (D. Pereira, Nascimento, & Gomes, 2011). The lack of information sharing between different entities and health care professionals can also be considered another reason for the needless repetition of the referred procedures (Rocha, 2007).

Most of the Information Technology (IT) infrastructures in health care entities do not allow any remote real-time attendance by other professionals during the therapeutic and diagnostic tests due to the lack of specialized equipment. The absence of these functionalities means that all the involved professionals have to be present during the procedure, adding avoidable expenses.

In the last decades, the scientific and technological developments in the medical field have been remarkable, especially in the digestive endoscopy. The development of new materials and equipment led this technique to ceased to be only a diagnostic endoscopic procedure and also make it a therapeutic endoscopic procedure. The progress in the branch of gastroenterology made it a medical specialty with a substantial technical nature, which is based in a diversity of exams to diagnose and treat diseases of GI tract (Ministério da Saúde & Administração Central do Sistema de Saúde (I.P.), 2008).

There are many imaging based therapeutic and diagnostic tests (e.g. CT scans, X-ray, ultrasound, endoscopy). Among them is the EsophagoGastroDuodenoscopy (EGD), which presents low cost and good results (Axon, 2008; Laranjo et al., 2013). Endoscopy is a diagnostic test that aims to obtain a diagnosis and/or perform therapeutic procedures. It is considered an important diagnostic tool in various branches of medicine (e.g. gastroenterology, surgery, urology, gynaecology) because it allows the specialist to study and record images of organs (e.g. stomach, lung, bladder), as well as doing biopsies, remove polyps or foreign bodies (Avunduk, 2002; Olympus, 2002).

The digestive endoscopy covers the EGD (visualizes the upper part of the GastroIntestinal (GI) tract), Colonoscopy (examination the large bowel and the distal part of the small bowel), Endoscopic Retrograde CholangioPancreatography (ERCP) (study of biliary or pancreatic ductal systems), Enteroscopy (study of small bowel) (Cotton & Williams, 2008). Wireless Capsule Endoscopy (WCE) that is a technology to record videos and images covers the parts of GI tract that cannot be visualized through other types of endoscopy (Mackiewicz, 2011).

Technically, EGD and Colonoscopy are performed using a thin and flexible tube called endoscope, that has a light source and a very small video camera housed in its distal tip, thus allowing the visualization of the mucosa through the other end of the apparatus or in a video monitor (Brugge, 2009; Olympus, 2002). This technique requires manipulation by the gastroenterologist, with both hands to manipulate the endoscope, and with the feet to capture frames. Regardless of the color recognition system used (sequential or non-sequential (Cotton & Williams, 2008)), the electrical signal captured by the Charge