Chapter 22
Implementation of Telecytology in Georgia

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ABSTRACT

The field of e-Health is rapidly evolving. The new models and protocols of application of info-communication technologies for healthcare purposes are developed. Despite of obvious advantages and benefits, practical application of e-Health and its possibilities in everyday practice are slow. Much progress has been made around the world in the field of digital imaging and virtual slides. But in Georgia, telecytology is still in evolving stages. It revolves around static telecytology. It has been revealed that the application of easy available and adaptable technology together with the improvement of the infrastructure conditions is the essential basis for telecytology. This is a very useful and applicable tool for consulting on difficult cases. Telecytology has significantly increased knowledge exchange and thereby ensured a better medical service. The chapter aims description of practical application of telecytology under conditions of Georgia.

INTRODUCTION

Telecytology is a branch of telemedicine that consists in the exchange of microscopy digital images through telecommunication with the purposes of diagnosis, consultation, research and/or education. The concept of telecytology to provide diagnostic services to remote locations was first described in the USA in 1968, when monochrome images were transmitted in real time using a dedicated point to point microwave link. In little more than a decade telecytology has developed from the prototype commercial system first described in 1986 to today's multimedia computers which can be purchased 'off the shelf' at very low prices and can be used as the basis of telecytology systems (Furness, 1997). There are technological concerns which may prevent the acceptance of telecytology by cytologists and thus hinder its application within the routine environment. Some cytologists believe that telecytology is too expensive and that it does not have a useful role in routine cytology.

Others have doubted if computer monitors can be used for making a diagnosis, although results have shown no significant difference between a cytologist's performance using a microscope and using a digital image (Coleman, 2009). Many of the concerns expressed about the use of telecytology are not derived from knowledge. There is a need to involve as many cytologists as possible in the use of these systems, particularly cytologists working in routine services roles. Many cytologists believe that fast access to expert opinion is the key to reducing the numbers of diagnostic errors, which have been estimated at up to 5%. Although most of these are not necessarily critical to the patient, some could be.

There is a very clear need for the expanded application of information technology (IT) in healthcare. Clinical workflow still depends largely on manual, paper-based medical record systems, which is economically inefficient and produces significant variances in medical outcomes (Banta, 2003; Detmer, 2000; Detmer, 2001).

Quality assurance programs in cytology are one of the most important methods to maintain and improve the diagnostic acumen of cytotechnologists and cytologists, but there are difficulties in carrying out such programs. A long turnaround time for the circulation of glass slides is a major drawback. It is well known, that it is prolonged in the case of large number of participants and widely spread institutions. The use of photographed slides has been a partial, but unsatisfactory solution because of costs and delays in preparation. Nowadays digital images acquire more and more importance for morphology practice.

BACKGROUND

It is well known, that telecytology may be static (store and forward), dynamic (real-time), or hybrid. Store and forward telecytology is a less efficient method but there have been isolated reports of a concordance of as high as 95-100% between glass slide and telecytology diagnosis (Rocha et al, 2009; Raab et al, 1996). It has limitations because of the disjointed nature of the images, and the diagnostic errors incurred with this method have been attributed to inappropriate field selection by the submitting cytologist. Dynamic telecytology using fully motorized robotic systems, through cost-prohibitive, has revolutionized the field, and a concordance rate of 99-100% has been reported between telecytology and light microscopy diagnosis. The fully motorized robotic systems are a cost-prohibitive for Georgia, but they are used very routinely in other locations, especially in countries with middle and high incomes. Hybrid systems use virtual slides (so called whole slide images – WSI) and in various studies the diagnostic efficacy was shown. The 'virtual slides' are entirely digitalized glass slides at a very high resolution and can be viewed by multiple cytologists and without any loss of resolution.

The applications of telecytology, like those of telemedicine can be classified into four major groups: primary opinion (first diagnosis on a case), second opinion (expert opinion about a case), third opinion (expert group opinion/discussion about a case) and distance learning. The most frequently use case of telecytology is the second opinion. In remote and rural areas where because of economic reasons, one cannot afford to have a competent cytologist, telecytology is considered to be a boon. eLearning in cytology has also gained acceptance. Telecytology has been used for research applications, distance education, remote consultations with astounding success (Coleman, 2009; Rocha et al, 2009; Weinstein et al, 2009).

Georgia is not lagging far behind in the field of telecytology. The first telecytology consultation was done in 2003. Since then a number of distance consultations were implemented.

Digital images acquire more and more importance for morphology practice. They can be easily captured by the conventional digital camera, so by the specific hardware (slide scanner, robotic microscope and etc.). By application of digital

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