

The web based archive of digital images of laryngeal and eye diseases

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Abstract

Medical image management is one of the hottest areas in the medical device market, which is experiencing a high degree of dynamism and competition. Otolaryngology and ophthalmology are well positioned to take advantage of telemedicine and images archiving and transmission using telemedicine and Internet facilities because diagnostics in these specialties is mostly based on evaluation of the live images and graphical data.

Purpose: An international Baltic MedWeb project was devoted to the creation of Internet based data archive of the images of laryngeal and eye diseases.

Material and methods: Several alternatives of obtaining and collecting medical images were used: "frozen" still pictures from video laryngostroboscopic examination, images from surgical microscope and slit lamp as well as CT and MRI data. The images are systemized and archived according the classification of laryngeal and eye diseases.

Results: Up to date about 1500 clinical cases containing more than 8000 digital clinical images of various laryngeal and eye diseases are included into the structural systematical archive.

Conclusions: The benefit of international Baltic MedWeb project consists of implementation of new technologies and possibilities for education, consultations for medical society and finally, for the best medical care for the patients.

Key words: educational databases, image management, telemedicine, larynx, eyes.

Introduction

Medical image management is one of the hottest areas in the medical device market, which is experiencing a high degree of dynamism and competition [1,2]. Otolaryngology and ophthalmology are well positioned to take advantage of telemedicine and Internet images transmission because diagnostics in these specialties is mostly based on evaluation of the live images and graphical data [3-6].

The task of an international Baltic MedWeb project is to create an Internet based data archive of the images of laryngeal and eye diseases. This project was running in cooperation among the Departments of Otolaryngology and Ophthalmology of Kaunas University of Medicine, Kaunas University of Technology (Lithuania) and Euromed Networks AB (Sweden) and supported by Stockholm County Council.

Materials and methods

The medical images were collected using telemedicine systems (Euromed Eurotel I), which are connected with medical examination devices. Telemedicine systems are equipped with frame grabbers (Matrox Meteor II) for image digitalization. Several alternatives of obtaining and collecting medical images were used: "frozen" still pictures from video laryngostroboscopic examination (KAY Elemetrics RLS model 9100) of the laryngeal patients, images from surgical microscope (Moller-Wedel Universa 300 and 3CCD video camera attached) obtained during direct microlaryngoscopy under general anesthesia as well as CT and MRI data of the same patients. Images of eye diseases were obtained using slit lamp (Topcon SL-8Z) with 3CCD video camera (Sony DXC-950P) attached.

The specialized software was used for acquisition of images and formation of clinical objects-cases. The "cases" consisted of information related to the patient's clinical data (history, complains etc.) and information related to the images itself (comments, explanations, technical data). The images were

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systemized and archived according to the working classification of laryngeal and eye diseases.

The cases were stored in relational databases: local (MS Access) and central (MS SQL Server 2000). Also all descriptions of the fields of the input form to the database were stored in the database itself. This feature allows the connection of different clients and dynamic formation of the data input forms. The central database is linked with Web server (MS IIS server), thus updated database can be reached immediately using Web based interface. Web based interface is used for user authorization as well as for browsing and searching the educational database.

Results and discussion

The demand for contemporary, systemized and highly qualified medical information for medical students, specialists, researchers, teachers and other people working in the field of health care has rapidly increased. Evaluation of the clinical images is extremely important in diagnostics of laryngeal and eye diseases. Therefore both, otolaryngology and ophthalmology are uniquely positioned to use effectively the benefits of images archiving and transmission using telemedicine and Internet facilities.

An international Baltic MedWeb project was a fruitful extension of previous pilot Swedish-Lithuanian telemedicine Litmed project [7]. Consequently, in Baltic MedWeb project less effort was needed to build working team and infrastructure. Therefore, Baltic MedWeb project was devoted to the creation of Internet based data archive of the images of laryngeal and eye diseases and concentrated on software solution development, involving new medical specialties and intercommunication.

Up to date about 1500 clinical cases containing more than 8000 digital clinical images of various laryngeal and eye diseases are included into the digital archive.

An extensive database of clinical images collected in systematic structure has a great value not only for education of medical students, but for improvement of the qualification of medical specialists, as well.

Collection and archiving of medical images of rare clinical cases (diseases) would allow sharing an experience with colleagues from other medical institutions.

Another very important feature of the archiving of laryngeal images is the possibility of documentation of the results of laryngeal microsurgical operations. This allows explaining and discussing the result of the operation with the patient. The possibility to document and discuss later consequent steps of the operation contains a great educational potential for practical training of residents and young physicians. Moreover, such archive of pre-surgical and post-surgical laryngeal images could be of great importance in some difficult contentious medico-legal situations.

The ophthalmologic database has been created in order to promote and facilitate the development and implementation of training, professional development and information programs for eye-disease patients. This database will assist the general practitioners to diagnose and differentiate acute eye diseases.

In addition, the practical integration of Internet based

archive of images of laryngeal and eye diseases with electronic patient records, hospital information system and connection to picture archiving communication systems will form the basis for the development of decision support system [1,2,9]. The case based reasoning is particularly suitable approach to problem solving and learning in decision support systems [10].

Conclusions

At the present the benefit of international Baltic MedWeb project consists of implementation of new technologies and possibilities for education, consultations for medical society and finally, for the best medical care for the patients. The utility of Baltic MedWeb project is based on international and very fast exchange of information, participation in distant education.

The use of Baltic MedWeb archive of images of laryngeal and eye diseases in combination with Web technology is certainly among the factors that will make these technologies to be available to mainstream hospitals and medical universities.

Acknowledgements

The Baltic MedWeb project was supported by Stockholm County Council (Sweden).

References

1. Frund R, Techert J, Strotzer M, Borner W, Tsakpinis A, Feuerbach S. The PACS concept of the University of Regensburg. *Rofo Fortschr Geb Rongenstr Neuer Bilgeb Verfahr*, 2001; 173: 363-7.
2. Schmidt H, Kraff W, Stasche N. Digital image archiving – concept of digital image and video documentation in ENT. A contribution to quality assurance. *HNO*, 1999; 47: 541-5.
3. Fried MP. The challenges and potential of otolaryngological telemedicine. *Arch Otolaryngol Head Neck Surg*, 2001; 127: 336-8.
4. Fuchs M, Strauss G, Werner T, Boote F. Teleteaching in otorhinolaryngology. Part 2. The European database “medicstream”. *HNO*, 2003; 51: 104-12.
5. Goldenberg D, Wenig BL. Telemedicine in otolaryngology. *Am J Otolaryngol*, 2002; 23: 35-43.
6. Holtel MR, Berrgess LP. Telemedicine in otolaryngology. *Otolaryngol Clin Norht Am*, 2002; 35:1263-81.
7. Paunksnis A, Barzdzikus V, Kurapkiene S, Gričius R, Cimbalsas A, Uloza V, Lukosevicius A, Almquist L-O, Blomdahl S, Calissendorff B, Varnauskas E. Cooperation between Lithuania and Sweden in telemedicine (Litmed project). [In:] *Proceedings Int Conf Biomed Engineering, Kaunas*, 2000, p.3-7.
8. Smith RV. The digital camera in clinical practice. *Otolaryngol Clin North Am*, 2002; 35: 1175-89.
9. Baum ED, Becker DG, Kennedy DW. An Internet otolaryngology referral center: a preliminary report. *Am J Rhinol*, 2003; 17: 251-6.
10. Althoff K-D, Bergmann R, Wess S, Manago M, Auriol E, Larichev O, Bolotov K, Zhuravlev Y, Gurov A. Case-based reasoning for medical decision support tasks: the INRECA approach. *Artif Intilig Medicine*, 1998; 12: 25-41.