Telemedicine in Laryngology: Remote Evaluation of Voice Disorders
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ABSTRACT

Objectives: To describe the set-up, execution, and application of telemedicine in evaluating voice disorders.

Study Design: Prospective case series.

Methods: Two long distance evaluations were performed using audio, video, internet streaming, and internet encoding and decoding technology. Both patients were examined at our tertiary care center via flexible fiberoptic laryngoscopy with stroboscopy and the audio and video was streamed in real time to distant locations for consultative review. A piano accompanist was able to perform with the patient at a remote location using similar technology.

Results: Both patients were able to undergo live, interactive evaluation with physicians and speech language pathologists in both locations. Cloud technology was also demonstrated.

Conclusions: Telemedicine in laryngology is a technologically feasible and useful way to provide patient care. Access to this technology will continue to grow as costs decrease.

METHODS

- Two unique, remote laryngological evaluations were performed using state of the art technology during two national voice and laryngology meetings.
- A vocalist performed with piano accompaniment in the voice studio at Cleveland Clinic.
- Audio and video of vocalist was transmitted live over the internet to Symposium via HD encoding.
- Piano performance (MIDI) transmitted to Yamaha Grand Piano at conference location, accompanying vocal performance.
- A Strobe exam of the vocalist broadcast live over the internet from Cleveland Clinic vocal studio to Symposium.
- After HD decoding, physicians at the conference watched the procedure, interacted with patient, and provided diagnosis and treatment plan.
- Both real-time and cloud based, store and review, technology was employed.
- Representatives from software, scope, and archiving systems were present for both demonstrations. We worked collaboratively with IT and AV staff at both locations.

RESULTS

- Stroboscopic images and audio as well as music from instrument is captured into archival system and the encoded via HD video encoder software.
- This is then transmitted via internet to remote computer with decoding software. Image and audio is then shown via AV equipment (can be done in real-time or via cloud based technology).
- Both real-time and cloud based technology were demonstrated.
- Audience participation was easily facilitated and remote patient – audience interaction was successfully demonstrated. This was done using standard teleconferencing equipment including a separate camera and computer link such as Skype.

DISCUSSION

Telemedicine in otolaryngology is becoming a feasible means of delivering health care. The precedent for this has been set in remote areas like Alaska and during times of crisis such as Hurricane Katrina in Louisiana. The Alaska Native Medical Center (ANMC) has employed telemedicine to follow up with patients s/p PE tube placement and has found telemedicine to decrease wait times for subspecialty care by 50% 1,2.

Following Hurricane Katrina, there was no subspecialty neuro-otology care in Louisiana. Arraga et al describe the establishment of a telemedicine clinic from Pittsburgh that allowed for consultation and scheduling of procedures3.

Laryngology is well situated to continue this trend. Telemedicine in laryngology has the potential to improve access to patients in rural locations and to professional voice users who may be travelling/performing far from their home.

Herein, we describe the set-up of two unique patient evaluations using video-stroboscopy, remote control of musical accompaniment to evaluate two singers. We also utilized both real-time interaction and cloud based, store and review capabilities for this type of evaluation. This represents the first description of such a setup.

CONCLUSION

- Telemedicine in Laryngology is technologically feasible.
- Both real-time interaction and cloud-based, store and review capabilities can be successful.
- Enhanced patient access to subspecialty laryngological care is possible.
- May be an excellent option for professional voice users with busy travel schedules or patients in remote locations with limited travel resources.
- Current limitation may be cost, but costs expected to decrease as technology becomes more available and bandwidth and speed increases.
- Secure, password protection is essential for protecting patient information and maintaining HIPAA compliance.

REFERENCES