Telehealth Applications in Head and Neck Oncology

La télésanté au service de l'oncologie de la tête et du cou

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Abstract

Telehealth is increasingly used to provide healthcare services to people living in remote locations. This article describes the use of telehealth technology to provide speech-language pathology services to people living with head and neck cancer.

Abrégé

Les professionnels ont de plus en plus recours à la télésanté pour offrir des services de santé aux personnes qui habitent en région éloignée. Le présent article décrit la façon dont la technologie peut servir à offrir des services d'orthophonie à des personnes atteintes d'un cancer de la tête et du cou.

Key Words: telehealth, clinical services, head and neck cancer, rural health care, laryngectomy

Head and neck cancers and their treatment can have significant consequences for patients in the areas of communication, eating and swallowing, and appearance, not to mention overall quality of life (Doyle, 1994, 1999). Professional and peer support is critical for one's adjustment to the effects of the disease and treatment. Because head and neck cancers are relatively less common than other types/sites of malignancy, individuals living in remote communities may feel isolated by lack of access to both health care services in general and to the specialised supports necessary for them to regain their lives. This potential isolation may reduce the success of rehabilitation with subsequent reduction in overall satisfaction with care provided and resultant quality of life. Telehealth technology is one way to bridge this gap.

Telehealth is defined as "the use of information and communications technology to deliver health and healthcare services and information over large and small distances" (Picot, 1998). Telehealth uses videoconferencing technology to link people to health care expertise at a distance. Satellite or ground links are used to enable both the provider and the recipient to see, hear, and talk to one another. Specialized equipment such as digital stethoscopes and otoscopes, cameras, and document scanners can enhance assessment and information provision. Telehealth offers the ability to provide patient care, information, and support to individuals and their families living in remote communities, on a more frequent, less costly, and less inconvenient basis for the patient and members of his or her family (www.mbtelehealth.ca/links.php). Telehealth has been used successfully in various medical areas such as diagnostic imaging, otolaryngology, neurology, pediatrics, and oncology (Roine, Ohinmaa, & Hailey, 2001; Weinerman, den Duyf, & Hughes, 2003).

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Telehealth applications related to speech-language pathology services have been documented in the areas of neurogenic communication disorders (Duffy, Werven, & Aronson, 1997), voice disorders (Mashima, Birkmire-Peters, Holtel, & Syms, 1999), fluency (Kully, 2000, 2002), and developmental speech and language disorders (Jessiman, 2003; McCullough, 2001; Scheiderman-Miller & Clark, 2000). Hill and Theodorus (2002) reviewed 13 studies on the use of telehealth in speech-language pathology and concluded that the reviewed studies, although providing positive or encouraging outcomes, failed to provide cost-benefit information or evaluation of the technology itself. Further, there was an absence of studies on the educational or informational aspects of telehealth, and a limited range of communication disorders for which telehealth use has been documented. To date, there are no published studies on the use of telehealth for head and neck cancer rehabilitation.

Receiving adequate follow-up and rehabilitation is a challenge for the person living with head and neck cancer. Because of the potential level of communication disability that is often encountered following treatment for head and neck cancer, the importance of receiving such services is even more dramatic for those who reside in rural or remote communities. This concern is of particular importance to remote areas of Manitoba, where access to specialized expertise is often unavailable. It is estimated that approximately 30% of Manitobans must travel a distance to access medical expertise (Manitoba Government, Ministry of Health). Such travel can be expensive, inconvenient (particularly when another family member is required to provide transportation), stressful, and sometimes hazardous due to inclement weather conditions. Additionally, telephone contact with such patients can be ineffective, since one's speech capacity and/or intelligibility may be very poor, particularly early in the course of rehabilitation. Furthermore, many patients may not have access to computer technology such as the Internet or electronic mail (e-mail) or have low literacy levels and, therefore, cannot gain as much from the provision of traditional written information. Telehealth provides video as well as audio capabilities that enhance the spoken message and increase speech reception. It also may provide a critical "human" link for those who exhibit substantial potential for isolation that may foster improved outcomes. For these reasons, telehealth technology was selected for use with several individuals who were living with head and neck cancer. The following case examples describe how telehealth was used to provide services to this important clinical population who were living in remote communities of Manitoba.

Case Presentations

Case 1: This case involves the provision of speech rehabilitation and psychosocial support for a person who had undergone a total laryngectomy. JH, a 55-year-old male, had undergone total laryngectomy and radical neck dissection in February 2002. Prior to laryngectomy, JH had undergone chemoradiation that was unsuccessful. He had worked full-time in sales prior to his surgery, and was subsequently unable to return to work due to lack of speech. Due to postoperative healing complications, his surgeon opted to wait one year postsurgery before considering a tracheoesophageal puncture (TEP) for voice restoration (Singer & Blom, 1980). At the time of the initial contact, JH was using writing and mouthing words as his primary means of communication and he was unable to use the telephone. Speech rehabilitation focused on effective use of an electrolarynx and development of esophageal speech (Doyle, 1994). JH and his spouse also were experiencing numerous difficulties adjusting to physical, social, and life-style changes as a result of the surgery, including communication difficulties, problems with stoma care, fatigue, depression, and loss of usual vocational activity.

In-person speech rehabilitation sessions with the speech-language pathologist were arranged in conjunction with his surgical follow-up appointments at CancerCare Manitoba (CCMB), approximately every two to three months. In addition, two-day, back-to-back appointments were scheduled monthly with the speech-language pathologist and social worker at CCMB. JH's home community was 11 hours by bus from CCMB. Costs for these visits were significant (i.e., a return trip was $370.00 by bus, or $700.00 by air) and this cost was doubled because he required an escort to facilitate with communication enroute. Speech-language pathology services were available in CH's home community. However, it was at a maximum frequency of once per month and by a new clinician without any experience working with adults who had undergone a laryngectomy. Additional telephone follow-up was attempted; however, the patient's speech was extremely unintelligible, and face-to-face communication was necessary to maximize the effectiveness of communicative interactions.

Telehealth sessions via videoconferencing were scheduled, with the patient at the telehealth site in his local health care facility and the speech-language pathologist at CCMB. The telehealth coordinator at each site provided technical support, ensuring adequate audio-visual quality, while the speech-language pathologist conducted the speech therapy session, and the social worker subsequently provided psychoeducational support and counselling to the patient and his wife. Sessions were conducted on a weekly or bi-weekly basis. On one occasion, a well-rehabilitated laryngectomized peer support worker attended the session with the speech-language pathologist and provided information as needed. JH attended his sessions with various others in attendance, including his wife, his son, a neighbour, and local health care staff, who were unfamiliar with JH's anatomical and physiological changes postlaryngectomy (e.g., neck breather status), and were interested in learning how to assist in his care. JH was eager to educate family and community health workers about his condition. The local speech-language pathologist attended on two occasions as well, in order to increase her knowledge of speech rehabilitation techniques and supportive counselling for a newly laryngectomized individual and his family.

During one speech therapy session, JH reported feeling ill and subsequently became unresponsive. The clinician in the urban site was able to coach the spouse on ensuring airway patency while awaiting medical response in the remote site hospital. This information was also conveyed to attending first responders. JH was successfully treated for obstructive mucus plugs in emergency and resumed his therapy the next week. This occurrence reinforced the importance of conveying specific and important clinical information to remote healthcare providers and family members who may be unfamiliar with such medical needs.

Summary: This specific case illustrates several advantages of telehealth applications including provision of: (1) speech rehabilitation and psychosocial support to patients and members of their families in remote locations on a less costly and more frequent basis, (2) ongoing education of patient, family, community members, and local health care providers on the anatomical, physiological, and psychosocial consequences of laryngectomy (e.g., stoma care, artificial respiration for total neck breathers) and on enhancing communicative exchanges with alaryngeal speakers, (3) peer support for the patient and family, and (4) consultation and education for clinicians with limited experience in specialized clinical areas.

Case 2: This case illustrates the provision of therapy, psychosocial support, and education for a patient (AB), aged 45, who underwent radical chemoradiotherapy for a T1 N2b tonsillar tumour. AB completed treatment in January 2002, which resulted in persistent severe dysphagia and xerostomia, and an altered sense of taste, necessitating permanent gastrostomy tube feeding. AB also had severe dysphonia secondary to radiation therapy, with reduced vocal endurance and voice loss associated with voice use. Just prior to his cancer diagnosis, AB had accepted a teaching position in his local community, and was subsequently unable to work due to severe complications from his treatment (i.e., dysphonia, depression, ongoing fatigue, and pain). AB experienced difficulty coping with and adjusting to the profound physiological and lifestyle changes. He attended CCMB every 3 months to monitor his cancer status, and during these visits, connected with the speech-language pathologist and social worker.

Summary: For AB, telehealth sessions were arranged to provide more frequent psychosocial support and rehabilitation services to promote ongoing improvement of voice and swallowing abilities. Information provision and general counselling were essential elements of the telehealth service provision. These services were not available in his home community, a distance of 950 km round trip from CCMB, hence the telehealth provided access to health care services that might have otherwise been unavailable without considerable time and expense.

Case 3: This final case demonstrates the unique provision of clinical care that involved a technical component, that is, the change of a TEP voice prosthesis via telehealth. RA, a 76-year-old male, underwent total laryngectomy with primary tracheoesophageal (TEP) voice restoration in 2001 (Hamaker, Singer, Blom, & Daniels, 1985; Yoshida, Hamaker, Singer, Blom, & Charles, 1989). The TEP is a method of postlaryngectomy voice restoration that involves placement of a one-way silicone valve in a puncture site within the trachea (Blom & Hamaker, 1996; Blom, Singer, & Hamaker, 1988). The procedure allows pulmonary air to flow into the esophageal reservoir and produce vibration of the upper esophagus for alaryngeal voice generation and resultant speech.

Due to postoperative infections and secondary wound healing problems associated with multiple postoperative graft reconstructions, RA had a deeply recessed TEP site. The location of the TEP made it impossible to secure the strap of a standard prosthesis to the suprastomal skin. An "indwelling" type of prosthesis (InHealth Technologies, Carpenteria, CA) was deemed to be the prosthesis of choice since it could be safely used with the strap removed (Blom, 1994, 1996, 2000; Leder & Erskin, 1997).

The indwelling prosthesis is a more secure TEP prosthesis, but generally requires placement by the speech-language pathologist and/or the surgeon (Blom, 2000). RA was unable to do his own stoma care or TEP management due to severe hand tremor subsequent to Parkinson's Disease. Although RA's daughter was trained in prosthesis care and troubleshooting, she was reluctant to learn prosthesis removal and re-insertion. In order to control fungal growth on the prosthesis, which can cause premature leakage and subsequent aspiration, the surgical oncologist prescribed a rinse of oral Nystatin once daily to control candidiasis as per the standard voice restoration protocol (Blom & Hamaker, 1996; Blom & Singer, 1986; Mahieu, van Saene, Rosingh, & Schutte, 1986).

Once the TEP tract length was stable, RA had an average prosthesis lifespan of 3-4 months. The patient and his family came to CCMB for routine prosthesis changes. RA tolerated the indwelling prosthesis well and was eventually able to use the TEP as his primary method of verbal communication with ease and excellent speech intelligibility.

RA then experienced an unrelated infection requiring antibiotic treatment. He developed a prosthesis leak which was assumed to be due to the formation of Candida deposits on the prosthesis valve tip and subsequent to the use of antibiotics (Blom & Hamaker, 1996).

A damaged prosthesis can cause leakage of oral contents (including saliva, liquids, and occasionally food) into the airway via the TEP voice prosthesis and subsequently lead to respiratory infection (Andrews, Mickel, Monahan, Hanson, & Ward, 1987). RA had had respiratory difficulties postoperatively and, thus, controlling aspiration was immediately necessary. While in some cases, application of a Blom-Singer "valved insert" into a leaking TEP prosthesis can be applied to prevent leakage through the device, RA was unable to wear this prosthesis insert due to his deeply recessed puncture site.

As a result of this problem, the options were: (1) to leave the prosthesis in situ until RA could come to CCMB for a prosthesis change which would increase the risk of an infection in the meantime, (2) have the prosthesis removed by a local physician and the TEP tract occluded

with a catheter, which would stop the leak but eliminate voicing, or (3) attempt to change the prosthesis via telehealth, with the CCMB clinician coaching RA's daughter through the procedure. Because RA resided 950 km round trip from CCMB, the family was unable to travel to CCMB for an immediate prosthesis change, and furthermore, had had plans to attend a family wedding in another town the next day. RA required a prosthesis change to allow safe oral intake and management of oral secretions, as well as meeting his desire to have the ability to talk via his TEP with family members who would be attending the wedding.

A telehealth session via videoconferencing was immediately arranged. The remote site coordinator and RA's daughter ensured the availability of the required supplies: a replacement indwelling prosthesis of the appropriate size, a gel-cap loading device, two pairs of mosquito or Kelly forceps (for prosthesis removal), water-based gel, and a size 22 Fr stent or dilator. The stent was not available; however, a 22 Fr Foley catheter was obtained from the hospital to be used to stent the TEP site and dilate the tract prior to insertion of the new TEP prosthesis.

The telehealth session took place in the patient's community hospital. Telehealth facilitators provided adequate lighting and close up and still digital images to allow for accurate assessment of the TEP site. A local hospital nurse was available. A community nurse familiar to the patient and a nursing student attended for educational purposes.

The nature of the leakage (through the prosthesis) was assessed with a close-up view of the patient taking sips of liquid. The prosthesis fit was assessed by having the daughter gently pull the tracheal end of the existing prosthesis, and the clinician gauging the adequacy of the length of the prosthesis from the urban location. The prosthesis size had been stable in recent months and was presently judged to be appropriate. RA's daughter conducted the prosthesis change and confirmed placement of the device, with the clinician monitoring and instructing the daughter in a step-by-step fashion from the urban Telehealth link. Demonstration by the CCMB clinician (e.g., gel cap loading) and use of scanned documents were provided as needed.

Summary: The patient was comfortable and tolerated the procedure well. The procedure took approximately 50 minutes. The patient was discharged with an intact, functioning TEP voice prosthesis, intelligible and fluent speech, and the restored ability to safely consume food and fluids. The session was videotaped for teaching purposes with the consent of the patient and family. The success of this proxy procedure for the removal and reinsertion of a new TEP voice prosthesis supports the potential application of telehealth practices for some "hands-on" procedures provided adequate professional personnel are available for direct consultation on-site.

Discussion

The preceding three cases presentation demonstrate the potential for varied types of clinical service provision via the application of telehealth technology to the rehabilitation and management of persons with head and neck cancer. All three individuals had services provided by a highly experienced speech-language pathologist located at an external site. Specifically, telehealth was used to provide voice and speech therapy, TEP management, psychosocial and peer support, and education for patients, family members and local health care professionals. Additional applications that have been conducted with this patient population in Manitoba, including discharge planning for postsurgical head and neck patients and an interactive peer and professional support group, have been pursued with early success.

Telehealth is well suited to a country like Canada with a widely dispersed population. Telehealth offers several advantages: (1) elimination of patient and family travel for specialized expertise, (2) convenient, timely, and useful service, and (3) access to specialized direct patient care service, education, and support. Technology requirements for patients with head and neck cancer include: availability of close-up, high resolution video and still images; adequate lighting for accurate assessment of stomas, prosthesis status, and skin and mucosal properties; and a room with acceptable acoustics, given the poor speech intelligibility that many patients may have early in the course of their rehabilitation. In-person visits are helpful initially to establish contact and perform an initial assessment, as well as facilitating a relationship between the clinician and the patient. Nursing assistance in the remote location may be advisable when technical procedures, such as TEP voice prosthesis management, are conducted.

In conclusion, the utility of telehealth in the management of individuals with head and neck cancer appears promising. While direct patient access is clearly ideal, the use of telehealth for those in rural and remote communities will serve a need. In addition to facilitating timely access to care, it appears that "urgent" problems such as that presented in Case 3 may be undertaken via telehealth provided additional supports are available (i.e., nursing services). It is recommended that research be conducted to evaluate clinical effectiveness of speech-language pathology services with this patient population (e.g., diagnostic accuracy, clinical outcomes, patient/client safety and risks, and patient/client satisfaction), as well as other clinical populations. In addition, clinical efficiency should be assessed in terms of such factors as cost of service, timeliness, accessibility, and need for required follow-up. Professional regulatory bodies are charged with the task of developing standards and guidelines for use of telehealth technology among the professions (NIFTE Research Consortium, 2003). With initial favorable results such as that described above, the use and scope of telehealth in rehabilitation will undoubtedly continue to increase.

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