

► Store-and-forward teleneurology in developing countries

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Summary

We assessed the feasibility of a store-and-forward email teleneurology service between a UK neurologist and a rehabilitation hospital in Bangladesh. Over 12 months, email advice was requested for 12 patients (mean age 43 years, range 15–57 years). Each patient generated an average of 5.2 email messages. Eight cases were considered complicated by the neurologist, who would have preferred a video-link consultation for these. The referring doctor found the neurologist's advice beneficial in 75% of the complex cases and in all of the more straightforward cases. Patient care was changed in 50% of the cases as a result of the specialist advice and one patient transfer out of the country was avoided. Store-and-forward teleneurology is effective for delivering expert neurological advice.

Introduction

Telemedicine is the process in which expert medical advice from afar is provided through the use of communications technology. A number of systems are available and the one chosen for a given application will depend primarily on the needs of the user, but also on the available finances and technical resources. For example, store-and-forward techniques which use email and the Internet are much less expensive than realtime telemedicine using videoconferencing equipment and ISDN lines. In poor countries the former may be achievable but the latter is unlikely to be in the foreseeable future. This poses a problem for neurology, where it is generally assumed that accurate transmission of a neurological examination is necessary for diagnosis, and this would require high-bandwidth connections and realtime video. To test whether much simpler, store-and-forward telemedicine could be useful for neurological patients we set up a connection between a neurologist in the UK and a rehabilitation hospital in Bangladesh.

Methods

A full description of the methods used has been published¹. Bangladesh has a population of about 120 million people. The Centre for the Rehabilitation of the Paralysed (CRP) is a 100-bed hospital in Bangladesh and the majority of its patients are extremely poor. The CRP clinical staff consists

of one full-time consultant orthopaedic surgeon, one resident medical officer and two medical officers.

Olympus UK donated two digital cameras (C1400XL) and accessories, two tripods and a laptop to the Swinfen Charitable Trust, which trained a small team of dedicated local staff in the use of the equipment and how to send email referrals to a series of UK specialists. Most of the staff had no previous experience of using computers. The CRP took out a subscription with an Internet service provider in Dhaka (Bangla net). The UK neurologist used his home-based email system on a laptop computer. The telemedicine protocol was similar to that of the British Defence Medical Services system, which relies on the transmission of still images attached to email messages containing clinical information². The use of a numbering system ensured patient confidentiality. Copies of email messages were sent to two Swinfen Trust administrators, who carried out the study evaluation.

Results

Twelve consultations were dealt with in 12 months. The mean age of the patients was 43 years (range 15–57 years). The mean number of email messages per referral was 5.2 (range 2–13) and the total time spent by the neurologist was about 11.5 h. Two cases were completed in one day, five in one week and 10 in three weeks.

Six patients had established neurological diagnoses (three had had a stroke, and one each had cerebral palsy, Parkinson's disease and a back injury) and were referred for evaluation of troublesome symptoms. Three had a history of progressive disease for more than one year and were referred for diagnosis.

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Three had recent onset of new neurological symptoms. History and examination were the keys to diagnosis in all the patients; clinical photographs were sent in two cases and added little to the diagnosis. Pictures of magnetic resonance and computerized tomography scans were easily interpretable by the neurologist in six cases; help from a neuroradiologist was required in one case.

The neurologist would have preferred a video-link in eight of the 12 cases which he perceived as extremely complicated. The referring doctor found the advice beneficial in six of these eight cases as well as in the four more straightforward cases. As a result of the consultation, the management was changed in six patients, with one wheelchair-bound patient gaining the ability to walk, reassurance given in four and no benefit accruing in two. One transfer out of the country was avoided. Of the two patients not helped, one had a progressive condition eventually diagnosed as carcinomatous meningitis, and the other was a case of unexplained abnormal posture.

Discussion

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Store-and-forward telemedicine is a feasible and practical option for providing neurological advice to clinicians in developing countries. In the present study, an initial reply was generally obtained within one day, something which would have almost certainly not been achievable with real-time telemedicine, since it would have required simultaneous involvement from clinicians at two sites separated by 8000 km and a 6 h time difference.

The patient group seen was extremely complex, with 10 out of 12 patients having structural neurological disease, a higher proportion than in a previous study of inpatients admitted to a district general hospital in Northern Ireland³. The importance of history and examination in making the diagnosis requires a sound clinical relationship between the referring and consulting clinicians, with each being aware of the limitations of the other's role.

The differences in the perception of this study between a specialist in the industrialized world (VP) and a referring clinician in the developing world (FH) are striking. The former thought that his advice on eight of the 12 patients was not adequate, whereas the latter felt that it was of benefit to six of the eight patients. Patients also benefited, one in walking function, five in improved symptoms, and four by clarification of diagnosis and prognosis.

The present study demonstrates the great power of email as a simple, reliable, cheap and effective method of asynchronous communication. The cost of the equipment is modest, is shared by specialties other than neurology, and is recouped by the savings made in obviating the need for the patient to travel out of the country for further opinions. It has shown itself to be effective in dealing with very complicated neurological problems in a far-off land and offers the prospect of benefit to neurological patients in the developing and industrialized worlds. We challenge the common belief that realtime, high-quality videoconferencing is always required for the assessment of neurological patients.

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