ORIGINAL ARTICLE

Electronic referral in orthopaedics benefiting patients and the system

Fernando W.P.A, MBBS, MS, FRCS[1], Premadasa R.P.R, MBBS, MS[2], Marasinghe N.C, MBBS[3], Wijesinghe W.M.N.C, MBBS[4], Wickramarachchi R.E, MBBS[5], Senaratne S.A.D.V.R, MBBS[5], Perera B.L, MBBS, MS, FRCS.[6]

1 Consultant orthopaedic Surgeon, Colombo North Teaching Hospital Ragama.
2 Senior registrar in orthopaedics, Colombo North Teaching Hospital Ragama.
3 Registrar in surgery, Colombo North Teaching Hospital Ragama.
4 Registrar in orthopaedics, Colombo North Teaching Hospital Ragama.
5 Registrar in surgery, District General Hospital, Gampaha.
6 Consultant Surgeon, District General Hospital, Gampaha.

ABSTRACT

Introduction: The orthopaedic unit at the Teaching Hospital, Ragama is the referral centre for three large hospitals, having the only orthopaedic surgeon in the entire Gampaha district (with a population in excess of two million). Each day, patients are transferred for orthopaedic opinion and for further management at inconvenience to the patient and cost to the hospital. An electronic mail link between two units is easily set up at minimal cost as a route for telemedicine.

Method: A surgical unit at district general hospital Gampaha served as a referring unit. A template was used. History, management, digital photographs of radiographs, and of the wound where relevant were electronically mailed with Short Message Service notification. Trauma patients requiring orthopaedic opinion were included in the process except those whom the surgeon decided needed immediate transfer (to Ragama for orthopaedics or to Colombo for neurosurgery)

Results: Eighty four patients were referred in 43 batches. The initial management at Gampaha was considered satisfactory in 40 (48%). Minor corrections were advised in 14 (17%). Eleven, (13%) were to be reviewed in the clinic at Ragama. Only 4 (5%) required immediate transfer. Maximum delay in obtaining an opinion was 12 hours (overnight). Overall, 62 (74%) patients were saved a four hour round trip. An estimated thirty four ambulance journeys including 3 to 4 staff members per journey were saved.

Conclusion: Electronic referral in orthopaedics is feasible. Inconvenience to patients is reduced while the hospital will save time and money.

Key words: Electronic referral; Tele-medicine; Orthopaedic trauma.

Introduction

The Colombo North Teaching Hospital (NCTH) at Ragama is the tertiary hospital for the Gampaha district, which is home to an estimated population of 2,063,684, making it the second most populous district in Sri Lanka [1]. The orthopaedic unit at NCTH caters to a number of hospitals (Table 1) in the district as it is the only unit in the district with a consultant orthopaedic surgeon (Table 2). With growing numbers of trauma related orthopaedic problems, the number of referrals to the orthopaedic unit at NCTH following initial management by the surgical team at local hospitals as well as direct admissions are increasing daily.

This is an enormous burden to the orthopaedic unit at NCTH which has only 40 beds [2] and a team of five doctors, including the consultant

Correspondence: Pradeep Fernando, Consultant Orthopaedic Surgeon, North Colombo Teaching Hospital, Ragama, Sri Lanka.
Email: wpafernando@yahoo.co.uk
The Sri Lanka Journal of Surgery 2011; 29(1):15-18.

orthopaedic surgeon, as well as, to the referring hospital, which needs to arrange transportation

Table 1. Health institutions in the Gampaha district

Types of Hospital*	
Teaching hospitals	3
District General hospitals	2
Base hospitals Type A & B	2
District hospitals	6
Peripheral units	3
Rural hospitals	5
Prison hospital	1
Maternity hospitals/ Central dispensaries	41

**Hospitals and bed strength in SL –Ministry of health 2010*

Table 2. Distribution of Orthopaedic Surgeons in Sri Lanka

Hospital	**Number of Orthopaedic Surgeons ***
Colombo – NHSL / LRH	5
CSTH	1
SJGH	1
Kaluthara	1
Ragama	1
Galle	2
Mathara	1
Rathnapura	1
Badulla	1
Ampara	1
Kandy/ Peradeniya	3
Kegalle	1
Anuradhapura	1
Polonnaruwa	1
Kurunegala	1
Chilaw	1
Jaffna	1
Armed forces	2

** Orthopaedic Association of Sri Lanka*

orthopaedic surgeon, as well as, to the referring hospital, which needs to arrange transportation of patients at the expense of money, manpower and time. A selective method of referring patients should be established, avoiding inconvenience to patients needing specialized orthopaedic care.

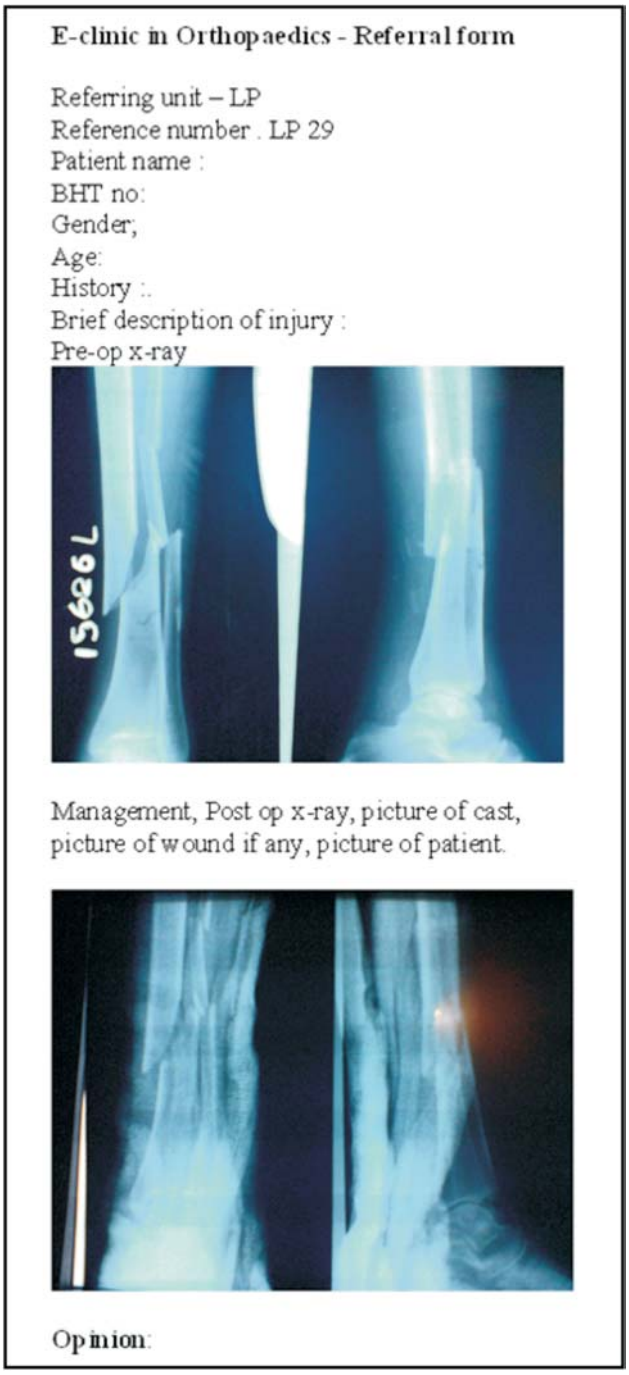
Telemedicine has evolved as a convenient, effective and safe mode of distant consultation especially in the areas of neurology, cardiology, rehabilitation, psychiatry, and a number of other specialties in medicine [3]. Since the majority of the initial management of uncomplicated orthopaedic conditions would be undertaken by the surgical team of the respective local hospital, arranging a mode of delivering expert opinion on relevant orthopaedic conditions would reduce the burden on the system. This could be facilitated by means of telemedicine using internet and E-mail.

Method

A pilot project was initiated, where the consultant surgeon at district general hospital Gampaha and the orthopaedic unit at NCTH would communicate electronically to refer patients for an orthopaedic opinion. An internet connection was established between the units and patients were referred using E- mail.

A concise template (Figure 1) was used with referral numbers and patient details and digital photographs of x-rays and, where relevant, photographs of wounds were taken before and after initial management.

All patients with trauma related orthopaedic conditions presenting to the Gampaha surgical unit, needing orthopaedic opinion were referred via E-mail after initial stabilization and management. The consultant surgeon at the referring point was free to transfer, to a tertiary centre, patients needing immediate orthopaedic care or those with other concomitant injuries who were deemed in need of urgent transfer to a tertiary centre of his choice. Such patients were excluded from the study. A short messaging service from a mobile telephone was used as a method of notification to the receiving hospital team when patients were referred. The consultant orthopaedic surgeon at NCTH would review the E referral and provide an opinion electronically in the shortest possible time.


E-clinic in Orthopaedics - Referral form

Referring unit – LP
Reference number . LP 29
Patient name :
BHT no:
Gender;
Age:
History :.
Brief description of injury :
Pre-op x-ray

Management, Post op x-ray, picture of cast, picture of wound if any, picture of patient.

Opinion:

Figure 1. Sample E referral template.

Results

A total of 84 patients were referred as a first consult over a period of nine months from March to November 2009 in 43 batches. The initial surgical management at the referring unit in Gampaha was considered acceptable in 40 (48%) (Figure2). Minor corrections of the management which could be done at the local hospital itself were advised in 14 (17%), e.g. wedging of cast, removal of bandages, application of slings and conversion to full casts.

Transfer for open reduction and internal fixation or for re-manipulation under general anaesthesia was requested in 13 (16%) patients. There were 4 (5%) patients in whom the initial management was deemed unsatisfactory and immediate transfer was recommended. Eleven (13%) were scheduled for review at the orthopaedic clinic. Three (3.5%) patients referred as having a fracture were found not to have fractures and management as soft tissue injury was advised. One patient was referred purely for expert opinion on follow up. Overall, 75 (89.1%) did not require immediate transfer, and 62 (73.8%) did not require to be transferred at all.

The maximum delay in receiving an opinion was 12 hours (overnight). An estimated 34 ambulance trips with 3 to 4 staff members each trip were avoided.

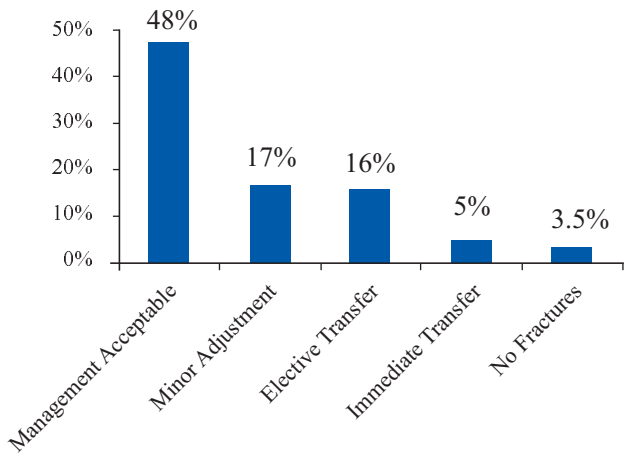


Figure 2. Outcome of E referrals.

Discussion

The concept of telemedicine is not new, and must be at least as old as the telephone. Merriam Webster however, gives the earliest date of use as 1970 and defines it as; 'the practice of medicine when the doctor and patient are widely separated using two-way voice and visual communication (as by satellite or computer).'

The need for the establishment of an electronic referral and consultation system for orthopaedics in Sri Lanka is of the utmost importance due to

lack of resources and personnel, and is supportive of available resources.

Avoidance of congestion at specialized surgical centres not only reduces the burden on the system but allows the provision of specialized care for those who need it the most.

The feasibility of telemedicine is well established and is currently being practiced in other specialties such as Neurology, Cardiology, Dermatology, Ophthalmology, Psychiatry and Dentistry [3,4]. Large sample high end control studies have shown benefits in telemedicine [3] but adequate data are not available for telemedicine in orthopaedics.

The American Telemedicine Association has put forward guidelines pertaining to telemedicine in various specialties, but not for orthopaedics [5]. Therefore, the safety of practicing such an E-referral system has not been established.

In this study, therefore, the consultant surgeon was allowed to transfer patients at his discretion when he felt that the patient needed immediate orthopedic attention. The initial stabilization and management was undertaken by the surgical team at the referring hospital under supervision of a consultant surgeon and therefore the patient did not, at any time, experience delay in, or deprivation of, treatment.

Due to the E referral system, many patients were saved the inconvenience of transportation to NCTH to receive an orthopaedic opinion. Those who needed transfers for surgery were scheduled for surgery through the E- referral system and were transported to NCTH after being optimised at the referring hospital. The referring hospital was saved manpower, transportation and administrative time in seventy three percent of patients.

The feedback from the patients and the referring unit with regard to the process was satisfactory though not objectively assessed.

Conclusion

Electronic referral in orthopaedics is feasible in Sri Lanka. It is cost effective, reduces congestion at specialized centres and provides convenient specialized orthopaedic care to the patient, without undue delay, while allowing the health system to deliver focused care for those who require it most.

References

1. Management development and planning unit, Ministry of health Sri Lanka. Hospitals & bed strength (government sector). 2010.
2. Department of census and statistics Sri Lanka. Population and Housing, Statistical abstract. 2010.
3. Weerasinghe J.U. Clinical Trials on Computer Based Telemedicine: A Systematic Review. Sri Lanka Journal of Bio-Medical Informatics. 2010;1(1):12-20.
4. Nishantha D, Hayashida Y etal; Internet Collaboration: A Promise for Technology Transferring to Developing Countries, In Proceedings of the 3rd International Internet Society@Internet Conference on Web and Communication Technologies and Internet-Related Social Issues. Asakusa, Tokyo, 27th-29th July 2005. (Springer, LNCS 3597, July 2005)
5. americantelemed.org. American telemedicine association; 1100 Connecticut Ave, NW, Suite 540, Washington. 2011. http://www.americantelemed.org/i4a/pages/index.cfm?pageid=3311

Awarded the best paper at the annual sessions of the College of Surgeons of Sri Lanka 2010.