

Telemedicine: a new model of care

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Susan Hayes and Simon Dodds describe how the vascular services at the Good Hope Hospital were reorganised as a one-stop clinic. This was followed by the development of a telemedicine system allowing image-based electronic patient records to be shared between hospital and community practitioners.

KEY WORDS

Telemedicine
Leg ulcers
Electronic patient records
Communication

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An estimated one per cent of the population will have a leg ulcer and prevalence increases markedly with age (Angle and Bergan, 1997). At any one time it is estimated that 100,000 patients have open leg ulcers that require treatment. This treatment is mainly repeat dressings over extended periods of time, carried out by community nurses. This is estimated to cost £600m each year in the UK (Logan, 1997). Improving healing time for leg ulcers and reducing recurrence leads to an improved quality of life for patients and their carers in addition to major cost savings for the NHS.

Improving ulcer healing Recent studies from Scotland report unacceptably low healing rates for leg ulcers that did not improve despite the use of published guidelines and targeted training for community nurses (Ruckley, 2001). Ghauri et al (2000) suggest that improved outcomes in leg ulcer healing can be achieved by introducing a coordinated, community-based service, with access to a one-stop specialised vascular assessment clinic.

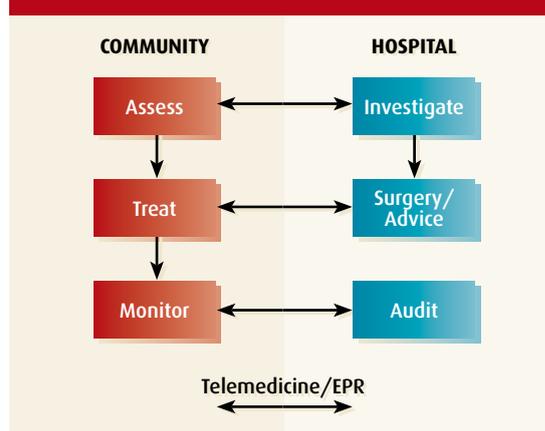
Establishing a definitive diagnosis and treatment plan when a patient first presents with an ulcer is preferable to requesting specialist help only when the ulcer has failed to heal after three months (RCN, 1998; Scottish Intercollegiate Guidelines Network, 1998)

About 70 per cent of leg ulcers are venous in origin (Moffatt and Franks, 1994). There is increasing evidence that about half of these are a result of isolated superficial venous reflux that could benefit from minor venous surgery and may avoid the use of long-term compression bandaging (Bello et al, 1999).

Pinch skin-grafting carried out as day-case surgery under local anaesthetic is a simple and effective method of providing early relief from pain with more rapid and durable healing than leaving ulcers to heal spontaneously (Chilvers and Freeman, 1969). The healing rate for PSG of chronic leg ulcers is reported to be between 36 per cent and 60 per cent (Tegner et al, 1997).

Shared-care model Up to 80 per cent of patients with leg ulcers receive most or all of their care from community nurses who may not see enough patients to acquire or sustain the necessary clinical skills and may also be isolated from a specialised leg ulcer service (Callam et al, 1985). Current practice in the North Birmingham region follows the evidence-based guidelines of the RCN (1998). The pathway was sequential and referrals to specialists were made if there was significant arterial disease (ABPI <0.8) or if an ulcer failed to heal after three months.

FIG 1. ELECTRONIC SHARED-CARE PATHWAY FOR LEG ULCER MANAGEMENT



Over the past five years, the vascular service at the Good Hope Hospital has had a fourfold increase in the demand for vascular services with a corresponding increase in waiting times for new and follow-up appointments. It became apparent that the pattern of referrals to the service was inconsistent, as were the methods of transferring and updating information between the hospital and community practitioners. This would often result in confusion over care.

An audit of services from 1999–2000 found that the average time for a patient to wait for an appointment at the vascular clinic was six weeks, the waiting time for a duplex scan could be 12 weeks and the average number of repeat visits to the clinic was six. It was not routine practice to measure the healing rate of ulcers.

It was felt that optimal management should be based on creating rapid access to specialist diagnostic and treatment services when patients first present with an ulcer, and aim to improve communication between the community and hospital teams.

One-stop clinic Two major changes to the existing care process had to be made. First, the conventional multiple-visit outpatient clinic was reorganised into a one-stop clinic where patients could see a consultant vascular surgeon, vascular nurse specialist and vascular technologist in one visit and usually leave the clinic with a diagnosis and management plan. The audit following the implementation of the OSC (2000–2001) revealed that the time from referral to diagnosis had been reduced from 18 weeks to four weeks and the number of repeat visits from six to five.

Second, an image-based electronic patient record (EPR) system was designed to link the OSC with the

community nurses via the NHS net. A new shared-care management pathway enabled both hospital and community care to occur in parallel, not in sequence as before (Fig 1). After the EPR system was installed a further audit showed that the time from referral to definitive treatment was reduced from four to two weeks and the number of repeat visits to the clinic reduced from five to two.

A decrease in ulcer area is an objective measure of healing. Measurements taken at each visit by digital image tracing are automatically plotted on a graph in the patient's electronic record (Fig 2). It has been possible to predict the approximate time for healing from the initial response to treatment and deviations from the healing pathway can be clearly seen.

The telemedicine system The basic requirements for implementing the system are a computer with NHS net access, the telemedicine software, a digital camera and specific training.

A dedicated application had to be developed that is based on the existing care pathway used by the vascular service. The system requires minimal computer expertise and is secure; reliable; and easy to install, upgrade and maintain.

Managing the change from paper to electronic records and tackling the fear of technology of some users has been overcome by encouraging the community nurse teams to visit the hospital to witness the whole care process in operation. Individual training sessions, study days and workshops are ongoing. When nurses experience directly the benefits that the system can bring to their patients, they are encouraged to learn the necessary skills, despite initial reservations.

Benefits of the shared-care model A randomised controlled trial is currently gathering evidence of clinical and cost effectiveness, comparing the conventional paper-based process with the EPR system. However, the new model of care is already demonstrating a large number of benefits.

The complete, problem-specific, care record is accessible to hospital and community practitioners 24 hours a day, seven days a week. The telemedicine system has been shown to speed up referrals, reducing the misery and high cost of changing dressings repeatedly. The results of the specialist assessment and investigations can be accessed as soon as they are completed and a management strategy prepared.

Treatment may involve urgent day case PSG or venous surgery under local anaesthetic for patients with isolated superficial venous disease. We have found that

this often dramatically speeds up the healing rate, particularly for large ulcers, eliminating the need for months of compression bandaging.

Patients prefer to have their routine dressings done in their own home or local clinic and their quality of life is enhanced by reducing the need for follow-up hospital visits. This enables the OSC to focus its resources on detailed initial assessments and providing expert support while still being able to monitor treatment outcomes. Community nurses can request advice remotely and asynchronously via the telemedicine system and usually receive a reply within 24 hours. A close working partnership is developing between hospital and community practitioners and the confusion over care has been eliminated. The cumulative knowledge is being used as a valuable training resource for students and staff who are new to leg ulcer care.

We have found that the graphic display of healing rate produced from the digital image measurements provides a simple method of assessing the effectiveness of treatment. Any problems can be identified quickly and a suitable intervention suggested. Showing patients this visible evidence of progress is a great psychological boost and encourages them to become active partners in their healing process.

Conclusion A dedicated leg ulcer telemedicine system that links the specialist vascular clinic with community clinics and nursing teams has been proved to be technically and clinically feasible. It is effective and efficient and directly benefits patients, carers and staff. The system can be used as an audit tool and to provide accurate information on long-term cost and clinical effectiveness. It is easily adaptable for use in diabetic foot clinics, dermatology and pressure area care. ■

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