

Cycloidal vibration for the treatment of cellulitis in a community setting

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Abstract

Cellulitis of the lower limb is a common infection seen in primary care resulting in a significant number of hospital admissions per year. The NHS is proposing and developing services to treat patients more effectively in the community to prevent hospital admission. Cycloidal vibration (CV) therapy is a medical device that when combined with standard antibiotic therapy for cellulitis results in an effective treatment. This retrospective analysis is a review of patients with cellulitis seen in a community medical centre before and after the introduction of CV therapy. This therapy in conjunction with antibiotics resulted in the successful recovery of patients with cellulitis that previously required hospital admission for treatment. As a consequence a significant reduction in the cost of treating these patients has been determined.

Key words: Cellulitis ■ Cycloidal vibration ■ Tissue viability ■ Wound

Cellulitis has an incidence rate in the UK of 15.8 cases per 1000 patient consultations (Office of Population Census and Surveys, 1992). In 2005–06, there were 74247 hospital admissions in England due to cellulitis (Department of Health [DH], 2006a). In 2006 the DH (2006b) issued a press release highlighting cellulitis among 17 other common ailments – known as ‘ambulatory care sensitive’ conditions – that cost around £1.3 billion a year in hospital admissions. It is proposed that better management of these conditions in community care is required to prevent admissions, improve patient care and reduce healthcare costs.

Cellulitis

Cellulitic infection is commonly caused by *Streptococci* spp. and *Staphylococcus aureus* entering wounds such as leg ulcers, insect bites, toe-web maceration, tinea pedis and general breaks in the skin. In addition, peripheral vascular disease, oedema, lymphoedema, obesity and diabetes are all recognized risk factors in the aetiology of cellulitis (Bisno and Stevens, 1996; Dupuy et al, 1999). Cellulitis commonly occurs in the lower leg (Ellis Simonsen et al, 2006) and is characterized by skin redness (erythema), oedema, warmth, blistering and pain in the infected tissue (Morris, 2002; Figure 1); pyrexia, nausea

and a raised leucocyte count are often accompanying signs and symptoms (Baxter and McGregor, 2001).

Cellulitis can also lead to oedematous swelling, with 29% of patients developing chronic oedema and 29% recurrence of the infection within 3 years (Jorup-Lundberg and Britton, 1987). Cellulitis can be misdiagnosed and not be confused with conditions such as varicose veins, deep vein thrombosis, thrombophlebitis and vasculitis (Papafio, 1999).

In primary care, cellulitis is most commonly treated with oral antibiotics prescribed after consultation with the GP (Cox et al, 1998). However, severe cellulitis can require intravenous (IV) antibiotics resulting in hospital admission. In some areas of the UK, IV antibiotics are administered by nurses trained in community IV therapy to prevent hospital admission (Depledge and Gracie, 2006).

Cycloidal vibration (CV)

CV therapy is a form of 3-dimensional oscillating vibration with a small-amplitude and low frequency waveform. When applied to the skin, it has been shown to increase microcirculation and fluid flow in the soft tissues without the concomitant effects of compression bandaging (Ryan et al, 2001; Button et al, 2002). Cellulitis often results in compromised local immunity and the infected tissue. CV therapy stimulates the microcirculation in the infected area enhancing potential delivery of antibiotics to the tissues and reducing the associated inflammation at the same time (Johnson et al, 2007).

This article discusses how CV therapy is an effective treatment for cellulitis in community care, improving the results of oral antibiotic treatment and subsequently preventing hospital admission.



Figure 1. Acute cellulitis of a lower limb.

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hospital admission: The article describes the introduction of CV therapy for cellulitis patients in a community medical centre, analysing the results of the intervention and the costs of treatment before and after its introduction.

Background

The medical centre studied has seven GPs and 14 district nurses, and provides services for part of Skegness and the nearby villages of East Lincolnshire.

Patients with cellulitis seen at the medical centre are usually referred to the local hospital, resulting in admission for IV antibiotics and bed-rest. To reduce the number of hospital admissions for cellulitis the district nurse team, in collaboration with the tissue viability service, were trained in using CV therapy and oral antibiotic therapy. In a 10-month period, 14 patients with lower limb cellulitis were seen by the medical centre; 13 were successfully treated with CV therapy and fully recovered in community care. Only one patient required onward hospital referral.

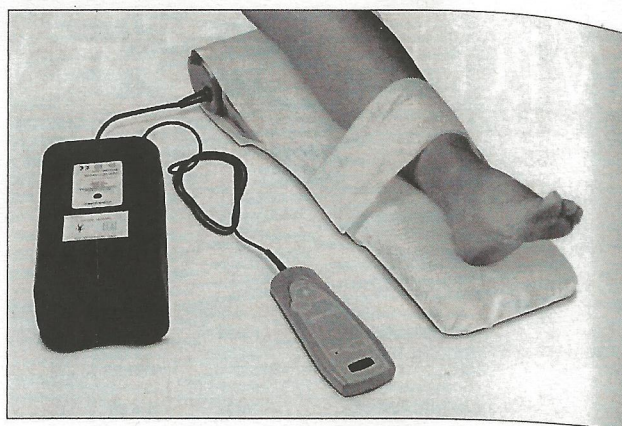
Application

The Vibro-Pulse® pad is placed under the lower leg and straps are placed over the leg and fastened to ensure effective treatment (Figure 2). It is applied three times a day for 30 minutes per session, and after simple instruction it can be easily self-administered.

Review

The following is a review of three patients with a history of recurrent cellulitis, and their treatment before and after the introduction of CV therapy. During the 12 months before the introduction of CV therapy the patients had a total of eight recorded episodes of lower limb cellulitis. This resulted

Figure 2. Vibro-Pulse® cycloidal vibration therapy unit.



in five hospital admissions and 54 bed days; the average length of stay per admission was 11 days.

The cost of treatment for a single episode of cellulitis resulting in hospital admission is £2185 (Table 1). Therefore, the cost of treating the three patients with eight recorded episodes of cellulitis resulting in five hospital admissions over 12 months was £11 178 (Table 2).

CV therapy and oral antibiotics

Over the 10-month period post-application of CV therapy the three patients had six further episodes of lower limb cellulitis. All episodes were reviewed by a GP, and instead of referral for hospital-based treatment, the decision was made to prescribe the patients oral antibiotics and combine them with CV three times a day – either self administered or in conjunction with a district nurse visit. All episodes of lower limb cellulitis recovered in an average of just over 10 days.

To treat all cases of cellulitis, CV therapy was used for a total of 62 days (mean = 10.3 days per episode in combination with oral antibiotics). Each patient was visited twice by a district nurse during the 10 days of treatment. Resolution of cellulitis varied between 8 and 14 days.

Over the 10-month period since the introduction of CV therapy the cost of successfully treating the three patients with six episodes of cellulitis in the community was £1828.50, or £304.75 per episode.

Discussion

Reducing hospital admissions is a key priority of *The NHS Improvement Plan* (DH, 2004), and the NHS is working towards a target of reducing emergency bed days through improved care and focus in primary and community settings (DH, 2004). The DH (2001) stresses the importance of preventing unnecessary hospital admissions for older people. Preventing hospital admission and delivering effective treatment in community care also eliminates the risk of vulnerable patients contracting a hospital-acquired infection. It is currently estimated that one out of eleven hospital-based patients acquire an infection as a result of their hospital admission, which then results in an extended hospital stay (National Audit Office, 2000).

In the 12 months before the introduction of CV therapy, all three patients had a total of eight recorded episodes of cellulitis, resulting in five hospital admissions at a cost of treatment of £11 178, or £1397 per episode. In the 10 months

Table 1. Cost of treatment comparison for one episode severe cellulitis

	Hospital admission for treatment	Treatment in community using Vibro-Pulse®
surgery consultation 20 minutes	£50	£50
prescription cost oral antibiotics	£0	£34.60
cost of hospital admission for treatment.		
Payment by Results	£2135	£0
average number of hospital bed stay or community treatment days	11	10.3
district nurse visits (3) (£30.25 per minutes)	£0	£90.75
Vibro-Pulse® £15.50 per day amortized of equipment plus disposable or packs	£0	£159.65
Total cost of treating one episode of severe cellulitis	£2185	£335.00
alternative cost of treatment based on hospital bed days. £250 per day, IV antibiotic therapy average £10 per day)	£2860	

Source: Netten and Curtis (2006)

since the introduction of CV therapy the same three patients had six further episodes of cellulitis. All were successfully treated in community care using CV therapy combined with oral antibiotics, resulting in a treatment cost of £1828, or £304 per episode.

The medical histories of these patients indicated that previous hospital admissions were required to treat their cellulitis. If the patients treated in the medical centre had been admitted to hospital, then the cost of treating the six episodes would have been £12810. By treating these patients in the community, not only was an estimated cost saving of £10981 made, but also hospital admission was avoided.

Limitations

It is acknowledged that this study involved a small number of patients and therefore generalization may be difficult based on limited findings. Additional research is proposed to demonstrate further benefits of CV therapy.

Conclusion

This small study has demonstrated the benefits of CV therapy in managing patients with cellulitis and associated oedema. It is acknowledged that while patient numbers are limited, there have been 13 patients with cellulitis that were successfully managed in the medical centre, improving patient experience by treating patients closer to home, as encouraged by the DH (2006c). Prior to the introduction of CV therapy it is likely these patients would have been admitted to hospital for treatment at an estimated cost of £27755 (DH, 2006d).

Due to the successful results the GPs and nursing staff in the medical centre are confident in its use and performance. Consequently, only one patient with cellulitis has required referral to hospital in the 10-month period since the introduction of CV therapy.

CV therapy combined with oral antibiotics has resulted in 13 patients being successfully treated in the community. As a result, this not only prevented hospital admission, but also improved patient outcome by effective community treatment, significantly reducing treatment costs. BJN

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Table 2. Cost comparison of treatment

	12 months before the introduction of Vibro-Pulse®	10 months after the introduction of Vibro-Pulse®
Number of episodes of severe cellulitis	8	6
Number of hospital admissions required for treatment	5	0
Total number of hospital bed days	54	0
Total number of community treatment days using cycloidal vibration therapy	0	62
Cost of hospital treatment per patient (Table 1)	£2185	£0
Cost of community-based treatment per patient (Table 1)	£84.60	£304.75
Total cost of community treatment three episodes not requiring hospital admission	£253.80	—
Total cost of treating episodes of cellulitis	£11 178.80	£1828.50
(Alternative NHS cost of treatment based on hospital bed days. £250 per day 16, intravenous antibiotic therapy – average £10 per day)	£14040	—
(Cost of treatment if patients were admitted to hospital for treatment)	£12810	

Source: Netten and Curtis (2006)

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KEY POINTS

- Lower limb cellulitis is a very common skin infection seen in general practice and results in a significant number of hospital admissions per year.
- Cycloidal vibration therapy used in combination with antibiotics is an effective treatment for cellulitis in community care.
- Antibiotics combined with cycloidal vibration to treat cellulitis in community care can prevent hospital admission and reduce treatment costs.