

Case Report

“VAC” Technique as a Physiatrist’s Bridge between Debridement and Surgery : Case Report of Filarial Leg Ulcer

Poonekar P. D.¹, Mishra P.²

Abstract

Difficult ulcers have differing aetiologies calling for varying strategies. For long, physiatrists have been treating diabetic foot and decubitus ulcers with great success. The “vacuum assisted therapy” (VAC) technique is proven to alter the local milieu to facilitate wound healing. A known case of filariasis for last 14-15 years, presented with elephantiasis of left leg with a large ulcer. The financial status of the patient prevented usage of the commercial VAC machine and so “in-house” VAC technique innovations were used at a fractional cost. She was successfully treated using the VAC technique and spontaneous complete healing was achieved in 8 weeks and resulted in early rehabilitation. It was very cost-effective.

Key words: Vacuum assisted closure (VAC), negative pressure wound therapy (NPWT), local negative pressure therapy (NPT), topical negative therapy (TNP), vacuum assisted therapy (VaT), subatmospheric therapy, filariasis, leg ulcer, rehabilitation, rural.

Introduction:

The course any ulcer takes is dictated by the local and systemic variables. The associated pathophysiology often grossly influences the final outcome. In long-standing cases of filariasis, due to progressive lymphatic blockage, the skin and subcutaneous tissues of the affected limb is gradually lifted from the normal feeders resulting in compromised viability of the overlying skin. VAC technique can be successfully used in wounds of complex ulcers due to the local “altered induced local pathophysiology¹.” A case of filariasis presented with elephantiasis and a large ulcer on the lower part of the leg. She was successfully treated using VAC technique. The case highlights the VAC technique as an effective bridge between different available modalities of ulcer management and stands as an efficient tool in the hands of any physiatrist.

Case Report :

A 48 years lady, from the local rural area, with history of filariasis for about 14-15 years, came with elephantiasis left leg and a large ulcer on the lower part of the left leg. She developed a large ulcer on the affected leg few days before presenting to the hospital. The leg ulcer was located on the lower part of left leg on the anterolateral aspect of the ankle (Fig 1 2) measuring 12 x 6 cm and depth of 2 cm with necrotic tissue on the floor. The base was mobile. The leg was erythematous and very tender. There were 3 superficial small ulcers (0.5 x 1 cm) in calf area. The right leg was normal. She was non-diabetic and clinically did not indicate any vascular compromise.

She was treated using the “VAC technique and was very effective . The low illiteracy state of the patient and that of the attendant-relative as taken into consideration with the ultimate aim of empowering the patient for strict adherence to the treatment regime and a suitable VAC technique protocol was developed. Negative pressure of -125 mm Hg was applied for cycles of 10 minutes each - 6 minutes vacuum with interval of 4 minutes rest. The commercially available VAC apparatus, with prototypes manufactured in USA (Fig 3), are very costly for most patients in any developing country more so in a rural setting. To keep the cost low, “in-house” vacuum system including, tubing and “end-vacuum applicator” was fabricated. (Fig 4).

Conventional wound management and study parameters were addressed as required to include

Authors' affiliation:

¹ MBBS, PMR, UP RIMS&R, Professor

² MBBS, M.D., DNB PMR, Senior Resident

Department of Physical Medicine and Rehabilitation, UP RIMS&R Saifai – 206 130 (UP) India

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Correspondence:

Prof (Dr). Pradip D. Poonekar, Dept of PM&R, UP RIMS&R, Saifai, Etawah – 206 130 (UP) India. Email : pdpoonekar2013@yahoo.com, ppoonekar@rediffmail.com

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base-line blood investigations, urine and blood biochemical parameters to assess the clinical status, and to treat associated comorbidities, if any. Repeated blood smears were tested for filariasis but were negative. Wound management protocol included weekly ulcer measurements and mapping (on sterile transparent plastic sheet), circumferential measurement of the leg girth at the mid-calf level (at a fixed point), regular wound culture and antibiotic sensitivity test, periodic photography of the local site with well place flexible measuring scales (to nullify any optical illusion in the size of the ulcer due to camera zoom-in or out status) and volumetric assessment done by POP paste. Radiological investigations indicated no bone or joint involvement. Doppler study was not conclusive due to the significant swelling in leg and ankle. Systemic therapy included right choice of antibiotics and other supportive multi-drug therapy. Regular routine absorbent cotton-gauge saline sterile dressing was given and ensured it was in an air-tight environment for VAC therapy.

She was successfully treated using an “in-house” VAC technique only. With a treatment of 8 weeks by VAC technique, there was complete epithelisation over the wound (Fig 5). The patient was managed totally at a conservative level. The time period could be halved if she had agreed to SSTG at the right stage. The whole procedure was very cost-effective at approximate cost of Rs 60/- per day using usual sterile dressing material routinely obtained from the CCSD as in any hospital / ward and the indigenous VAC technique.

Discussion:

There is no “ideal” method to treat difficult ulcers is proven by the fact that there are different treatment modalities practiced for treating difficult ulcers including different agents (local and systemic), electro-therapy, magnetotherapy, hyperbaric oxygen and even surgical intervention from SSTG to rotation flaps or even using microsurgery for “free / composite flaps”. Each has its own financial burden and limited by the facilities locally available.

Since well proven use of VAC / NPWT by Fleischmann in 1993 on animal models¹ the concept took a clinical profile projected by Mullner *et al*², Morykwas *et al*³, Deva *et al*⁴, and today VAC technique has evolved as a “alternative” method to treat wounds / ulcers . In general, VAC technique has been used for decubitus ulcers, diabetic foot ulcers, chronic wounds, flaps, grafts, complex wounds like sternotomy wounds, open abdomen wounds, acute wounds, adjuvant to SSTG, degloving injuries, chronic radiation wounds and

fasciotomy wounds⁴⁻¹¹.

The success story of VAC technique lies in the altered topical physiology and the healing process. There is increased vascular flow at the local site³, in-turn increased delivery of O₂ and nutrients¹ and increased systemic medication infusion of cellular with immunological and combat components, decreased wound aedema^{4,5,11}, and drainage of exudate³ Morykwas and thereby decreasing topical microbial load. Its role and effectiveness in ulcer with filariasis is dramatic and was evident wherein the interstitial fluid drained out in the limb is seen as wrinkles on the foot and leg within 24-48 hours (Fig 3)⁶.

In the present setting, with a background of a poor socio-economic status, rural environment, illiteracy and geographical location of being far any metro, it was necessary to use the modern and well proven VAC to suit the local milieu. This leads to journey of its own form by fabricating an “in-house” vacuum system to include tubing and “end-vacuum applicator” without compromising both the principles and sterile environment as required in any wound management. This was achieved by changing the system components from a “bench to bedside” approach to suit the situation – flexibility of concepts with strict adherence to the basic principles is the key point. Details of the “in-house” vacuum system using sterile disposable “water-bottle / soft drink” caps, will come up as a separate paper in the “innovation” section of the journal.

Conclusions:

As documented, VAC technique is an efficient method of treating ulcers, including in cases with a progressive / refractory filariasis status. To make the technique more patient friendly, considering the socio-economic and literacy state, the branded VAC system needs to be suitability modified for good end results. The VAC’s future, from a practical point of view, lies in its further modification(s) for its use in any developing country as a “home-care” model in the community also and to suit everyone’s pocket; its future from a research point of view, is to ascertain that as part of altered anatomy due to VAC, whether there is associated “neo-vascularisation” rather than proven just “angiogenesis”. The VAC technique is a promising “ulcer management tool” in the ever growing physiatrists’ armamentarium of strategies for treating any difficult ulcer.

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Fig1- Left Leg with Elephantiasis with Deep Infected Ulcer on the Left foot.



Fig 2- Infected Ulcer with Necrotic Material on the Floor of the Ulcer (Grade-3).



ActiVAC Therapy Unit VACulta™ NP T S

Fig 3 - Branded KCI® USA Inc VAC Machines.



Fig 4- Innovation in Action – “End Vacuum Applicator” with Luer- lock Connector and 16 F Tubing Ulcer



Fig5- Complete Epithelisation of Wound at 8th Week with Total Conservative Wound Management.



Fig 6 - Decreasing Necrotic Material and Progressive Granulation Tissue with Wrinkles on the Foot and Leg are due to Loss of Local Interstitial Fluid. Flexible Measuring Tape is Used during Photography for Quantitative Data Collection.

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