

The Use of Citric Acid for the Treatment of Chronic Non-Healing Sinus

Letter to the Editor

Dear Editor,

A discharging sinus not responding to conventional therapy becomes a chronic non-healing sinus. Conventional/traditional therapies have their own limitations in the management of chronic discharging non-healing sinus. Thus, the treatment of such non-healing sinus is a big worry for a clinician. We report a case of non-healing sinus, which did not respond to conventional antimicrobial treatment and local care combined for years, but was treated successfully by using three percent citric acid as a sole topical antimicrobial agent.

A 22-year-old unmarried female referred to an orthopedic surgeon with a chronic discharging sinus at the right mid-tarsal region. The case was examined thoroughly. Followings are the details of various examinations:

Haemoglobin; 11.6 gm/dl, white blood cell count; 5400/mm³, differential leucocyte count: neutrophils; 61%, lymphocytes; 31%, monocytes; 3%, eosinophils; 4% and basophils; 1%, peripheral blood smear; normocytic, normochromic, mildly hypochromic, and anisocytosis, Erythrocyte sedimentation rate (ESR); 46 mm/hr, serum uric acid; 4.8 mg/dl; C-reactive protein; absent, rheumatoid arthritis factor (R. A factor); absent, urine analysis; Nothing abnormal detected (NAD), anterior-posterior and oblique X-rays of right foot; osteoporosis of lateral bones with a soft tissue swelling and chronic soft tissue infection, enzyme linked immunosorbent assay test (ELISA) for antimycobacterium tuberculosis antibodies: IgG; 140 units/ml and IgM; 1.0 units/ml, and weight of the patient; 50 kg.

The case was diagnosed as Koch's mid-tarsal joints, based on the laboratory and clinical findings. There was no osteomyelitis. The patient thereafter was subjected to Anti-Koch's (multidrug) therapy with a four-drug regimen involving rifampicin, pyrazinamide, isoniazid and ethambutol for one year. The patient was considered responsive on the basis of weight gain (55 kg) and decreased ESR level (28 mm/hr). However, the sinus was persistent without any clinical improvement in spite of Anti-Koch's therapy for one year. This prompted the clinician to start antibiotic therapy. Different groups of antibiotics were tried for two months without any changes in sinus presentation (figure 1A). Finally the patient approached us for citric acid therapy, which she received duly. The sinus was flushed with normal saline and was irrigated with 3% citric acid. Cotton swabs soaked with citric acid were placed in the sinus opening. This modality of local application of citric acid was carried out for 11 days (one application each day). The sinus showed signs of healing, and was closed completely within two weeks of therapy (figure 1B). Thereafter, the patient was followed up for six months, and no draining from sinus was observed.

The effective use of citric acid in the treatment of acute and chronic wounds and ulcers has been reported. Excellent results of citric acid therapy have been obtained while dealing with chronic wounds.¹⁻⁵ Citric acid physiologically functions as an antibacterial agent and effectively controls the infection as indicated by microbiological studies and by rapid clearing up of infected surfaces.⁶ The antiseptic property may be due to the lowering of pH of the infected surfaces, which makes the envi-

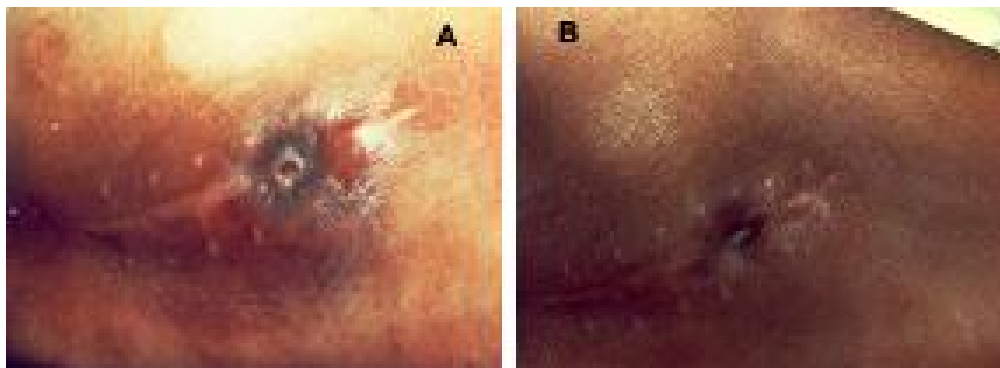


Figure 1: Nonhealing tuberculous sinus in the mid-tarsal region of a 22-year-old woman (A) before the application of citric acid, (B) after 11 daily applications of citric acid.

ronment unsuitable for the growth and multiplication of the bacteria. It also enhances epithelization, which is a major factor in wound healing. Hydration, oxygenation and removal of dead tissue ensure good epithelization.¹⁻⁵ Histological studies showed that citric acid was found to enhance the wound healing process by boosting fibroblastic growth and neo-vascularization, which in turn increases microcirculation of wounds that enables the formation of healthy granulation tissue thereby leading to faster healing of wound.⁶ All of these actions increase the migration of epithelial cells from the surrounding skin, and epithelization acts as a stimulus for laying the ground substance. Also, the citric acid is a synergistic antioxidant,⁷ which may prevent free radical damage and may stabilize lysosomal enzymes needed for collagen synthesis.

In the present study, we used citric acid for the treatment of chronic sinus successfully. The sinus, which did not respond to anti-Koch's treatment or loads of antibiotics, healed completely in 11 (one application a day) applications of citric acid. Hence, we can safely suggest the use of citric acid in the treatment of a chronic sinus when other conventional modalities are exhausted.

Basavraj S. Nagoba¹, Vinayak V. Aghav², Bharat J. Wadher³, Arunkumar. Rao⁴, Sohan P. Selkar⁵

¹Departments of Microbiology, ⁴Orthopedics and ⁵Physiotherapy, MIMSR Medical College, Latur, ²Department of Biochemistry, Governmental Medical College, Latur, ³Department of Microbiology, RTM Nagpur University, Nagpur.

Correspondence:

Basavraj S. Nagoba,
Department of Microbiology,
Research & Development,
MIMSR Medical College,
Latur 413 531 (M.S.) India.

Tel: +91 0942 307 5786

Fax: +91 02382 227246

Email: dr_bsnagoba@yahoo.com

bsnagoba@indiatimes.com

Received: 2 June 2010

Revised: 12 September 2010

Accepted: 27 September 2010

References

- 1 Nagoba BS, Pathan AB, Wadher BJ. Citric acid treatment of nosocomial infections: a new era in the antimicrobial chemotherapy. *Kuwait Med J* 1999; 31: 72-4.
- 2 Nagoba BS, Gandhi RC, Wadher BJ, et al. Citric acid treatment of severe electric burns complicated by multiple antibiotic resistant *Pseudomonas aeruginosa*. *Burns* 1998; 24: 481-3.
- 3 Nagoba BS, Wadher BJ, Chandorkar AG. Citric acid treatment of non-healing ulcers in leprosy patients. *Br J Dermatol* 2002; 146: 1101.
- 4 Nagoba BS, Wadher BJ, Rao AK, et al. Simple and Effective Approach for the Treatment of Chronic Wound Infections Caused by Multiple Antibiotic Resistant *Escherichia coli*. *J Hosp Infect* 2008; 69: 177-80.
- 5 Nagoba BS, Gandhi RC, Wadher BJ, et al. A simple and effective approach for the treatment of diabetic foot ulcers with different Wagner grades. *Int Wound J* 2010; 7: 153-8.
- 6 Nagoba BS, Gandhi RC, Wadher BJ, et al. Microbiological, Histopathological and Clinical Changes in Chronic Wounds after Citric Acid Treatment. *J Med Microbiol* 2008; 57: 681-2.
- 7 Budawari S, O'Neil MJ, Smith A, Heckelman PE. Citric acid. The Merck Index – An Encyclopedia of Chemicals, Drugs and Biologicals, 11th ed. Rahway: Merck & Co. Inc.; 1989. p. 2330.