Noncontact, Low-Frequency Ultrasound Therapy* to Expedite Healing of a Dehisced Surgical Incision

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Background

Cardiovascular and peripheral vascular diseases contribute to wound chronicity. Modalities to aid the wound-healing process in patients with vascular disease are needed.

Published clinical studies evaluating noncontact, low-frequency ultrasound* (hereafter noncontact ultrasound) for healing of chronic wounds have primarily involved lower-extremity wounds of diabetic, ischemic, and varied etiology.[1] To date, no studies have been published evaluating this novel ultrasound therapy in post-surgery wounds.

Purpose

This case report describes the course and outcomes of noncontact, low-frequency, ultrasound therapy to expedite healing of a dehisced surgical incision in a patient with multiple comorbidities including cardiovascular and peripheral vascular disease.

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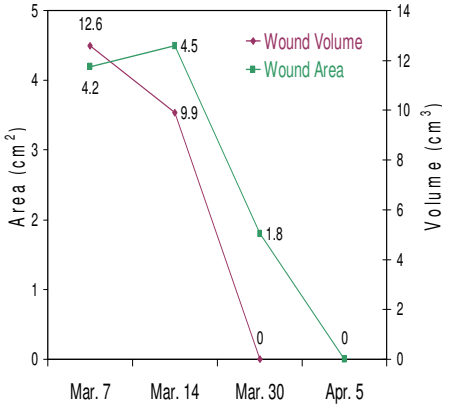
Case Report

History

A 76-year-old man presented to our unit 52 days status post surgical repair of an ascending aortic aneurysm. The sternal incision had separated. His comorbidities included hypertension, coronary artery disease, venous insufficiency, chronic renal failure requiring dialysis, respiratory failure, and history of cerebrovascular accident. He was ventilator-dependent and used a manually operated wheelchair.

Treatment

Initial treatment consisted of papain-urea with chlorophyllin copper complex ointment and gauze dressing. After 10 days of this treatment, noncontact ultrasound was initiated on March 7, 2007 as an adjuvant therapy 3 times per week for 3 minutes per session.



Course and Outcomes

The wound progressed to closure with 4 weeks of noncontact ultrasound in addition to the enzymatic debrider and gauze dressing. As shown in the figure, wound volume began to decline during the first week of noncontact ultrasound therapy and entered a steep decline during the second and third weeks. Lack of wound depth by the end of Week 3 resulted in zero wound volume from that point forward. Wound area increased very slightly during the first week of treatment but entered a steep decline during the second and third weeks resulting in complete wound closure by the end of Week 4 (see photograph series).

March 7 **March 14** **April 5**

Discussion

This patient's poor vascular and pulmonary health would typically be associated with impaired wound healing. In the author's estimation, complete closure in such a case could be expected to take 8 to 12 weeks. Healing of this dehisced surgical wound with 4 weeks of noncontact ultrasound therapy and an enzymatic debriding agent compares favorably to the expected healing time.

Conclusions

The addition of noncontact ultrasound therapy to conventional wound-healing therapies may offset the healing delays typically associated with vascular and pulmonary disease.

References

[1] Unger P. Low- frequency, noncontact, nonthermal ultrasound therapy: a review of the literature. *Ostomy Wound Manage.* 2008;54(1):57-60.