Impact of a microcurrent generating device on wounds with Complex Etiology

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BACKGROUND

The success of wound healing outcomes depend on wound etiology, chronicity, presence of pre-existing co-morbidities, and importantly, method of management. Many long-term problems arise from complex diagnoses and unexpected circumstances, including instances such as an implanted nerve stimulator becoming infected and wounds not healing due to aggressive cancer treatments. These patients face unseen circumstances that further derail their ability to heal an already complicated wound healing situation. Management of the local wound condition, as well as addressing systemic conditions supports efforts in restoring an optimal wound environment. Not all wounds are suitable candidates for standard of care wound treatment approaches, and in the case of complex wounds, a more rigorous multi-modality approach must be taken. Recent evidence-based treatments, including that of a microcurrent-generating dressing (MCD) (a) , has shown improved clinical outcomes and quality of life, and improved healing on both a cellular (1) and clinical (2-4) level.

METHODS

A case series was performed to assess the effects of the microcurrent generating device (MCD) in four patients presenting with nonhealing, complex wounds. Patients belonged a long-term care facility and presented with significant co-morbidities. Wound etiologies included two ulcerations and two surgical wounds, all iatrogenic in nature. The device was applied as a primary contact layer or in concert with Negative Pressure Wound Therapy (NPWT) when needed. Three of the four cases used the MCD and NPWT at a point in the treatment regime when indicated. One of the four cases used the MCD as the wound contact layer and an appropriate secondary dressing. Patients were monitored on their healing progress.

RESULTS

The complex cases presented in this series highlights the daunting challenge of wound management in patients with significantly compromised health status, numerous co-morbidities, and history of delayed and poor healing. Case #1 showed improved healing with the MCD + NPWT on a cellulitis related wound, despite various comorbidities. Case #2 demonstrates improved healing with MCD and relief of a painful wound in a patient with 35 co-morbidities. The wound had failed traditional management techniques, and with the application of the MCD, secondary surgical intervention was prevented. Case #3 pointed to the efficacy of the MCD + NPWT in initiating healing in an extremely painful, deep and complex wound; significantly, following the application of the MCD, patient no longer required fentanyl patch (b), hydromorphone (c), and alprazolam (d). In Case #4, the application of the MCD + NPWT resulted in wound healing in a tunneling wound of a patient with over 42 comorbidities.

CONCLUSION

Results from this case series demonstrates tremendous promise of the microcurrent generating device in offering a practical and efficacious approach to both complex- as well as standard wounds. In a compromised, high-risk patient population with numerous co-morbidities, products that may initiate healing, improve quality of life through reduced wound discomfort, and reduce need for secondary surgical intervention, play a vital role in the wound care clinic and beyond.

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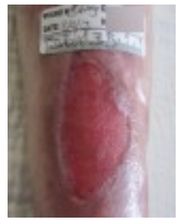
a) Procellera® Antimicrobial Wound Dressing, Vomaris Wound Care, Chandler, AZ
b) Duragesic, Janssen, Titusville, NJ
c) Dilaudid, Purdue Pharma, Stanford, CT
d) Xanax, Pfizer, New York, NY
e) Medihoney®, Derma Sciences, , Princeton, NJ

CELLULITIS

Patient History 60 y/o, W, M with brain cancer had developed a wound on his right lower extremity related to cellulitis. He received an I & D and was placed on NPWT in the hospital. Admitted to the rehab center on 8/4/12 for continuation of wound care and therapy services. He was receiving chemotherapy. Chronicity of cellulitis prior to I&D is unknown.

Dx: Brain CA, chemotherapy, L hemiplegia, altered mental status, RLE cellulitis, I & D RLE, DM, depressive disorder, anxiety, insomnia, cerebral edema, falls, speech disturbance, urine incont., hypomagnesemia, leukocytosis, pulmonary embolism, UTI

Treatment:
8/4/12: MCD/NPWT/foam filler at 125 mmHg; dressing changes 3x/wk
8/7/12: Decreased dressing change frequency to 2x/wk
8/9/12: Changed NPWT filler to gauze, decreased pressure to 80 mmHg
8/20/12: Decrease pressure of NPWT to 75 mmHg
8/22/12: D/C NPWT, no longer needed. Continued with MCD with drsg changes 2x/wk
10/30/12: Patient expired d/t progression of brain cancer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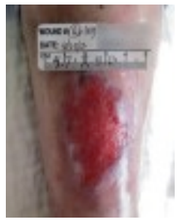
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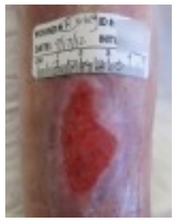
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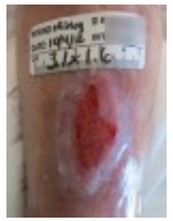
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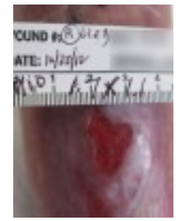
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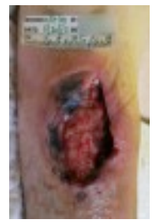
HEMATOMA

Patient History: 65 y/o, W, M with long hx of bilateral lower extremity wounds related to his dxs of venous insufficiency, severe PVD, non-compliance, and lower extremity edema. The wound site began as stable hematoma on 8/10/12 and was monitored daily and waiting for reabsorption. Patient sent from dialysis, without conferring with the rehab center, to an acute care ER for evaluation of the site and underwent I & D and returned with an order for wet to dry. Wound very painful and he was unable to tolerate this treatment. Medicinal grade honey (e) was applied with no improvements, and patient was switched to MCD 4 days later, with wound progressing towards healing. Skin grafting procedure was scheduled but avoided due to improved outcomes with MCD.

Dx: MS, major depressive disorder, UTI, MRSA, ESRD with hemodialysis 3x/wk, cardiac failure, DM, cerebrovascular disease w/dysphagia, hemiplegia, cognitive deficits, anemia, renal osteodystrophy, chronic venous ulcers, severe PVD, HTN, hyperlipidemia, cardiomegaly, heart disease, hyperphosphatemia, CAD, osteoporosis, dependent edema, urinary incont., bowel incont., cerebral arteriosclerosis, anxiety, vascular dementia, senile dementia, obesity, falls, pulmonary congestion, non-compliance, vitamin deficiency, AF, atherosclerotic disease, OA w/chronic pain, apraxia.

Treatment:
8/10/12: Hematoma originated, stable and intact. Applying skin prep and monitoring daily.
8/15/12: I & D performed in ER, returned to the rehab center with Wet to Dry order, change QD, and abx.
8/16/12: Medicinal honey, cover, change QD
8/20/12: Changed to MCD, change 2x/wk due to pain and wound decline.
10/30/12: Wound closed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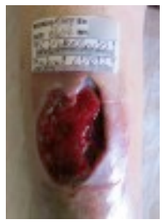
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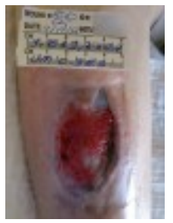
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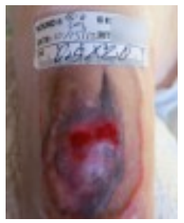
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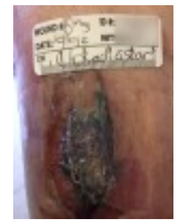
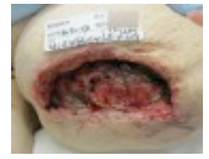

Day 71

DEHISCENCE

Patient History: 80 y/o, W, F initially underwent a L BKA in Jan. 2012. Multiple re-admissions to the hospital for severe UTI, two revisions to the L amputation site, and debridement of the final revision. Was taken from a BKA to an AKA and then revised to a higher AKA. First admitted to the rehab center 4/11/12 with a very unstable L AKA revision, multiple PU on her sacral/coccyx region, and 3 vascular areas on her right foot. She was later re-admitted to the hospital for debridement of the L AKA surgical incision and returned to the center on 5/4/12. She was very malnourished, and L AKA surgical debridement site unstable. It was very difficult to perform dressing changes due to her severe pain. Wound had copious exudate and required multiple dressing changes daily. She received hydrocodone, fentanyl patch, and anxiety meds and pain continued to be severe. She was started on NPWT and MCD with dressing changes 2x/wk in attempt to reduce her pain. Dressing changes decreased to 2x/wk vs. multiple times daily. She suffered a severe UTI and pneumonia during the treatment period in addition to the uncontrollable pain. At one point she was receiving the Fentanyl patch, hydromorphone, and alprazolam to control her pain. She went on to completely heal and the pain eventually subsided.

Dx: L AKA, hypothyroidism, AF, thromboembolic disease, DM, MRSA (wounds), chronic renal disease-stage 3, OSA, 1st degree atrioventricular block, hyperkalemia, PAD, depression, chronic pain, Vitamin D deficiency, UTI-E Coli x2, CHF, acute post hemorrhagic anemia, severe malnutrition, senile dementia, chronic F/C use, chronic CHF, Leukocytosis, HTN, pneumonia

Treatment and significant dates:
5/7/12: Began treatment with NPWT and MCD with 2x/wk dressing changes
5/21/12: Pain addressed with fentanyl patch, Lortab, and anti-anxiety meds
5/29/12: UTI with ESBL, started IV abx. Led to yeasty skin issues
6/4/12: Pain now being addressed with Fentanyl patch, hydromorphone, and alprazolam
6/8/12: Dx with pneumonia began IV abx
6/19/12: 1st time to report no pain with dressing change and required no pain meds
7/16/12: D/C NPWT due to no longer being indicated. Continue with MCD with dressing changes 2x/wk
8/13/12: Wound closed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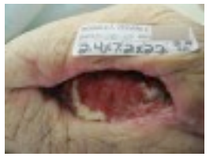
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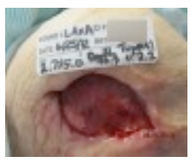
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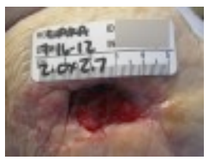
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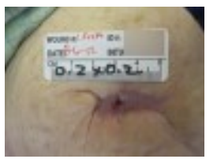
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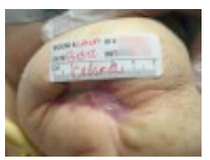
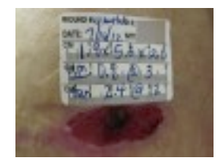

Day 98 MCD

DEHISCENCE

Patient History: 71 y/o, W, F. Significant h/o back surgeries x 7 with placement of a neurostimulator in the LLQ area between the left upper portion of the buttock and the left lateral lower back. Patient suffered a slight overall decline in health status in March/April of 2012 and developed a DTI on 4/27/12 in the left buttock region in a perfect square; the size, shape, and location of the stimulator. She was admitted to the hospital for removal of the device. She returned on 5/11/12 with the deficit reapproximated with steri-strips. The area opened on 5/17/12 and was addressed with multiple different antimicrobial dressings until 6/1/12 when she followed up with a plastic surgeon to open the area to expose the necrotic tissue within the cavity. She began NPWT and active leptospermum honey to address the necrosis. Once the necrosis was eliminated on 7/16/12, she was changed to NPWT and MCD to continue addressing any surface bacteria and stimulate epithelial migration to speed the healing. She continued with this treatment until NPWT was no longer needed on 8/20/12 and continued to closure with MCD alone with 2x/wk dressing changes.

Dx: DM II, long-term insulin use, obesity, OA, h/o spinal surgery w/ laminectomy and spinal fusion, h/o 7 total back surgeries, placement of neurostimulator device, dementia, behavior disturbances, falls, HTN, neuropathy, depression, urine and fecal incontinence, h/o CVA, h/o RLE cellulitis, h/o mental disorders, tachycardia, Vitamin D deficiency, hyperlipidemia, anxiety, dysphagia, renal disease, h/o ischemic colitis, venous insufficiency, facial droop, L side hemiplegia, right eye blindness, pleural effusion, h/o recurring pneumonia, hypocalcaemia, psychosis, lumbosacral spondylosis, degenerative disk disease, lumbago, idiopathic spondylosis, h/o TIA, Vitamin A deficiency, hypoglycemia, UTI, removal of implanted neurostimulator device, atrophic vaginitis, vaginal prolapse, bowel strictures, hypokalemia.

Treatment and significant dates:
7/16/12: MCD and NPWT at 100 mmHg, change 2x/wk
8/20/12: D/C NPWT due to no longer needed. Continue with MCD changing dressing 2x/wk
10/15/12: Wound closed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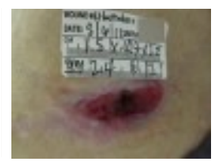
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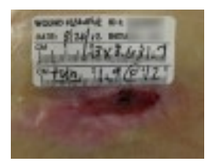
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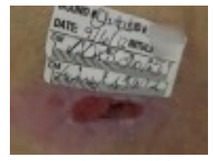
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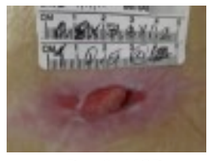
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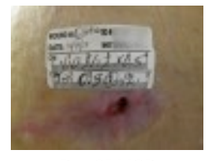
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