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ENGINEERED TISSUE SOLUTIONS

Risk Mitigation by Avoiding the Operating Room: Wound Closure in High Surgical Risk Patients Using an Innovative Bioactive Glass Wound Matrix

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INTRODUCTION

The American Society of Anesthesiologists (ASA) physical status classification was developed to characterize a patient's physiologic condition and help predict operative risk on a scale of 1-5, whereby 1 is normal health and 5 is moribund.[1] Recent data has shown that patients with an ASA class of IV or greater, compared to their healthy ASA I class counterparts, are 17 to 63 times more likely to develop a medical complication and 212 to 2093 times more likely to die following surgery.[1]

Many of the same co-morbidities associated with severe systemic disease and increasing ASA class/risk, are also markers of patients at high risk for development of chronic wounds (e.g., poorly controlled diabetes, peripheral and/or cardiovascular disease, pulmonary disease, obesity, smoking, and renal failure). Thus, many patients being treated for chronic wounds are poor candidates for surgical intervention. In these high-risk patients who have failed prior treatments, or have developed stalled wounds, management decisions become challenging. It is truly risk-analysis with severe consequences, whereby that risk could mean death.

A recently developed novel borate-based bioactive glass wound matrix* (BGWM) has demonstrated promise in wound healing.[2] This bioactive glass nanofiber has been shown to stimulate soft tissue growth and angiogenesis, and to reduce inflammation and incidence of infection.[3-5] Here we present a series of patients with large chronic wounds that were referred to a surgical office for operative intervention. These patients were all deemed to be poor surgical candidates, with ASA classification of IV. All patients were treated in the outpatient clinic with an innovative bioactive glass fiber matrix and were successfully healed without adverse event.

*MIRRAGEN® Advanced Wound Matrix, ETS Wound Care, Rolla, Missouri

METHODS

Three patients were treated. All patients were ASA Class IV and deemed poor surgical candidates by the primary author. Wounds were cleansed with sterile normal saline solution and debrided if appropriate. BGWM was shaped to fit the size of the wound bed and pressed directly in contact with the wound, covering the entire wound area and overlapping 3-4 mm onto periwound. A non-adherent dressing was used to secure the BGWM to the wound bed and covered with a super-absorbent bolster dressing to absorb exudate. Dressings were changed once per week.

PATIENT ONE

BEFORE HEALED AT 14 WEEKS

PATIENT TWO

BEFORE

HEALED AT 14 WEEKS

PATIENT THREE

BEFORE HEALED AT 3 WEEKS

RESULTS

Average patient age was 69 (range: 61-84) and all patients had multiple comorbidities including diabetes, vascular disease, and active anti-coagulation. Two of the patients were active smokers, and one was obese with coronary artery disease and cerebrovascular disease. Wound types included two surgical wounds following wide debridement of hematoma-induced skin necrosis, and one chronic fasciotomy wound due to critical limb ischemia. Wounds were present an average of 12 weeks prior to initiation of BGWM. All patient wounds had stalled with negative pressure wound therapy. The average wound area at the start of BGWM treatment was 89 cm2 (range: 33 – 119 cm2). All wounds healed after an average of 11 weeks during use of BGWM. There are no complications, infections, or reports of pain during treatment.

DISCUSSION

Bioactive glass wound matrix is an effective alternative to surgical closure of chronic wounds in high-risk patients. Successful healing with this novel, antimicrobial skin substitute mitigates the risk of postoperative complications and provides a comfortable, versatile outpatient solution to a challenging situation in challenging patients.

REFERENCES

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