Preliminary Experience Using Axolotl (*Ambystoma Mexicanum*) Dermis Patches as a Biologic Agent for Wound Management After Neurosurgical Procedures

Megan D Malueg BS, Ammad A Baig MD, Matthew Moser MD, Brianna M Donnelly BS, Justin Im, BS, Jaims Lim MD, Vinay Jaikumar MD, Bernard K. Okai BS, Steven B Housley MD MSc, Adnan H Siddiqui MD PhD, Kenneth V Snyder MD PhD

BACKGROUND AND OBJECTIVE

In the US, chronic wounds affect more than 6.5 million people annually—a mean cost of $23,755 among neurosurgery patients. Current wound management solutions have disadvantages, including rejection, disease transmission from mammalian-sources, and cultural issues prohibiting some products. Here, we describe preliminary use of xenograft tissue derived from axolotl (*Ambystoma mexicanum*) dermis for use in wound management after neurosurgical procedures.

METHODS

Our prospective database was retrospectively searched for consecutive patients who underwent wound closures using axolotl dermis patches (NeoMatriX, NeXtGen Biologics, Alachua, FL). Patient demographics, daily alcohol and tobacco use, radiation history, operation type, and antibiotic regimens post-closure were collected. Rates of postoperative infection, wound dehiscence, and wound revision or repeated irrigation were collected for outcomes

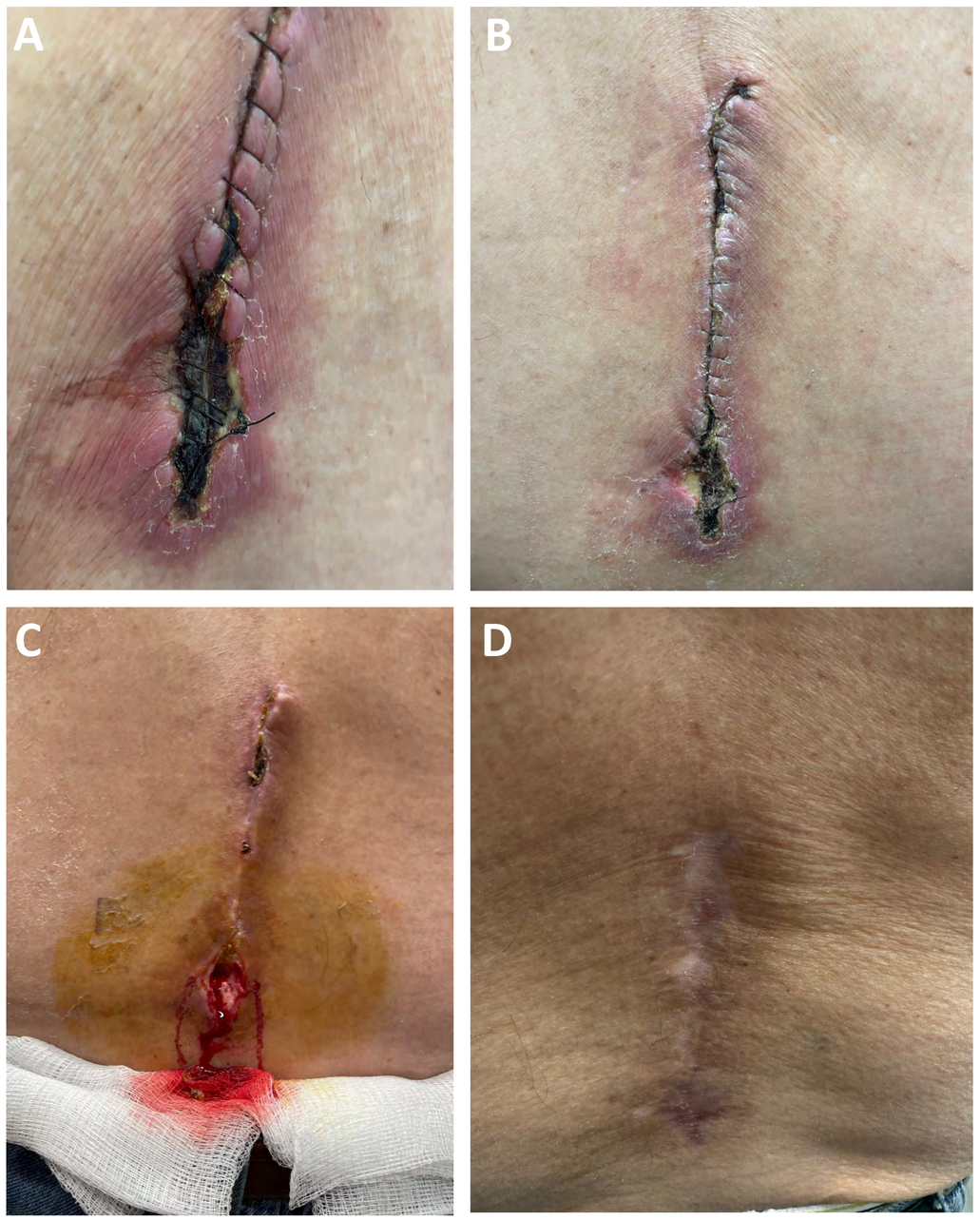

Figure: (A) Presentation of wound at first follow-up appointment, prior to any application of axolotl dermis patch; (B) State of wound healing following suture removal and application of 2 8mm discs of axolotl dermis patch for secondary wound closure, 4 days prior; (C) State of wound approximately 5 weeks after initial presentation for follow-up, following a second wound debridement. Additional 15mm disc and 10×20mm axolotl dermis patches were subsequently applied for revision of secondary wound closure; (D) Healed wound approximately 16 weeks after the first application of axolotl dermis patches for secondary wound closure

RESULTS

Twenty-three patients underwent wound closure with the patches. At least one comorbidity related to delayed wound closure was present in included patients: obesity = 8 (34.8%), diabetes = 3 (13%), chronic obstructive pulmonary disease = 3 (13%), hypertension = 11 (47.8%), hyperlipidemia = 10 (43.5%), hypothyroidism = 3 (13%), benign prostatic hyperplasia = 3 (13%), HIV = 1 (4.3%), cancer = 7 (30.4%), daily alcohol use = 4 (17.4%), and current smoking = 7 (30.4%). Wounds treated were from decompressive laminectomy, microvascular decompression, thoracolumbar instrumentation revision, and pseudoaneurysm ligation/resection in 1(4.3%) patient each. Three (13%) patients had wounds from aneurysm clippings, 6(26.1%) each from craniotomies and wound dehiscence treatments, and 4(17.4%) from cranioplasties. Patches were applied for primary wound closure in 14(60.9%) patients and secondary wound closure in 9(39.1%) patients. Post-application wound infection or wound dehiscence and/or revision occurred in 2(8.7%) patients.

CONCLUSIONS

Pro-regenerative axolotl dermis for mammalian wound management has favorable potential in improving neurosurgical wound closure and healing and overall outcomes.

MKT-019-8 Rev 0 CO-2024-074 Effective Date: 10/30/24

UB NS University at Buffalo Neurosurgery

NEXTGEN™ BIOLOGICS