normal wounds but pathologic (diabetic, radiated) ones as well. Further work continues towards a better understanding of the mechanisms underlying the salutary effects of alpha gal.

136

Denervation Induced Degradation of Motor Endplates can be Delayed Using Local Supplementation of Agrin at the Time of Injury.

Winnie Palispis, MD¹, Henry Hoang, BS¹, Jennifer Uong, BS¹, Justin P. Chan, BA¹, James Clune, MD², Ranjan Gupta, MD¹

¹University of California, Irvine, Irvine, CA, USA, ²Yale University, New Haven, CT, USA

PURPOSE: Robust muscle atrophy and fibrosis are cited as the prime causes for the permanence of motor deficits following surgical intervention for a denervation injury. Following a peripheral nerve transection, regenerating axons traverse long distances to reinnervate their target organs. However, due to the slow rate of axonal regrowth and a large segmental defect, muscle atrophy and destabilization of the neuromuscular junction (NMJ) usually proceeds before reinnervation occurs. Agrin is characterized as an essential component of NMJ formation and synaptogenesis. Here, we utilize an in vivo agrin deficient mouse nerve denervation model to both characterize the morphology of agrin deficient endplates as well as the response of the NMJ to local delivery of agrin following a denervation event. We found the endplates of agrin-deficient mice in a more degraded states than the endplates of wildtype mice following denervation. We also found that local delivery of agrin following denervation serves to transiently improve motor endplate morphology. We thus demonstrate the efficacy of using a biomolecular therapeutic approach to maintain and preserve the denervated NMJ.

MATERIALS AND METHODS: A denervation model was created in 6-week-old mice from WT and agrin deficient C57BL/6 strains by excising 10mm right sciatic nerve segment from the mid-thigh of the mice and suturing the proximal nerve stump to the gluteal muscle with 9-0 suture so as to prevent regeneration. Agrin deficient mice were either injected with supplemental agrin or PBS as a control at the site of injury. The downstream denervated and contralateral control soleus, plantaris and gastrocnemius muscles were harvested for immunohistochemistry, cryo-sections with H&E staining, and quantitative western blots at the 1, 2, 4, 8 and 16-week timepoints. Quantification of motor endplate morphology was done using Velocity 3-D image software. Quantification of muscle fiber diameter was done using ImageJ software.

RESULTS: Fluorescence confocal imaging of harvested soleus muscles revealed that agrin supplemented animals retained superior motor endplate morphology over control animals in all timepoints. The average surface area of agrin supplemented endplates were significantly greater than control endplates in all analyzed timepoints (p <0.05)

CONCLUSION: Highlighting the importance of agrin, we have shown that even a single supplemental dose of agrin delivered locally at the site of injury is effective in preserving motor endplates in denervated mice hindlimbs even at the latest time points. This is consistent with our previous work that detailed MMP3 knock down maintained agrin at the NMJ and thereby preserved the motor endplates so as to improve function recovery. Taken together, these current experiments support the strategy to preserve motor endplates so as to prolong the window of opportunity for surgical intervention after a traumatic nerve injury.

137

Clinical Outcomes in Prepectoral Stage 1 Breast Reconstruction

Shanique Martin¹, Elizabeth Turner², Brian Thornton², Rahim Nazerali³

¹Stanford University, Palo Alto, CA, USA, ²ThorntonMD, Louisville, KY, USA, ³Division of Plastic and Reconstructive Surgery, Stanford Hospital and Clinics, Palo Alto, CA, USA

PURPOSE: Plastic surgeons are increasingly exploring prepectoral breast reconstruction as an option for their patients, but there is little evidence on clinical outcomes to guide this decision-making process. The placement of a prosthetic device superficial to the pectoralis major muscle is an attractive breast reconstruction technique addressing the issue of animation deformity and incurring less
postoperative pain. Emphasis is often on appropriate patient selection with obesity, tobacco use and prior breast irradiation being listed as relative contraindications to immediate prepectoral breast reconstruction. Here we present a large series of patients from a single surgeon database on prepectoral reconstruction outcomes.

METHODS: We performed a retrospective review of a prospectively maintained database on prepectoral implant-based breast reconstructions, between January 1, 2017 - October 30, 2018. All patients who were at least 30 days postoperative after tissue expander placement (stage 1) reconstruction were eligible for inclusion in the study.

RESULTS: There were 169 patients who underwent stage 1 breast reconstruction with prepectoral tissue expander placement. Overall, 135 patients (average age 51.1 years) were included in the study. Postoperative follow-up ranged from 1.2 months (36 days) to 20.5 months (628 days) with a median of 5 months (153 days).

The average BMI was 27.3 kg/m² with 37 patients (27.4%) classified as obese. The prevalence of diabetes and tobacco history were each 5%. There were 28 patients (20.7%) who received neoadjuvant chemotherapy and 9 patients (6.7%) with prior breast irradiation. Nipple sparing mastectomies were performed in 73 patients (54%) and 108 patients (80%) underwent bilateral reconstruction. Immediate tissue expander insertion after mastectomy was performed in 111 patients (82%). Complete anterior coverage of the tissue expander with acellular dermal matrix (ADM) was performed in 86% of the immediate reconstruction cases and ADM was used in 25% of the delayed reconstruction cases. There were 33 patients (24%) who received postoperative oral antibiotics for greater than 24 hours following the procedure. The overall rate of complications following stage 1 reconstruction was 23%, with 6 patients experiencing multiple complications. Surgical site infection (23 patients, 17%) and flap and/or nipple necrosis (14 patients, 10%) were the most common complications. There was 1 complication of incision dehiscence. Multivariate analysis demonstrated that both obesity and immediate reconstruction were associated with increased risk of surgical site infection (OR 4.7, p= 0.006 and OR 12.4, p=0.028), though neither were associated with flap necrosis.

CONCLUSIONS: The rates of prepectoral breast reconstruction have increased in the past 5 yrs. Limited data exists in the literature describing the safety and rates of complications for this procedure in a large population. This review of a single surgeon’s experience with prepectoral breast reconstruction provides additional support for the continued adoption of this technique, given appropriate patient selection and counseling.

138

Breast Skin Reinnervation following Mastectomy

Amelia Van Handel, Thomas Tung

Washington University, Saint Louis, MO, USA

PURPOSE: Skin-sparing mastectomy is a morbid and disfiguring procedure. Breast reconstruction contributes to the patient’s recovery both physically and psychologically. However, the spared native breast skin remains insensate which can be annoying and bothersome at the least, and can cause paresthesias and chronic pain at its worse. Over time, some sensitivity may slowly return but it remains crude and very abnormal. The use of innervated flaps for reconstruction can help to restore some sensation but the flap skin paddle is often a small portion of the reconstructed breast surface, the majority of which is made up by denervated native breast skin. Reinnervation of the native breast skin has not been previously described. Our objective is to report a small series of patients who have undergone reinnervation of their native breast skin at the time of mastectomy.

METHODS: After the mastectomy was completed, and at the time of tissue expander placement, the native breast skin was reinnervated by intercostal sensory nerves. Our first patient underwent direct nerve repair as we were able to identify distal sensory nerves on the mastectomy skin flaps and severed proximal sensory nerves. However we have not been able to consistently identify the distal sensory nerves on the breast skin in subsequent patients and we therefore developed an alternative technique of harvesting intercostal sensory nerves for transfer. These were then coapted directly to the dermis of the underside of the mastectomy skin flaps for sprouting. Usually 2 intercostal nerves were used per side. This technique also provides extra nerve length to help accommodate tissue expansion. Tissue expander placement proceeded in a standard manner and the nerve transfer coaptations were completed with fibrin glue just prior to skin closure to prevent disruption of the nerve transfers during expander placement. The transferred intercostal sensory nerves were also positioned to avoid disruption at the time of second stage implant exchange. Sensation was evaluated postoperatively