the desired gain in length is created at the expense of shortening in the transverse axis and therefore, it is difficult to achieve tension-free closure with double opposing palatoplasty in wide clefts. Our aim in this study is to introduce a new modification of Furlow repair to overcome the disadvantages and compare its surgical outcomes with straight line repair.

METHODS: In this technique, an incision similar to square root shape is planned in the soft palate. Anteriorly based oral mucosal flap, which forms the transverse axis of the square root sign is almost 90 degrees to the central limb along the cleft edges. This design allows better mobilization and vascularity of this flap, and prevents accidental tearing of the oral mucosal flap towards its base. Posteriorly based oral myomucosal flap, which forms the smaller “V” of the square root sign, can be easily transposed with this design. The levator veli palatini sling is reconstructed under the operating microscope and a spacer (acellular dermal matrix) is placed between mucosal layer and oral layer.

All patients undergoing primary palatoplasty by a single surgeon over 6 years were retrospectively reviewed. A total of 57 consecutive patients included in the study were divided into two groups: 30 in the modified furlow palatoplasty (MVP) group and 27 in the straight line repair group. Clinical characteristics (age at the time of surgery, sex, cleft type) and surgical outcomes (rate of fistula formation and speech outcomes) were compared between two groups. Speech outcomes are classified into 3 categories: normal speech, hypernasal and hyponasal speech.

RESULTS: Median age of repair at both groups was 8 months. Distribution of sex, cleft type and presence of associated syndromes were similar between the groups. Most common cleft type was Veau 3 (37% in straight line repair group, 40% in MVP group). Speech evaluation was available in 49 patients (85%). Hypenasality was more common in the straight line group than the MVP group (10/23 vs. 6/26, respectively; p=0.02) Fistula rates did not change significantly between two groups (18% in the MVP group vs 23% in the straight line repair group; p=0.67)

CONCLUSION: Modified Furlow double opposing z-plasty along with levator veli palatini retropositioning followed by a spacer of allogem placed between the posterior nasal spine and the muscle reconstruction of the levator for primary palatal repairs demonstrated superior perceptual speech outcomes and same fistula rate with primary palatal repair.

Osteogenic Effects of Dipyridamole Versus rhBMP-2 Using 3D-Printed Bioceramic Scaffolds in a Growing Alveolar Cleft Model

Presenter: Christopher D. Lopez, BA

Co-Authors: Paulo G. Coelho, DDS, PhD; Lukasz Witek, MSci, PhD; Andrea Torroni, MD; Michael I Greenberg, BA; Dean L. Cuadrado, BA; Audrey M. Guarino, BA; Abrar J. Haque, BA; Bruce N. Cronstein, MD; Roberto L. Flores, MD

Affiliation: NYU Langone Health, New York, NY

PURPOSE: Alveolar clefts affect three out of four patients with cleft lip and palate (CL/P) resulting in maxillary arch instability, inability to support dentition, and facial asymmetry. Secondary bone grafting is the standard of care for alveolar clefts, but the procedure is associated with donor site morbidity and graft resorption. Although rhBMP-2 is under investigation for alveolar cleft repair, safety concerns remain regarding pathologic effects on the growing suture. This provides the impetus for investigating alternative osteogenic molecules. Dipyridamole (DIPY) is an adenosine receptor indirect agonist with known osteogenic potential. This study compared the regenerative capacity and side effects of DIPY to rhBMP-2 at alveolar cleft defects delivered via 3D-printed bio-ceramic (3DBC) scaffolds.

METHODS: 23 skeletally immature New Zealand White rabbits underwent unilateral, 3.5mm x 3.5mm alveolar resection adjacent to the growing suture. Five defects without intervention served as negative controls. Five defects between samples were scanned using microCT and new bone volume within scaffold was quantified using Amira 6.1 software (Visage Imaging GmbH, Berlin, Germany). Non-decalcified histology was performed and new bone within scaffold pores were evaluated for mechanical properties (i.e. reduced elastic modulus, hardness) and compared to internal controls of non-injured bone. Statistical analysis was performed using a generalized linear mixed model between groups and Wilcoxon rank sum test within samples.
RESULTS: MicroCT revealed a lack of bridging bone healing in negative controls. There was bridging bone formation across all 3DBC treatment groups. As a function of bone growth within the scaffold interstices, 1,000μm-DIPY scaffolds regenerated 28.03 ± 7.38% bone, 10,000μm-DIPY scaffolds regenerated 36.18 ± 6.83% bone (p=0.104 vs. 1,000μm and 10,000μm DIPY), and rhBMP-2 coated scaffolds regenerated 37.17 ± 16.69% bone (p=0.104 vs. 1,000μm vs. 10,000μm DIPY). MicroCT also revealed rhBMP-2 to be associated with active bone resorption at the area of the suture and evidence of early suture fusion, which was again not seen in DIPY group or controls. On histology and electron microscopy, no changes in suture biology were evident in DIPY groups, while the rhBMP-2 group demonstrated early signs of suture fusion as well as osteoelastic activity at suture borders suggestive of osteolysis. Healing was intramembranous-like and endochondral-like, with highly cellular and vascularized structure across all groups. Reduced elastic moduli of new bone was significantly less than native bone, irrespective of DIPY or BMP augmentation (p<0.01).

CONCLUSION: Dipyridamole augments bone regeneration similarly to rhBMP-2 at both 1,000μm and 10,000μm concentrations. Dipyridamole generates new bone without osteolysis and early suture fusion associated with rhBMP-2. 3DBC scaffolds are effective at local osteogenic agent delivery.

RECONSTRUCTIVE SESSION 2

Retrorectus Mesh Fixation Using Fibrin Glue: Early Outcomes of an Evolving Technique

Presenter: Irfan A. Rhemtulla, MD, MS

Co-Authors: Michael G. Tecce, DO; Robyn B. Broach, PhD; Charles A. Messa, BS; Jaclyn T. Mauch, BA; John P. Fischer, MD, MPH

Affiliation: University of Pennsylvania, Philadelphia, PA

PURPOSE: The retrorectus approach to abdominal wall hernia repair has led to superior post-operative outcomes. However, this technique has been associated with long hospital lengths of stay (LOS), long operative times, long time to drain removal, and more frequent 30-day post-operative visits (POV). Additionally, there is substantial effect on patient well-being with high pain scores and low activity levels. The aim of our study was to determine the effect of fibrin glue fixation (FGF) of mesh when compared to suture fixation (SF) on early post-operative outcomes after retrorectus hernia repair.

METHODS: Patients undergoing retrorectus abdominal wall hernia repairs (n=87) by the senior author between June 1, 2015 and December 31, 2017 were retrospectively assessed. 28 patients (32.2%) received FGF, whereas 59 (67.8%) received SF. Demographic factors, intraoperative details, and early post-operative outcomes were identified through the electronic medical record. The two cohorts were then matched based on the type of mesh, number of prior repairs, average defect size, age, BMI, and wound class. Statistical analyses were performed using chi-square tests for categorical variables and Students T-tests for continuous variables.

RESULTS: After matching the two cohorts based on the 6 variables listed above, 21 patients remained in the FGF group and 21 remained in the SF group. All patients had retrorectus repairs with biosynthetic mesh. No statistically significant differences were identified in percentage of females (43% FGF vs. 48% SF, p=0.757), mean age (57 FGF vs. 56 SF, p=0.890), mean BMI (34 kg/m2 FGF vs. 35 kg/m2 SF, p=0.575), and average number of prior hernia repairs (0.81 FGF vs 0.76 SF, p=0.883). Intraoperative factors were similar as well with average wound class (1.33 FGF vs 1.38 SF, p=0.848), mean defect size (326 cm2 FGF vs. 334 cm2 SF), use of epidural and patient-controlled analgesics (p=1), concomitant procedures (p=0.756) including specifically panniculectomies (p=0.758), use of anterior component separation (p=0.4690), and use of transversus abdominis release (p=1). Surgical site occurrences between the two groups were not statistically significant except for a trend towards higher rates of seromas in the SF cohort (3 vs. 0 in FGF, p=0.072). Statistical significance was observed for LOS (3.7 days FGF vs. 7.1 days SF, p=0.032), time to drain removal (17 days FGF vs. 27 days SF, p=0.020), 30 day POV (2 visits FGF vs 3 visits SF, p=0.007), 24-hour pain scores (3 FGF vs 5 SF, p=0.021) and Braden activity scores (walking at 24 hours for FGF compared to sitting in a chair at 24 hours for SF, p=0.004). There was a trend towards decreased operative time (193 minutes FGF vs 217 minutes SF, p=0.352) and decreased narcotics being re-prescribed post-operatively (3 patients FGF vs 7 patients SF, p=0.272).

CONCLUSION: Compared to SF, FGF can improve pain and activity scores while reducing LOS, time to drain removal, and 30 day POV. This study shows that FGF is a safe and useful alternative to SF in the immediate