(P < 0.001). Overall, cell counts trended downward in the collagen only groups over 8 days with a significant decrease in count starting at day 6. There was no difference in the rate of proliferation of Alk+ cells in the presence of silicone shells. This is similar to the proliferation seen in Alk- BIA-ALCL cells, which was significantly more robust in the biomimetic platform compared to collagen-only groups, regardless of implant shell type (P < 0.01). Unlike Alk+ cells, Alk- BIA-ALCL cells grew nearly 30% faster in textured and smooth shell biomimetic groups compared with biomimetic wells lacking an implant shell.

CONCLUSIONS: Within a tissue-engineered 3-dimensional model of the breast microenvironment, Alk+ Lymphoma cells, which serve as an important comparator cell line to the study of Alk- BIA-ALCL, showed a significant increase in proliferation within the biomimetic groups only over 8 days, regardless of the presence or absence of implant shell. Comparatively, BIA-ALCL cells proliferated significantly more robustly within this platform in the presence of textured and smooth implant shell as well as biomimetic platform. These data suggest that there is thus something inherently unique to Alk- BIA-ALCL cells that drives proliferation in the presence of both biomimetic platform and silicone implant shell as the presence of a silicone implant shell does not drive increased proliferation of Alk+ Lymphoma cells. These data suggest that breast implant silicone shell in combination with the breast microenvironment may drive the growth of BIA-ALCL.

Prenatal Diagnosis of Craniofacial Anomalies: How Positive Are We About That Positive Result?

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**BACKGROUND:** Due to advances in 3-dimensional and 4-dimensional ultrasonography, it is possible to detect CF anomalies at 10 weeks of gestation as the facial bones begin to ossify. Rates of prenatally diagnosed craniofacial anomalies vary by region and country partially due to varied screening policies and level of technician expertise. Isolated craniosynostosis is a particular diagnostic challenge due to difficulties visualizing cranial sutures on ultrasound. The purpose of this study was to identify the diagnostic accuracy of ultrasound and magnetic resonance imaging (MRI) for various craniofacial anomalies at our tertiary care center associated with a high volume fetal diagnostic unit.

**METHODS:** Our institutional fetal imaging database, Fetal Force, was queried to identify patients with suspected craniofacial conditions from January 2002 through August 2019. Parental and demographic data, prenatal imaging, fetal DNA sequencing, postnatal exam findings, and outcomes (delivery, termination, fetal demise, infant demise) were obtained. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of prenatal diagnosis were calculated using postnatal clinical examination as the gold standard. Fetal terminations, demises, and dyads lost to follow-up were excluded from calculations due to lack of gold standard comparison.

**RESULTS:** Of the 73 parent/fetus dyads identified, 43 fetuses met all inclusion criteria. Thirty dyads were excluded for noncraniofacial anomalies, common facial clefts, or scans obtained due to family history of craniofacial anomalies. The mean maternal age at consultation was 32.8 ± 5 years (range, 22.4–41.3), mean gestational age 26w ± 4w6d (range, 19w–36w5d). 70% (30) of patients were prenatally suspected to have craniosynostosis, 14% (6) micrognathia, 7.0% (3) Binder’s syndrome, and 9.3% (4) a variety of other conditions; microophthalmos, goldenhar, amniotic band syndrome, and Rubenstein-Taybi syndrome. 69.7% (30) of patients received fetal ultrasound and fetal MRI, 23.3% (10) received fetal US only, and 7.0% of patients (3) received fetal MRI alone. Seven fetuses were terminated (Craniosynostosis n = 6, microophthalmos n = 1) and 4 infants with multiple congenital anomalies passed away in infancy. For the diagnosis of any craniofacial anomaly, ultrasound: sensitivity 90%, specificity 43%, PPV 82%, NPV 60%; MRI: sensitivity 86%, specificity 50%, PPV 86%, NPV 50%. For craniosynostosis specifically, ultrasound: sensitivity 100%, specificity 43%, PPV 71%, NPV 100%; MRI: sensitivity 100%; specificity 50%; PPV 82%, NPV 100%. Ultrasound had a sensitivity and PPV of 100% for both micrognathia and Binder’s syndrome. There were 4 false positive diagnoses of isolated craniosynostosis on prenatal ultrasound that were found to be overriding sutures without synostosis or normal head shape variants on postnatal examination. In the setting of syndromic craniosynostosis, careful attention was paid to associated anomalies (ie, hands and feet in Apert Syndrome) to support the diagnosis.
CONCLUSIONS: Although CF anomalies can be detected as early as 10 weeks gestation, most anomalies are diagnosed in the second trimester after the fetal anatomy scan. Finding ways to maximize diagnostic accuracy is paramount given the profound consequences of parental decision-making subsequent to diagnosis. Additionally, it is essential to communicate the degree of doubt associated with each prenatal diagnosis, especially in the setting of isolated anomalies.

Near-infrared Tissue Oximetry Predicts Outcomes of Flap Preconditioning in Rodents

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PURPOSE: Stress preconditioning of flaps is a potential strategy to mitigate risk of ischemia-reperfusion injury. The ability to reliably predict the impact of preconditioning on postoperative necrosis even before an incision is made would not only allow for improved operative planning but would also allow for better risk-stratification of patients. Although many devices have been developed to assess perfusion-related complications, they are limited by cost, intravenous dyes, and efficacy. This study assessed a novel, handheld, noninvasive and dye-less device using near-infrared spectroscopy to quantify tissue oxygenation in preconditioned tissue. By doing so, we determined the utility of near-infrared tissue oximetry in reliably measuring preoperative changes in flap oxygenation due to stress preconditioning, as well as this technology’s utility in predicting postoperative necrosis in preconditioned tissue.

METHODS: Twenty-four Sprague-Dawley rats were divided into 3 groups: (1) heat stress preconditioning, (2) negative pressure preconditioning, and (3) unconditioned controls. All rats underwent elevation of a dorsal, cranially based 10 cm × 3 cm random pattern modified McFarlane skin flap. Tissue oxygenation was assessed preoperatively before and after preconditioning, intraoperatively following flap elevation, and at 24-hour/7-d postoperative time points. Flap survival was assessed clinically and histologically at postoperative day 7. Chi-square and one-way analysis of variance were used to study clinical variables. Pearson product-moment correlation coefficients were used to study tissue oxygenation. ROC curves were used to assess the utility of the Intra.Ox in predicting flap necrosis.

RESULTS: Preoperative tissue oxygenation measurements recorded by the Intra.Ox device significantly increased 24 hours after negative pressure (51.2% versus 58.1%; P < 0.01) and heat stress preconditioning (50.3% versus 57.1%; P < 0.01). This correlated histologically to increased heat shock protein-32 staining from heat shocked tissue biopsied at this time point. In all animals, tissue oxygenation at all postoperative time points was negatively correlated with distance from the flap pedicle (r = −0.85 for postoperative day 7), with a statistically significant decrease in mean tissue oxygenation in the most distal centimeter of tissue compared to pedicle tissue (19.2% versus 48.9%; P < 0.01). Preconditioning with negative pressure and heat resulted in improved flap survival compared to unconditioned controls using histologic and clinical endpoints (mean weight of nonnecrotic tissue: 6 versus 5 versus 2.3 g; P <0.01). Accordingly, near-infrared spectroscopy demonstrated a significant increase in intraoperative tissue oxygenation in preconditioned distal flap tissue compared to unconditioned controls, with negative pressure preconditioning demonstrating the greatest increase in oxygenation (+19.2%, P < 0.001 for negative pressure, +15.4%; P < 0.01 for heat). For all experimental groups, intraoperative tissue oxygenation predicted tissue necrosis (area under ROC curve: 0.922).

CONCLUSIONS: Handheld near-infrared tissue oximetry may help in accurately predicting/preventing flap necrosis, as it was able to detect clinically relevant changes in rodent dorsal flap oxygenation even before a flap was raised. In fact, improved flap survival after preconditioning strongly correlated with preoperative changes in tissue oxygenation. Transcutaneous tissue oximetry should be further studied in clinical settings, in order to assess its utility in patient care.

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Global Trends in Plastic Surgery Content on Instagram

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