METHODS: For both studies, standardized frontal and lateral view preoperative and postoperative images of 20 patients who completed staged FFS (combinations of frontal sinus wall setback, supraorbital recontouring, mandibular angle reduction, genioplasty, upper lip shortening, septorhinoplasty, tracheolaryngeoplasty) were used; in addition, 10 male and 10 female unoperated control patients were included. (1) For the first study, the images were analyzed by 4 public neural networks trained to identify gender. Preliminary results led us to (2) a second study, using an online crowdsourcing platform. Respondents identified the gender of the same images, randomized, with a confidence rating (1: not confident; 10: highly confident). Age and smoking status were recorded as distractants. All results were recorded and analyzed for statistical significance.

RESULTS: (1) For the “neural network study,” all 4 programs provided a gender; 2 also provided a confidence score. The networks correctly identified male and female controls 98.6% and 91.2% of the time. Preoperative FFS patients were recognized as female only 54.5% of the time, whereas postoperatively this improved to 93.7%. Confidence scores (ranging from −1: confidently masculine to 1: confidently feminine) also significantly improved from 0.27 (preoperative) to 0.87 (postoperative) ($P < 0.0001$), with controls of −0.91 (male) and 0.89 (female). (2) For the “crowdsourcing study,” 802 people completed the survey. Control male and female images were correctly gender-identified 99.0% and 99.4% of the time with confidence 8.9 and 9.0, respectively. Preoperative FFS patients were identified as female only 57.3% of the time; by contrast, postoperatively 94.3% were identified as female, a statistically significant improvement of 37% ($P < 0.0001$). The confidence rating also improved from 1.41 to 7.78 ($P < 0.0001$).

CONCLUSION: The success of FFS (patients more likely to be identified as female) was demonstrated by both artificial and human intelligence methods. This is the first study of its kind evaluating how machine learning and the public gender type FFS patients.

Internal Cranial Expansion for Treatment of Refractory Intracranial Hypertension in an Adult Population

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BACKGROUND: Idiopathic intracranial hypertension (IIH) is a disease process attributed to increased intracranial pressure (ICP) that often presents with headaches, visual deterioration, and papilledema. Severe cases are often refractory to medical treatment, lumbar punctures, and cerebrospinal fluid shunts. Internal cranial expansion (ICE)
is a relatively novel technique that involves removing and shaving down the skull’s inner calvarial table and cancel- lous bone to increase intracranial volume and reduce ICP. Previous studies have shown success in pediatric patients. The present study describes the effectiveness of ICE in adult patients with IIH.

METHODS: A retrospective review was conducted of 9 patients from the ages of 18–61 years who underwent ICE for the treatment of IIH. Preoperative and postoperative clinical parameters including patient symptoms, presence of papilledema, and available ICP or cerebrospinal fluid opening pressures were compared. Procedural details and complications were noted. Intracranial volume increases were calculated using available pre- and postoperative computerized tomography scans.

RESULTS: Mean follow-up for the 9 patients in this series was 8 months. Technically successful ICE was performed in all patients within the cohort without any surgical complications. At the time of last follow-up, 4 (44%) of 9 patients were either symptomatically improved or asymptomatic. Three (33%) of 9 patients with headache had a reduction in or complete resolution of this symptom. Papilledema was resolved in all patients (4 of 4) with this sign. Postoperative intracranial volume expansion ranged between 6.9% and 18%.

CONCLUSIONS: ICE is a safe procedure that can provide symptomatic improvement for some adult patients and thus has a role in treatment of refractory IIH outside of the pediatric population. This surgery expands the intracranial volume and thus promotes ICP normalization, which may lead to the reduction or complete resolution of the signs and symptoms of IIH. ICE may be used as part of a multidisciplinary management approach in the treatment of refractory IIH.

Anticoagulation Protocols in Hypercoagulable Microvascular Head and Neck Reconstruction

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BACKGROUND: Inherited and acquired hypercoagulable conditions affect 15% of the population, and these conditions are often considered a relative contraindication to microvascular surgery. Anticoagulation protocols may be used to improve outcomes of microvascular surgery. The effects of anticoagulation protocols on success rates in the hypercoagulable head and neck population and complications related to these protocols have not been well described.

METHODS: A retrospective review was conducted of subjects who underwent microvascular head and neck reconstruction at a tertiary medical center over a 6-year period. Hypercoagulable subjects were defined as having an inherited coagulopathy or preoperative thrombotic event. Perioperatively, subjects were treated with individualized anticoagulation protocols. Outcomes studied were microvascular flap complications (thrombotic event or flap loss) and anticoagulation-related complications (flap or donor site hematoma). Multivariate analysis was used to compare outcomes.

RESULTS: A total of 137 head and neck microvascular reconstructions were performed during the study period. A preoperative thrombotic event had occurred in 23 of 24 subjects; 18 of 23 subjects (78.3%) had a history of deep venous thrombosis, 5 (21.7%) of PE, and 5 (21.7%) of spontaneous thrombotic stroke before 50 years old. Five subjects (20.8%) were diagnosed with an inherited or acquired thrombophilic disorder preoperatively. All subjects were treated with aspirin intraoperatively and daily postoperatively (n = 26; 92.9%), unless contraindicated by allergy. Subjects were stratified based on preoperative and intraoperative risk factors to receive either group 1 (low risk): prophylactic-dosing subcutaneous anticoagulation (n = 13; 46.4%); group 2 (medium risk): prophylactic-dosing continuous heparin infusion at 500 units/h (n = 8; 28.6%); or, group 3 (high risk): therapeutic anticoagulation/continuous PTT goal-based heparin infusion (n = 5; 17.9%). An inferior vena cava (IVC) filter was utilized in 12 reconstructions and was placed preoperatively in 9 subjects (32.1%) and postoperatively in 3 subjects (10.7%). All flaps were successful; however, 2 of 28 flaps (7.1%) were salvaged by operative revision from postoperative thrombotic events, 1 arterial and 1 venous, occurring on postoperative day 1. Focal necrosis requiring surgical excision and advancement occurred in 2 of 28 flaps (7.1%). A hematoma occurred at the site of flap inset in 3 of 28 reconstructions (10.7%) and at 2 donor sites (7.1%). Multivariate analysis of anticoagulation protocol did not demonstrate a statistical effect on flap complication rate or salvage. However, there was a statistically significant higher rate of both flap and donor site hematomas in group 3 with the use of therapeutic anticoagulation (P = 0.04). Subjects who had an IVC filter had a statistically higher rate of hematomas (P = 0.002) and trended toward increased flap complications (P = 0.06).

CONCLUSIONS: In our experience, the choice of anticoagulation protocol in hypercoagulable subjects does not affect reconstructive outcomes. However, we found that...