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3-D imaging protocols for assessing mesenteric blood flow in pediatric esophageal replacement surgery

Introduction

Esophageal replacement in the pediatric population is challenging due to patient longevity. Jejunal conduits have superior long-term outcomes compared to colonic and gastric conduits with less dysphagia, reflux, and chronic lung injury, but higher rates of anastomotic leaks and stricture due to the variable jejunal blood supply. We report early outcomes from our first 20 esophageal replacement cases utilizing jejunal conduits and our previously reported imaging protocol for operative planning.

Methods

A retrospective review was conducted with data collection including esophageal defect etiology, medical/genetic comorbidities, operative details, complications and nutritional outcomes.

Results

Between April 2023 and February 2026, 20 patients underwent esophageal replacement. 19 underwent supercharged jejunal conduits. One free flap was completed. 14 patients (70%) presented after failed attempts at congenital trachea-esophageal fistulas/esophageal atresia repair and 6 (30%) had previous caustic ingestions. Previous reconstructive procedures included staged Foker repairs (25%), gastric pull-up (25%), and colonic interposition (10%). Mean length of stay was 26.4 days (14-55). Complications included 1 partial conduit necrosis and 1 conduit stricture requiring revision early in the series. One patient had a contained leak from an end-to-side anastomosis managed with endoluminal ligation and one patient required resection of a similar pouch. One patient required laparotomy for a small bowel obstruction. Average in-person and/or virtual follow-up with the team was 30 weeks (3-123). Of patients with at least 4 months follow-up, 4/18 (22.2%) were feeding exclusively by mouth, 8/18 (44.4%) taking significant nutrition by mouth with G-tube supplementation, 2/18 (11.1%) are primary enterally feed but taking some oral nutrition, and 4/18 (22.2%) remain exclusively enterally alimented. All patients are in continuity and are swallowing oral secretions.

Conclusion

While technically challenging, supercharged jejunal conduits for pediatric esophageal replacement reliably achieve enteric continuity and improve oral nutrition with the prospect of better longitudinal outcomes. Plastic surgery involvement is critical to maximize conduit perfusion.

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Biography

Dr. S. Alex Rottgers is a pediatric plastic and craniofacial surgeon at Johns Hopkins All Children's Hospital in St. Petersburg, Florida. He is also an associate professor in the Johns Hopkins Department of Plastic and Reconstructive Surgery. Dr. Rottgers received his undergraduate degree in biology and philosophy from Rice University in Houston and his medical degree from Baylor College of Medicine, graduating with highest honors. He completed his residency in plastic surgery at the University of Pittsburgh and performed a fellowship in craniofacial surgery at Harvard Medical School and Boston Children's Hospital. Dr. Rottgers joined the Johns Hopkins faculty in 2015. He currently serves as the Johns Hopkins All Children's Hospital Chief of Pediatric Plastic Surgery, Director of the Cleft/Craniofacial Team, and Co-director of the Vascular Anomalies Clinic in St. Petersburg.