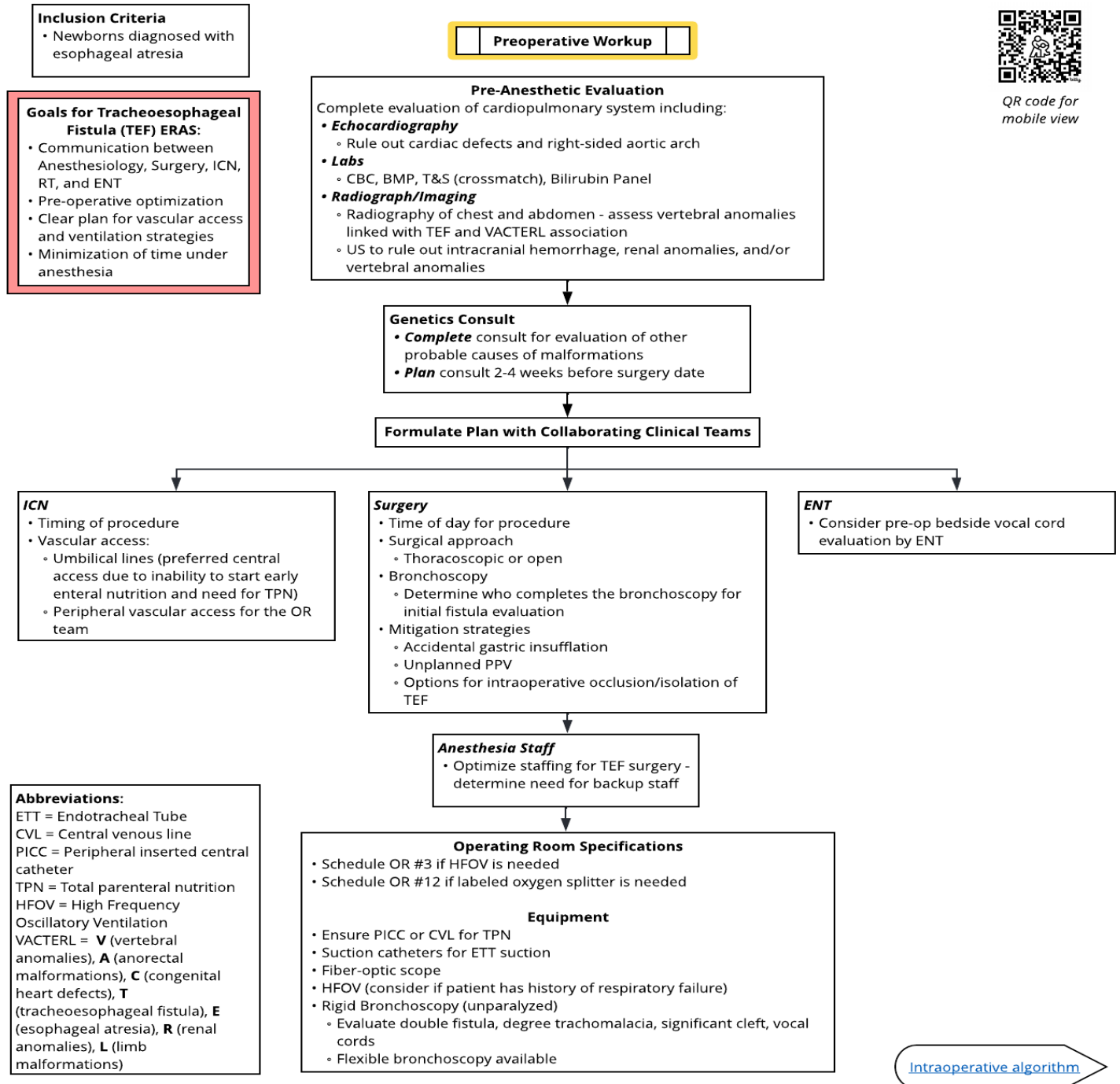




Tracheoesophageal Fistula Enhanced Recovery After Surgery Pathway Synopsis

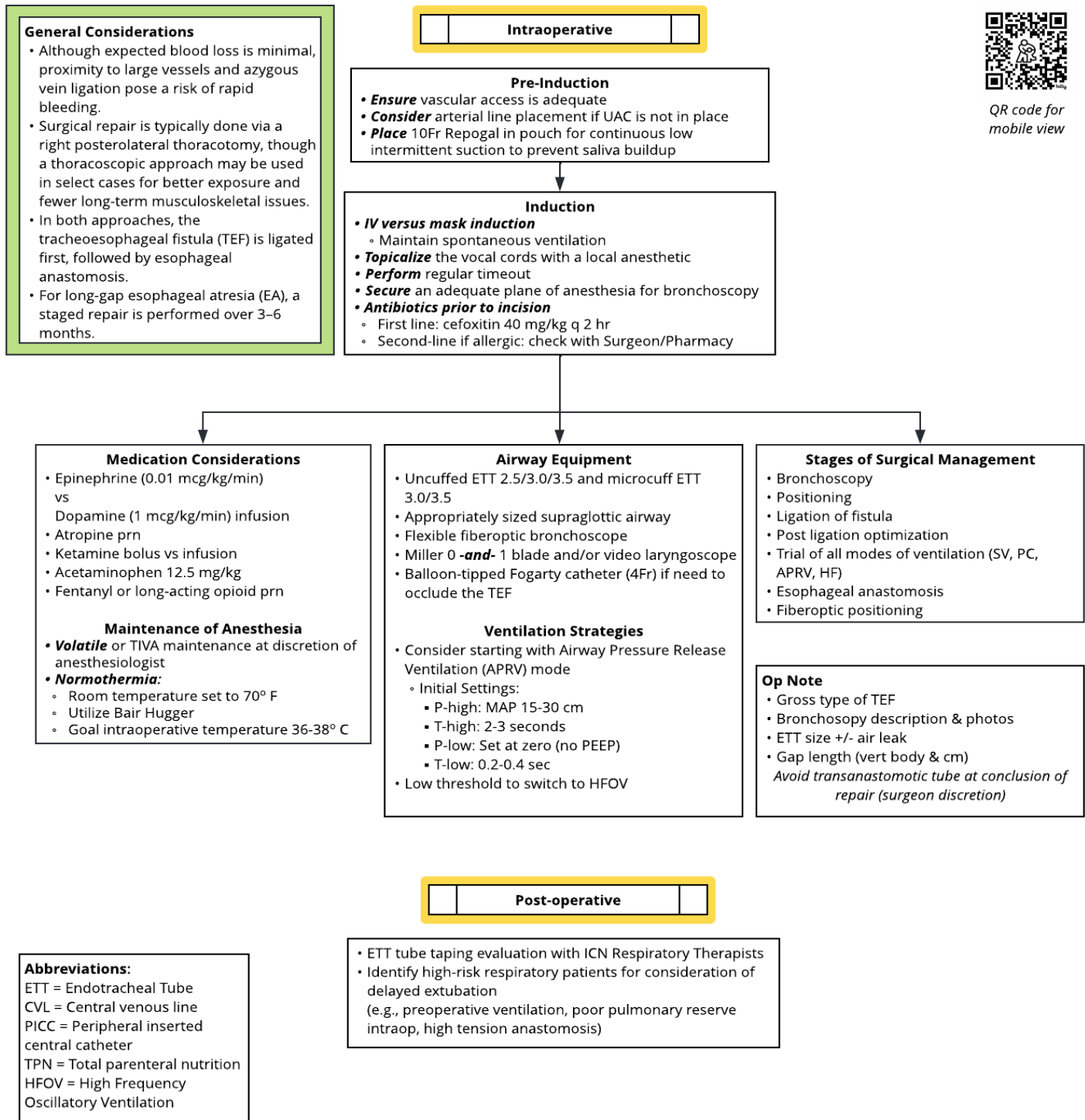
Tracheoesophageal Fistula Preoperative Algorithm



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Tracheoesophageal Fistula Intraoperative Algorithm



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Objective of the ERAS Pathway

The objective of the Tracheoesophageal Fistula (TEF) ERAS pathway is to enhance patient recovery by minimizing surgical stress and promoting early return to function through a multimodal, evidence-based approach across the perioperative period. Key goals include coordinated planning between Anesthesiology, Surgery, Neonatal Intensive Care, Respiratory Therapy, and Otolaryngology to optimize perioperative strategies—such as vascular access, ventilation management, and anesthesia duration. This collaborative approach aims to reduce complications, shorten hospital stays, and improve overall patient outcomes and satisfaction.

Background

Esophageal atresia (EA) is a congenital condition characterized by an incomplete formation of the esophagus, resulting in a discontinuity at birth. During fetal development, the laryngotracheal tube normally separates into the trachea and esophagus; disruption of this process can lead to EA, often accompanied by a tracheoesophageal fistula. EA occurs in approximately 1 in 2,500 to 4,000 live births (Lal et al., 2017), with the most common variant—EA with distal TEF (Type C)—accounting for 86% of cases (Ramirez-Martinez et al., 2020).

Effective airway and ventilation management requires careful consideration of the TEF's size, location, and orientation, as well as the neonate's respiratory status, surgical plan, and positioning needs (Ho et al., 2016). Management is complex due to potential esophageal-airway connections and a high incidence of associated anomalies (Ho et al., 2016; Kemper & Peuterbaugh, 2025).

A thorough understanding of EA is essential for timely diagnosis, optimal treatment, and complication prevention. While survival rates now exceed 90% long-term outcomes remain a concern (Wang et al., 2014). The Tracheoesophageal Fistula ERAS pathway provides evidence-based guidance from the pre-surgery workup through post-operative care to enhance and optimize patient outcomes among this population.

Target Users

- Physicians (Neonatal Intensivists, Otolaryngologists, Anesthesiologists, Surgeons, Fellows, Residents)
- Advanced Practice Nurses
- Nurses (Neonatal Intensive Care)
- Respiratory Therapists

Target Population**Inclusion Criteria**

- Newborns diagnosed with esophageal atresia

Core Principles of ERAS (which may or may not be applicable to each individual ERAS pathway)

- Preoperative education of the patient's family with an introduction to ERAS
- Goal-directed, strict intraoperative intravenous fluid therapy guidelines to avoid hypo-or hypervolemia
- Avoidance of routine nasogastric tube use
- Minimizing long-acting opioid analgesia in favor of regional anesthesia with epidural and/or local anesthesia for intra-operative and postoperative pain control when appropriate and using alternative non-opioid medications when appropriate (e.g., non-steroidal anti-inflammatories or acetaminophen)
- Early postoperative mobilization
- Early postoperative enteral feeding

ERAS Management Recommendations:**Pre-Operative Care and Optimization**

Preoperative planning focuses on multidisciplinary coordination to ensure optimal surgical conditions and patient safety. Key elements include:

- Collaborating with the ICN to establish a clear timeline for the procedure and confirm vascular access plans
- Coordinating with the surgical team to determine the procedure's timing and designate the appropriate operating room
- Confirming whether a thoroscopic or open surgical approach will be used

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- Ensuring appropriate anesthesia staffing, including backup support if needed
- Requesting Operating Room #3 or #12 if high-frequency oscillatory ventilation (HFOV) is required

Intra-Operative Care and Optimization

Effective intraoperative preparation includes confirming the availability of essential medications, equipment, and personnel.

- **Medications:** Epinephrine and dopamine infusions, atropine, IV acetaminophen, and ketamine
- **Equipment:** Suction catheters for ETT, fiberoptic scope, and HFOV (if indicated); set initial ventilation settings for APRV and HFOV modes
- **Procedure Planning:** Coordinate steps including line placement, bronchoscopy, patient positioning, fistula ligation, post-ligation ventilation trials (SV, PC, APRV, HF), esophageal anastomosis, and final fiberoptic confirmation

Post-Operative Care and Optimization

Postoperative planning includes evaluating ETT taping with the ICN respiratory therapist and identifying high-risk respiratory patients who may require delayed extubation due to perioperative ventilation, poor intraoperative pulmonary reserve, or high-tension anastomosis

Additional Questions Posed by the ERAS Committee

No clinical questions were posed for the development of this ERAS pathway.

Key Metrics To Be Monitored:

| Pre-Op | Intra-Op | Post-Op |
|---------------------------------|---|--------------------------------|
| Preop respiratory support needs | Temperature regulation | Post-op temperature regulation |
| Congenital abnormalities | Ventilation status | Ventilation status |
| | Fluid status | Accidental extubation |
| | Surgical approach (open vs thoracoscopic) | |

Value Implications

The following improvements may increase value by reducing healthcare costs and non-monetary costs (e.g., missed school/work, loss of wages, stress) for patients and families and reducing costs and resource utilization for healthcare facilities.

- Decreased inpatient length of stay
- Decreased unwarranted variation in care
- Improved communication between patients and care team throughout the perioperative period
- Improved post-operative pain control

Organizational Barriers and Facilitators

Potential Barriers

- Variability of acceptable level of risk among providers
- Challenges with follow-up faced by some families

Potential Facilitators

- Collaborative engagement across care continuum settings during ERAS development
- High rate of use of the ERAS pathway

Bias Awareness

Bias awareness is our aim to recognize social determinants of health and minimize healthcare disparities while realizing that our unconscious bias can contribute to these disparities.

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Power Plans

- There were no power plans developed for this ERAS pathway

Associated Policies

- There are no associated policies with this pathway

Education Materials

- ERAS overview handout
 - Intended to be a general handout encompassing the key concepts and plan for an ERAS pathway
 - Found on the CM external website for each ERAS pathway
 - Available in English and Spanish

ERAS Pathway Preparation

This ERAS pathway was prepared by the Department of Evidence-Based Practice (EBP) in collaboration with the Tracheoesophageal Fistula ERAS Committee, composed of content experts at Children's Mercy Kansas City. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Tracheoesophageal Fistula ERAS Committee Members and Representation

- Gabriel Gallegos, MD | Anesthesiology | Committee Chair
- Tolu Oyetunji, MD, MPH, MBA | Pediatric General Surgery | Committee Member
- Cory Nonnemacher, MD | Surgery Fellow | Committee Member
- Jennifer Lightfoot, DO, MBA | Anesthesiology | Committee Member
- Priya Tiwari, MD, FAAP | Neonatology | Committee Member

EBP Committee Members

- Todd Glenski, MD, MSHA, FASA | Anesthesiology, Evidence Based Practice
- Andrea Melanson, OTD, OTR/L | Evidence Based Practice

ERAS Development Funding

The development of this ERAS pathway was underwritten by the following departments/divisions: Anesthesiology, Pediatric General Surgery, Neonatology, and Evidence Based Practice.

Conflict of Interest

The contributors to the Tracheoesophageal Fistula ERAS have no conflicts of interest to disclose related to the subject matter or materials discussed.

Approval Process

- This product was reviewed and approved by the Tracheoesophageal Fistula Committee, content expert departments/divisions, and the EBP Department.
- Pathways are reviewed and updated as necessary every 3 years within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Review Requested

| Department/Unit | Date Obtained |
|---------------------------|----------------|
| Anesthesiology | September 2025 |
| Pediatric General Surgery | September 2025 |
| Neonatology | September 2025 |
| Evidence Based Practice | September 2025 |

Version History

| Date | Comments |
|----------------|--|
| September 2025 | Version one – algorithms and synopsis were created for this new ERAS pathway |

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Date for Next Review:

- September 2028

Implementation & Follow-Up

- Once approved, the ERAS pathway was presented to appropriate care teams and implemented.
- Key metrics will be assessed and shared with the appropriate care teams to determine if changes are needed.
- Education tools for patients and families were created for pre-surgery visits to provide an overview of the ERAS pathway. Health literacy reviewed the tool.
- Education was provided to all stakeholders:
 - Nursing units where the ERAS is used
 - Department of Anesthesiology, Pediatric General Surgery, and Neonatology
 - Providers from Anesthesiology, Pediatric General Surgery, and Neonatology
 - Fellows and resident physicians

Disclaimer

When evidence is lacking or inconclusive, care options are provided in the supporting documents that accompany the ERAS pathway.

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