Incidence of Malnutrition in Children with Esophageal Atresia/Tracheoesophageal Fistula and the Role of a Multidisciplinary Clinic in Improving Feeding and Nutritional Outcomes

**Introduction**

Children with Esophageal Atresia (EA)/Tracheoesophageal Fistula (TEF) are known to have growth and feeding problems. This is due to Gastroesophageal Reflux Disease (GERD), esophageal dysmotility, strictures, oral aversion and more recently Eosinophilic Esophagitis (EE).

**Aim**

To document the incidence of malnutrition in children with EA-TEF and assess the role of a multidisciplinary EA-TEF clinic in improving feeding and nutritional outcomes.

**Method**

- Retrospective file audit of children who attended a multidisciplinary EA-TEF clinic between February 2010 and July 2014. Baseline demographic and nutritional data were collected and compared to data from a random sample from those who had more than 1 clinic review.
- Factors that may impact growth in children with EA-TEF were analysed to determine the significance of their association on growth. These factors included age, gender, type of EA, long gap, primary vs delayed anastomosis, associated syndromes, fundoplication, EE, reflux, dysphagia, strictures and chest infections.
- The presence of negative intra-meal behaviours (not accepting appropriate textures, lengthy mealtimes, extreme food selectivity and challenging meal times) was also determined in the 56 children who saw the dietitian or speech pathologist at their initial appointment.

**Results**

- 75 children attended the EA-TEF clinic, 27% were seen once, 44% between 2-3 times and 29% >3 times.
- At the initial appointment, 71% were seen by a dietitian, 66% by a speech pathologist and 99% by a gastroenterologist.
- There were 30 males. 40% were premature and 28% had an associated anomaly. Median age at initial appointment was 6.5 years (0-16.6 years).
- 24% had a fundoplication.
- 32% had gastrostomies of which 13% were still in use.
- 67% had dysphagia and 11% were at risk of direct aspiration.
- Constipation reduced from 33% to 13% (p=0.007).
- 19% (49%) of children were iron deficient (hemoglobin < 10g/dL) at initial appointment and this reduced to 32% at final review (p=NS).
- 4.5% (14%) were vitamin D deficient (vitamin D < 50nmol/L) at the initial appointment and this reduced to 11% at final review (p=NS).

**Growth**

- Mean weight z score improved from -0.85 (SD 1.23) to -0.70 (SD 1.37).
- Mean length/height z score improved from -0.76 (1.13) to -0.52 (0.49).
- Mean BMI/weight for length z score improved from -0.42 (SD 1.25) to -0.32 (SD 1.08).

None of these were statistically significant.

**Table 1: Growth at initial and final review (z)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial review</th>
<th>Final review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight z score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; -1.0 - &lt; 2</td>
<td>19 (26)</td>
<td>14/54 (26)</td>
</tr>
<tr>
<td></td>
<td>13 (18)</td>
<td>8/54 (15)</td>
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<tr>
<td>Height/length z score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; -1.0 - &lt; 2</td>
<td>20 (27)</td>
<td>11/53 (21)</td>
</tr>
<tr>
<td></td>
<td>7 (9)</td>
<td>8/53 (15)</td>
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<tr>
<td>BMI/weight for length z</td>
<td></td>
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</tr>
<tr>
<td>&lt; -1.0 - &lt; 2</td>
<td>15 (20)</td>
<td>11/53 (21)</td>
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<td></td>
<td>8 (11)</td>
<td>4/53 (8)</td>
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</tbody>
</table>

**Factors affecting growth**

- Age: Infants more likely to have lower weight z scores compared to older children (p=0.007).
- Tracheoesophageal: Children with tracheoesophageal fistula more likely to have lower weight z scores (p=0.035).
- Dysphagia: Children with dysphagia had significantly lower weight z scores (p=0.048) but not height.
- Infants with dysphagia were more likely to be underweight compared to those without dysphagia (p=0.029).

**No significant effect was seen on growth for gender, type of EA, long gap, primary vs delayed anastomosis, associated syndromes, fundoplication, EE, reflux, strictures and chest infections.**

**Figure 1: Impact of age on weight (p=0.007)**

**Figure 2: Improvement in weight z scores for infants through follow up in EA-TEF clinic (p=0.03)**

**Conclusion**

1. Malnutrition was prevalent in children with EA-TEF.
2. Significant improvement in growth of infants with follow up in EA-TEF clinic.
3. Children with tracheoesophageal and infants were significantly more likely to be at risk of malnutrition.
4. Appropriately textured meals are still a challenge for these children.
5. Children with extreme food selectivity were significantly more likely to have poor growth.
6. A multidisciplinary EA-TEF clinic has been shown to improve growth, especially with infants.
7. Early referral of EA-TEF infants to their infant to a multidisciplinary team is more likely to result in significant improvements in their growth at 1 year.
8. Future long term prospective studies on a larger cohort are needed to better determine the effect of a multidisciplinary review by an EA-TEF team including a dietitian and speech pathologist on the growth and nutrition of these complex children.

**References**