

## EDITED & REVIEWED:

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## Surgical Management - PEDIATRIC GERD.

Preoperative check list as per International Pediatric Endosurgery Group (IPEG) in 2009 includes:

24-hr intraesophageal pH monitoring or

UGI imaging or

Gastric emptying scan or

Esophagoscopy with biopsy or

Bronchoscopy with washings.

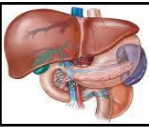
Operative treatment can be considered for:

1. Infants and children who have failed two weeks of medical management.
2. Atypical symptoms especially respiratory symptoms with confirmation of GERD by any of the previously mentioned tests.
3. Patients with complications of GERD such as aspiration, stricture or Barrett's esophagitis.
4. In the case of near SIDS and other clinical symptoms of GERD, risk of death may be decreased by operative therapy.<sup>2</sup>
5. Patients with neurologic impairment requiring feeding gastrostomy who are tested to have pathologic reflux are candidates for antireflux procedures
6. Patients post repair of esophageal atresia with reflux and recurrence of anastomotic stricture<sup>3</sup>.

In general, the Nissen fundoplication, which is a complete 360° wrap, best controls the symptoms of GERD but may lead to more episodes of dysphagia and gas bloat than a partial wrap. Toupet (partial 270° posterior esophageal wrap) and Thal (partial anterior 180° wrap) reportedly produce fewer complications. Closure of the hiatus should be considered.

Underlying associated conditions are considered when determining the type of wrap to perform.

Partial wraps have fewer reported episodes of dysphagia in the short term. Recent studies suggest that Nissen fundoplication after the first 3 months has equal rate of dysphagia to the partial wrap. There is controversy in the literature regarding recurrence rates with some articles suggesting that recurrence is decreased with 360° wrap and other studies showing no difference



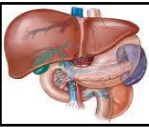
in recurrence with partial wraps. In one comparative prospective study, total fundoplication (Nissen) and partial fundoplication (Thal) had similar operative times, intraoperative complications, time to full feeds, and length of stay.<sup>19</sup> Even though Nissen fundoplication seemed to be particularly associated with postoperative dysphagia, other studies have reported that partial fundoplication had a higher incidence of persistent or recurrent reflux.<sup>20</sup>

The indications for laparoscopic fundoplication are the same as the indications for conventional open procedures. Preoperative accuracy of diagnosis of GERD and the skill of the surgeon are 2 of the most important predictors of successful outcome. Long-term studies suggest that fundoplications often become incompetent in children, as in adults, with reflux recurrence rates of up to 14% for Nissen and up to 20% for loose wraps; this fact currently combines with the potency of PPI therapy that is now available to shift practice toward long-term pharmacotherapy in many cases. Pediatric experience is limited with endoscopic application of radiofrequency therapy (Stretta procedure) to a 2-3 cm area of the LES and cardia to create a high-pressure zone to reduce reflux.<sup>4</sup>

Fundoplication does not correct underlying esophageal clearance, gastric emptying, or other GI dysmotility disorders<sup>5</sup>

In children who were operated on, those with NISSEN FUNDOPLICATION (NI)I have more than twice the complication rate, 3 times the morbidity and 4 times the reoperation rate of children without NI<sup>6</sup>Fundoplication in early infancy has a higher failure rate than fundoplication performed later in childhood<sup>7,8</sup>A significant reduction in the number of adverse respiratory events was observed in the year following surgery in those operated at <4 years of age. However, in older children, no benefit of surgery on the rate of hospitalization for adverse respiratory events was found<sup>9</sup>In a recent pediatric study, Nissen fundoplication did not decrease hospital admissions for pneumonia, respiratory distress or apnea, or failure to thrive, even in those with underlying neurological impairment<sup>10</sup>

Complications post fundoplications include gas-bloat syndrome, early satiety, dumping syndrome, and postoperative retching and gagging. In a postoperative study of otherwise healthy children, that is, with no underlying disorders, 36% had mild-moderate gas bloat symptoms, 32% were “very slow” to finish most meals, 28% were unable to burp or vomit, and 25% choked on some solids<sup>11</sup>Early and late operative failure may result from disruption of the wrap or slippage of the wrap into the chest. In otherwise healthy children evaluated at a mean of 10 months (1–35 months) following antireflux surgery, 67% had “no complaints,” but one third had objective evidence of operative failure<sup>12</sup>Mortality due to surgery in children without NI is difficult to assess because of the heterogeneous population in most surgical studies as per ESPGHAN guidelines. Diaz et al<sup>7</sup> reported that those with LNF had a higher reoperation rate than those with ONF. Average time to reoperation with LNF was 11 months versus 17 months for ONF. In children with 1 to 3 comorbidities the probability of reoperation was 18% to 24% after LNF(lap), compared with 6% to 16% for ONF(open)<sup>7</sup>Total esophagogastric dissociation is an operative



procedure that is useful in selected children with NI or other conditions causing life-threatening aspiration during oral feedings. The operation has been used either after failed fundoplication or as a primary procedure.<sup>13</sup> But it carries significant morbidity. Due to the high failure rates of conventional antireflux procedures in children with neurological impairment (75%), some believe that TGED should be used as a primary procedure in these patients<sup>21</sup>

4 of 16 children who had recurrent symptoms post Endoluminal endoscopic gastroplication required a repeat procedure 2 to 24 months postoperatively. Three years after surgery, 9 patients (56%) were taking no antireflux medication.<sup>14</sup>

Antireflux surgery should be considered only in children with GERD and failure of optimized medical therapy, *or* long-term dependence on medical therapy where compliance or patient preference preclude ongoing use, *or* life-threatening complications.<sup>15</sup>

Recent reviews comparing laparoscopic versus open fundoplication established the superiority of the laparoscopic technique. Shorter length of stay, reduced need for postoperative analgesia, and lower surgical complication rates were reported with laparoscopic fundoplication.<sup>16,17</sup> Although initially questioned, the safety, effectiveness, and outcomes of laparoscopic Nissen fundoplication in small children weighting less than 5 kg were similar to that of older children.<sup>18</sup>

PEDGIHEP may suggest in addition of avoidance of surgical treatment of GERD in infancy. The best AGE group to consider surgery in accordance with above literature review may be 1-4 years

Evidence has shown that the outcome of children who have undergone Nissen fundoplication with pyloroplasty was similar to those who have been treated without pyloroplasty. Postoperative complications have been reported to be higher when pyloroplasty was added to the antireflux procedure.<sup>22</sup>

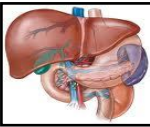
Failure of fundoplication occurs in 2% of neurologically normal and in up to 12% of neurologically impaired children.<sup>23</sup> Failure of fundoplication typically occurs 16 months after surgery and is recognized by recurrent GERD symptoms.<sup>24</sup> In neurologically impaired children the presence of uncoordinated swallowing, frequent supine position, seizures, spasticity, aerophagia, delayed gastric emptying, chronic constipation, and scoliosis contribute to fundoplication failure.<sup>25</sup>

Fundoplication failure is classified as follows<sup>26</sup>

Type 1. Disruption of the wrap

Type 2. Sliding hernia with intact wrap

Type 3. Slippage of stomach above the wrap (slipped Nissen)



Type 4. Intrathoracic herniation of the wrap.

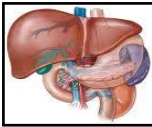
Multiple reports have indicated that “redo” fundoplication is a reasonable option and that, in experienced hands, laparoscopic Nissen fundoplication is a feasible technique with a failure rate of 6% at 2 years.<sup>27</sup>

### **Postoperative management of Nissen fundoplication**

Liquids are allowed the morning after surgery. For those patients with gastrostomy, tube feedings are resumed on the first postoperative day. Once oral intake is tolerated, the patients are kept on a pureed diet for at least 3 weeks. Follow-up visits should document the improvement in symptoms as well as appropriate weight gain. Upper GI studies are not routinely needed and should be ordered only when the patient has recurrent symptoms or when there is evidence of recurrent GERD.

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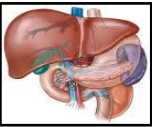
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