

# Perioperative Feeding Approaches in Single Ventricle Infants: A Survey of 46 Centers

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## Background of the Study Question

National Pediatric Cardiology Quality Improvement Collaborative (NPC-QIC) had an initial primary goal of reducing interstage mortality for infants with hypoplastic left heart syndrome (HLHS) and other similar conditions. This was done by putting into place various quality improvement projects aimed at refining and standardizing care as well as evaluating their database to examine any factors associated with interstage mortality.

Feeding infants with HLHS to maximize nutrition and growth while minimizing risks such as necrotizing enterocolitis (NEC) continues to be a goal for all centers caring for these patients; however, no universal feeding protocol exists for these patients. The goal of this study was to assess the different feeding strategies practiced among the various centers participating in NPC-QIC. In 2013 the NPC-QIC Feeding Workgroup reviewed available feeding protocols and existing data to develop evidence-based best practice recommendations for the improvement of nutritional outcomes in HLHS infants. These recommendations have been made available to the NPC-QIC centers during monthly “Action Period” calls and semiannual in-person Learning Sessions.

## How was the study done and what did it demonstrate

This was a web-based survey sent to 56 centers dealing with pre-operative, post-operative, and interstage feeding practices. There was an 82% response rate (46/56).

In the pre-operative period, 2/3 of centers allowed some feeding prior to initial surgery. During this period feeding methods varied with 63% of centers allowing infants to breast-feed and 90% of centers allowing infants to feed orally. The primary goal of feeding during this time was cited as the development of oromotor skills (70%) but interestingly 73% of centers utilized tube feeding (not exclusively) despite this stated goal. All of the centers reported discontinuing feeding following distress, clinical concerns, or vital sign changes. Centers that did not allow feeds were all concerned about the development of NEC, with some citing umbilical artery catheters and prostaglandins as additional contraindications. The investigators reported that data to support either these practices was lacking.

In the post-operative period, 52% centers had a standard practice for evaluating feeding safety and readiness, the method of evaluation however is varied, with the best method still to be determined. 33% of the centers had an informal process and 15% did not have a specific evaluation process. Only 7% of responders reported using the NPC-QIC's previously published guidelines. If there was concern for aspiration, 54% fed via NG or GT feeds, 24% mostly did not allow oral feeding, and 7% allowed mostly oral feeding. Anti-reflux medications (65%) and post-pyloric feeding (60%) was common in these patients that aspirated.

At the time of discharge, 40% of centers did not use tube feedings at all, which implies that these infants were able to take in all calories by mouth. There is data that shows greater weight for age z scores for orally fed infants at the second surgery with more complications associated with those who were GT fed at discharge. This might suggest that oral feeding relates to well-being, this however also still needs to be determined. Interstage feeding is managed by a variety of providers and remains a challenge.

### **Limitations of the study**

1. Web based survey that did not achieve 100% response rate, though the response rate was fairly high. In addition, only center participating in NPC-QIC were surveyed so other feeding variations may exist.
2. Survey might be hindered by recall bias from those responding.
3. Since the survey was blinded, unable to correlate feeding practices with overall outcomes.

### **What it all means**

This survey demonstrated that wide differences in feeding practices exist among the participating centers in the NPC-QIC though some common themes were present for most of the centers.

1. Majority of centers allowed oral feeds prior to surgery.
2. Majority of centers had at least an informal if not a formal feeding evaluation process.
3. There was more variation in feeding management during the interstage period.

This study identified particular points of variation and brings to attention the need for a well-defined team approach to make best practice recommendations. Future studies are needed to determine the extent of improvement of outcomes that have center or universal feeding evaluation / feeding protocols.