

# Exploring Impact of External Abdominal Support on Gastrointestinal and Safety Outcomes in Preterm Infants on Continuous Positive Airway Pressure



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Level IV NICU – Single cite study

## OBJECTIVE

To explore gastrointestinal (GI) and safety outcomes in preterm infants who received an external abdominal support intervention (ASI) in the Neonatal Intensive Care Unit (NICU) to address gaseous abdominal distension while on non-invasive positive pressure support (NPPS).

## BACKGROUND

- Preterm infants frequently require NPPS due to immature lungs.<sup>1</sup>
- NPPS combined with immature GI function and weak abdominal musculature in preterm infants can lead to CPAP Belly Syndrome (CBS), characterized by gaseous abdominal distension.<sup>3-4</sup>
- CBS may result in: Abdominal distension, Respiratory compromise, and Feeding intolerance<sup>2</sup>
- CBS has been associated with: Delayed attainment of full enteral feeds, Prolonged central line use, Increased reliance on TPN<sup>3-4</sup>

External abdominal support may improve abdominal wall stability and diaphragmatic efficiency, potentially reducing gaseous distension and improving GI tolerance.<sup>5-7</sup>

## METHODS

**Study Design** → Within-subject pre–post case series conducted in a single Level IV NICU.

**Sample** → N = 16 preterm infants  
June 2024 – February 2025

**Inclusion Criteria (Study)** → <37 weeks GA  
Received ASI while on NPPS (CPAP or non-invasive NAVA)

**Exclusion Criteria (Study)** → Congenital diaphragmatic hernia  
Hirschsprung disease  
Conditions affecting GI function

## ASI PROTOCOL

### Eligibility Criteria

#### Inclusion Criteria:

- ≥7 days old
- On CPAP or non-invasive NAVA
- Have intact trunk skin
- Stooling spontaneously
- Tolerate ≥120 ml/kg/day feeds for 24 hours
- Have no active GI concerns

#### Exclusion Criteria:

- Active NEC
- Spontaneous intestinal perforation
- Recent GI surgery
- Inability to stool spontaneously

### Initiate ASI

Device: NeoBellyBand: Provides gentle circumferential support from xiphoid to anterior superior iliac crest.

- Custom fit for each infant
- Worn continuously while on NPPS
- Removed only for scheduled care, skin checks, and during skin to skin based on caregiver preference

### End ASI

Transition to ≤ 2L High-Flow Nasal Cannula (HFNC)

## RESULTS

| Outcome               | Pre-ASI | During ASI | p-value |
|-----------------------|---------|------------|---------|
| Daily emesis          | 0.42    | 0.08       | 0.04    |
| Glycerin use          | 0.02    | 0          | 0.04    |
| Abdominal radiographs | 0.06    | 0          | 0.02    |

#### Main Outcomes:

- Daily emesis decreased
- Glycerin suppository use decreased
- Abdominal radiographs obtained for abdominal concerns decreased
- Radiographic “CPAP belly” decreased from **71.4% → 41.7%**

#### Feasibility:

- Median adherence: 100%
- Well tolerated across GA range: 23–30 weeks
- Feasible across varying respiratory support levels
- Successfully integrated into routine NICU care.

#### Safety outcomes:

- No infants developed NEC
- One infant experienced transient skin breakdown related to user error (resolved within 48 hours)

## DISCUSSION & LIMITATIONS

This case series demonstrates that external abdominal support:

- Is feasible, safe, and well tolerated in medically complex preterm infants
- May reduce emesis and need for glycerin suppositories
- May decrease need for abdominal radiographs due to belly concerns
- Did not increase NEC risk in this cohort

This low-cost, non-pharmacologic strategy shows promise for improving GI tolerance in infants on NPPS.

Limitations include: Small sample size (N=16), Single-site study, No control group, Potential confounders in pre–post design, Chart-based GI documentation, and Radiographs obtained per clinical indication only.

Future prospective controlled studies are needed to evaluate the efficacy of this low-cost, non-pharmacologic intervention, as well as to determine optimal timing and target populations

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