



# FONKSİYONEL BULANTI VE KUSMA

**Prof. Dr. Aydan Kansu**

**Ankara Üniversitesi Tıp Fakültesi  
Çocuk Gastroenteroloji, Hepatoloji ve Beslenme Bilim Dalı**

# Childhood Functional Gastrointestinal Disorders: Child/Adolescent

Jeffrey S. Hyams,<sup>1,\*</sup> Carlo Di Lorenzo,<sup>2,\*</sup> Miguel Saps,<sup>2</sup> Robert J. Shulman,<sup>3</sup> Annamaria Staiano,<sup>4</sup> and Miranda van Tilburg<sup>5</sup>

- ▶ "Fonksiyonel gastrointestinal sistem bozuklukları tanısı için 'organik hastalığa ait bir kanıt bulunmaması' yerine: Uygun tıbbi değerlendirme ile belirtilerin bir başka tıbbi duruma/hastalığa bağlanamaması
- ▶ Yakınma ve belirtilere dayalı tanı  
İncelemeler seçici olabilir, inceleme gerekmeyebilir

Fonksiyonel bulantı

Fonksiyonel kusma

# Fonksiyonel Bulantı

En az 2 aydır aşağıdakilerden hepsinin olması:

- ▶ Bulantının önde gelen semptom olması  
haftada en az 2 kere olması  
genel olarak öğünlerle ilgili olmaması
- ▶ Sürekli kusmayla birlikte olmaması
- ▶ Uygun tıbbi değerlendirme ile bulantının başka bir tıbbi duruma/hastalığa bağlanamaması

# Fonksiyonel Kusma

En az 2 aydır aşağıdakilerden hepsinin olması:

- ▶ Haftada 1 veya ↑ kusma olması
- ▶ Kendini kusturma olmaması  
Yeme bozukluđuna ait bir kriter olmaması  
Ruminasyona ait bir kriter olmaması
- ▶ Uygun tıbbi deęerlendirme ile kusmanın başka bir tıbbi duruma/hastalıđa bađlanamaması

# Kronik Bulantı

- ▶ Rahatsız edici, "hoş olmayan hir his"  
subjektif yakınma
- ▶ Sıklıkla ergenlik dönemindeki kızlarda
- ▶ Günlük yaşamı etkiliyor, yaşam kalitesini bozuyor
- ▶ Endişe, depresyon, özgüven eksikliği
- ▶ Sıklıkla bizler tarafından gözardı ediliyor
- ▶ Fonksiyonel karın ağrısına bulantı eşlik ettiğinde  
Komorbid belirtiler ↑  
Belirtilerin ciddiyeti ↑  
Erişkinlikte endişe, depresyon

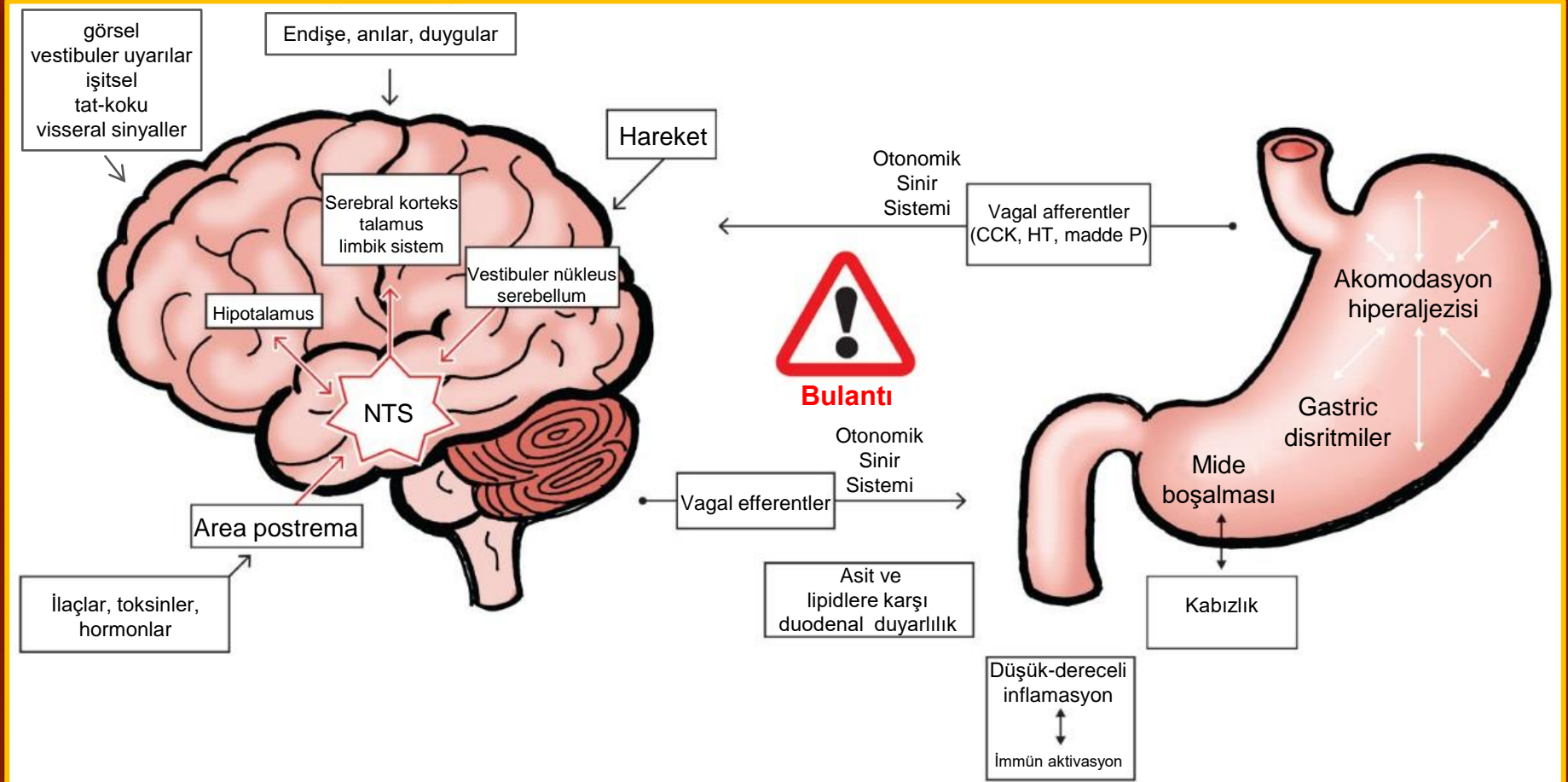
*Tarbell SE. Journal of Pediatrics 2020*

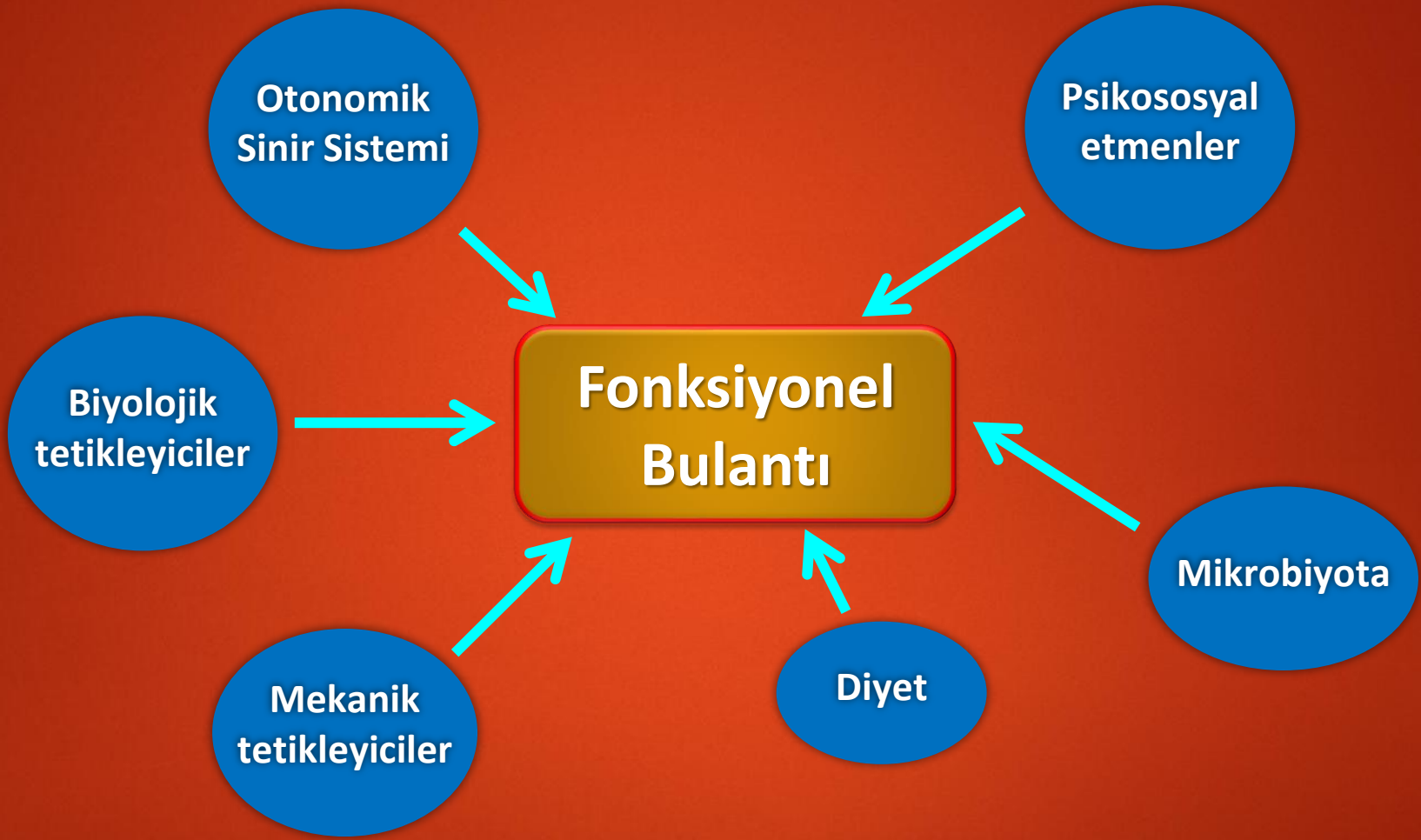
*Russell AC. Children 2016*

*Russell AC. Clinical Gastroenterology and Hepatology 2017*

*Kovacic K. Neurogastroenterology & Motility 2019*

*Kovacic K and Di Lorenzo C. JPGN 2016*





## Relationship among nausea, anxiety, and orthostatic symptoms in pediatric patients with chronic unexplained nausea

Sally E. Tarbell · Hossam A. Shaltout ·  
Ashley L. Wagoner · Debra I. Diz · John E. Fortunato

**Abstract** This study evaluated the relationship among nausea, anxiety, and orthostatic symptoms in pediatric patients with chronic unexplained nausea. We enrolled 48 patients (36 females) aged  $15 \pm 2$  years. Patients completed the Nausea Profile, State-Trait Anxiety Inventory for Children and underwent  $70^\circ$  head upright tilt testing (HUT) to assess for orthostatic intolerance (OI) and measure heart rate variability (HRV). We found nausea to be significantly associated with trait anxiety, including total nausea score ( $r = 0.71$ ,  $p < 0.01$ ) and 3 subscales: somatic ( $r = 0.64$ ,  $p < 0.01$ ), gastrointestinal ( $r = 0.48$ ,  $p = 0.01$ ), and emotional ( $r = 0.74$ ,  $p < 0.01$ ). Nausea was positively associated with state anxiety, total nausea ( $r = 0.55$ ,  $p < 0.01$ ), somatic ( $r = 0.48$ ,  $p < .01$ ), gastrointestinal ( $r = .30$ ,

$p < .05$ ), and emotional ( $r = .64$ ,  $p < .01$ ) subscales. Within 10 min of HUT, 27 patients tested normal and 21 demonstrated OI. After 45 min of HUT, only 13 patients (27 %) remained normal. Nausea reported on the Nausea Profile before HUT was associated with OI measured at 10 min of tilt (nausea total  $r = 0.35$ ,  $p < 0.05$ ; nausea emotional subscale  $r = 0.40$ ,  $p < 0.01$ ) and lower HRV at 10 min of HUT ( $F = 6.39$ ,  $p = 0.01$ ). We conclude that nausea is associated with both anxiety symptoms and OI. The finding of decreased HRV suggests an underlying problem in autonomic nervous system function in children and adolescents with chronic unexplained nausea.

**Keywords** Anxiety · Nausea · Orthostatic intolerance · Heart rate variability · Functional gastrointestinal disorders · Autonomic dysfunction





Genetik yatkınlık  
Çevresel etmenler (aile)  
Psikososyal etmenler

Baş etme  
yöntemlerini  
olumsuz etkileme

Bulantı hissi

Sosyal yaşamda bozulma  
Okul yaşamında bozulma

Bulantının rahatsız edici özelliği  
Tanıda kesinlik olmaması

Kesin etkin tedavinin olmaması, tedavinin yetersizliği



## High Prevalence of Nausea among School Children in Latin America

Miguel Saps, MD<sup>1</sup>, Carlos Velasco-Benítez, MD, MSc<sup>2</sup>, Katja Kovacic, MD<sup>3</sup>, Gisela Chelimsky, MD<sup>3</sup>, Karlo Kovacic, MD, MSc<sup>3</sup>, Edgar Játiva Mariño, MD, MSc<sup>4</sup>, Ricardo Chanís, MD<sup>5</sup>, and Roberto Zablah, MD<sup>6</sup>

**Objectives** To evaluate the prevalence of nausea and its association with functional gastrointestinal disorders (FGIDs) in a large-scale, population-based study of Latin American school children.

**Study design** This cross-sectional study collected data from children in 3 Latin American countries. A Spanish version of the Questionnaire on Pediatric Gastrointestinal Symptoms-Rome III Version (QPGS-III) was administered to school children in Central and South America. Subjects were classified into FGIDs based on Rome criteria (QPGS-III). Students from 4 public and 4 private schools in the countries of El Salvador, Panama, and Ecuador participated in this epidemiologic study.

**Results** A total of 1137 school children with mean age 11.5 (SD 1.9, range 8-15) years completed the QPGS-III (El Salvador n = 399; Panama n = 321; Ecuador n = 417). Nausea was present in 15.9% of all school children. Two hundred sixty-eight (24%) children met criteria for at least 1 FGID. Nausea was significantly more common in children with FGIDs compared with those without: El Salvador 38% vs 15% ( $P < .001$ ); Panama 22% vs 7% ( $P < .001$ ); Ecuador 25% vs 13% ( $P = .004$ ). Among children with FGIDs, those with functional constipation had a high prevalence of nausea. Nausea was significantly more common in girls and children attending private schools.

**Conclusions** Nausea is commonly present in Latin American school children. FGIDs are frequently associated with nausea. (*J Pediatr* 2016;169:98-104).

- ▶ Tüm okul çocuklarında bulantı sıklığı: %16
- ▶ Bulantı, FGID olanlarda daha sık: %28
- ▶ Bulantı kızlarda daha sık



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### RESEARCH ARTICLE

## A nationwide study on the prevalence of functional gastrointestinal disorders in school-children

Miguel Saps<sup>a</sup>, Jairo Enrique Moreno-Gomez<sup>b</sup>, Carmen Rossy Ramírez-Hernández<sup>c</sup>, John M. Rosen<sup>d,\*</sup>, Carlos A. Velasco-Benitez<sup>e</sup>

### Abstract

**Introduction:** Functional gastrointestinal disorders (FGIDs) are highly prevalent worldwide and are thought to result from the interplay of multiple factors that can vary from region to region. Nationwide studies can help understand the regional epidemiology and the pathogenesis of FGIDs. The objectives of this study were to determine the prevalence of FGIDs in school-children of Colombia and assess associated factors.

**Methods:** A cross-sectional study was carried out at twelve private and public schools in ten cities distributed through the four main geographic regions of Colombia. School-children completed a validated questionnaire to assess functional gastrointestinal disorders according to Rome III criteria. Demographic information and past medical and family history was obtained from the parents.

**Results:** A total of 4394/5062 (86.8%) children participated in the study, with ages ranging from 8-18 years (mean = 11.9, SD = 2.3). The percentage of children with at least one FGID was 23.7%. Disorders of defecation were the most common category FGID (11.7%) followed by abdominal pain related-functional gastrointestinal disorders (10.4%). Children have increased odds of FGIDs if they have separated parents (OR 1.22, P=0.007), attend private school (OR 1.54, P<0.001), or have nausea (OR 3.16, P<0.001).

**Conclusions:** This large epidemiological study of pediatric FGIDs is the first to evaluate a broad cross-section of children throughout a nation in the Americas. High prevalence of FGIDs and identified associations with their likelihood are relevant when providing medical care and when planning public health efforts.

### 3.3. Association with nausea

Nausea was reported by 10.5% of all children. Nausea was significantly more common among children with FGIDs (OR 3.63; 95% CI 2.96-4.44;  $p < 0.001$ ). There was an association of nausea with most FGIDs: IBS (OR 5.10; 95% CI 3.74-6.92;  $p < 0.001$ ), functional abdominal pain (OR 4.71; 95% CI 2.18-9.71;  $p < 0.001$ ), abdominal migraine (OR 4.62; 95% CI 2.73-7.66;  $p < 0.001$ ), functional dyspepsia (OR 3.80; 95% CI 1.86-7.40;  $p < 0.001$ ), and functional constipation (OR 1.42; 95% CI 1.06-1.87;  $p = 0.011$ ). There was no significant association between nausea and aerophagia, rumination, cyclic vomiting syndrome, or non-retentive fecal incontinence.

## Prevalence of Pediatric Functional Gastrointestinal Disorders Utilizing the Rome IV Criteria

Samantha G. Robin, BS<sup>1</sup>, Catherine Keller, BS<sup>1,\*</sup>, Russell Zwiener, MD<sup>2</sup>, Paul E. Hyman, MD<sup>2</sup>, Samuel Nurko, MD, MPH<sup>3</sup>, Miguel Saps, MD<sup>4</sup>, Carlo Di Lorenzo, MD<sup>4</sup>, Robert J. Shulman, MD<sup>5</sup>, Jeffrey S. Hyams, MD<sup>6</sup>, Olafur Palsson, PsyD<sup>1</sup>, and Miranda A. L. van Tilburg, PhD<sup>1,7,8</sup>

**Objective** To assess the prevalence of functional gastrointestinal (GI) disorders in children 0-18 years old according to the newly established Rome IV diagnostic criteria as reported by parents in a representative community sample.

**Study design** A cross-sectional study in which mothers ( $n = 1255$ ) of children aged 0-18 years old in the US were recruited to complete an online survey about their child's GI symptoms, quality of life (QoL), and other health conditions.

**Results** Based on the Rome IV criteria, 24.7% of infants and toddlers aged 0-3 years and 25.0% of children and adolescents aged 4-18 years fulfilled symptom-based criteria for a functional GI disorder. The most common functional GI disorders were infant regurgitation among infants (24.1%) and functional constipation among both toddlers (18.5%) and children and adolescents (14.1%). QoL was diminished in pediatric patients with functional GI disorders (median = 71.69 vs median = 87.60;  $z = -11.41$ ;  $P < .001$ ). Children were more likely to qualify for a functional GI disorder if their parent qualified for a functional GI disorder (35.4% vs 23.0%;  $P < .001$ ).

**Conclusions** Based on Rome IV criteria, functional GI disorders are common in pediatric populations of all ages and are associated with decreased QoL. (*J Pediatr* 2018;195:134-9).

**Table III. Functional GI disorder prevalence in children greater than 4 years old according to Rome III and Rome IV criteria**

Diagnoses	Rome IV, N (%)	Rome III*
Functional constipation	135 (14.10%)	122 (12.90%)
Functional dyspepsia – postprandial distress syndrome <sup>†</sup>	69 (7.20%)	-
Functional dyspepsia – epigastric pain syndrome <sup>†</sup>	4 (0.40%)	-
Functional dyspepsia – unspecified <sup>†</sup>	N/A	2 (0.20%)
IBS	49 (5.10%)	27 (2.80%)
FAP NOS	30 (3.1%)	FAP 2 (0.3%) FAPS 8 (0.8%)
Aerophagia	25 (2.60%)	41 (4.30%)
Cyclic vomiting syndrome	19 (2.00%)	10 (1.10%)
Functional vomiting	13 (1.40%)	-
Abdominal migraine	11 (1.10%)	87 (9.20%)
Functional nausea	5 (0.50%)	-
Nonretentive fecal incontinence	2 (0.20%)	17 (1.80%)
Rumination	0 (0%)	0.00%
Any functional GI disorder	25.00%	23.10%

FAP, functional abdominal pain; FAPS, functional abdominal pain syndrome; NOS, not otherwise specified.

\*Rome III prevalence data are from a previous study that used the same methods as the current study.<sup>2</sup>

<sup>†</sup>The 2 subcategories of functional dyspepsia (functional dyspepsia-postprandial distress syndrome and functional dyspepsia-epigastric pain syndrome) are new diagnostic categories under Rome IV criteria. As such, the categories for functional dyspepsia do not match between Rome III and Rome IV data.

# Children with Functional Nausea—Comorbidities outside the Gastrointestinal Tract

Sally E. Tarbell, PhD<sup>1,2</sup>, Erin C. Sullivan, BS<sup>3</sup>, Carol Meegan, BS<sup>3</sup>, and John E. Fortunato, MD<sup>3,4</sup>

**Objective** To detail common comorbidities and procedures performed to evaluate functional nausea in children.

**Study design** In total, 63 children age 7-18 years seen in a tertiary care pediatric clinic who met Rome IV criteria for functional nausea prospectively completed an Intake Questionnaire, the Pediatric and Parent-Proxy PROMIS-25 Profile v 2.0, the Pediatric and Parent-Proxy Pediatric Sleep Disturbance-Short Form 4a, and the COMPASS 31 orthostatic intolerance scale to assess comorbidities. Medical records were reviewed for diagnostic tests performed to evaluate nausea and for additional comorbidities. Summary statistics were used to determine the most common comorbidities and diagnostic yield of the procedures. Intraclass correlation coefficients assessed agreement between parent and child reports on the PROMIS scales.

**Results** Patients with functional nausea experienced multisystem comorbidities. A majority reported abdominal pain, headache, orthostatic intolerance, fatigue, disturbed sleep, anxiety, constipation, allergies, and vomiting. Agreement between parent-proxy and child report of symptoms on PROMIS scales was good to excellent (intra-class correlation coefficients = .78-.83; all  $P < .001$ ). Patients underwent extensive diagnostic testing: 96 endoscopic procedures, 199 radiologic tests, and 4 cholecystectomies. Most of the procedures were not diagnostically informative.


**Conclusions** Children with functional nausea have comorbidities outside the gastrointestinal tract that warrant evaluation. Gastrointestinal diagnostic tests were of low-yield in identifying a cause. Understanding the relationship with comorbidities may provide insight into etiologies for the nausea and define clinical phenotypes to better tailor care. (*J Pediatr* 2020;225:103-8).

Table II. Most common comorbidities

Comorbid symptoms	Number (%)
Abdominal pain	59 (93.7)
Headache	52 (82.5)
Orthostatic Intolerance	51 (81.0)
Fatigue	47 (74.6)
Disturbed sleep	45 (71.4)
Anxiety	37 (58.7)
Constipation	36 (57.1)
Allergies	34 (54.0)
Vomiting	32 (50.8)
Poor appetite	31 (49.2)
Joint pain	29 (46.0)
Hypermobility	23 (36.5)
Weight loss	22 (34.9)
Diarrhea	19 (30.2)
Syncope	17 (27.0)
Urinary symptoms	17 (27.0)
Depression	16 (25.4)
Dysphagia	16 (25.4)

# Öykü

- ▶ **Bulantı zamanı / sıklığı / süresi / öğünlerle-gıdalarla ilişkisi**
- ▶ **Artıran / azaltan nedenler**
- ▶ **Eşlik eden Gİ belirtileri**  
(ağrı, gaz, yemek sonrası şişkinlik, erken doygunluk, retrosternal yanma, kusma, dışkılama özellikleri)
- ▶ **Komorbid belirtiler**  
(otonomik: baş dönmesi, terleme, sıcak hissetme, solukluk, migren, baş ağrısı, uyku sorunları, kronik yorgunluk, endişe, distres, depresyon)
- ▶ **Alarm belirti-bulgular (kilo kaybı, nörolojik belirti-bulgular, sabah kusması – baş ağrısı, safralı-kanlı kusma)**



# Özgeçmiş – Soygeçmiş

- ▶ Hastada / ailede
  - Çölyak hastalığı
  - Alerjik hastalıklar
  - İnflamatuvar hastalıklar
  - H. pylori, peptik hastalıklar
- ▶ Ailede FGID
- ▶ Ailede migren

# Development and Validation of a Pictorial Nausea Rating Scale for Children

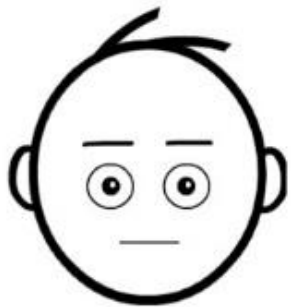


**WHAT'S KNOWN ON THIS SUBJECT:** A simple, reliable, validated pictorial scale for measuring nausea in children may help in its management. Current pictorial scales for nausea have limited construct and convergent validity and may lack specificity in the presence of pain.



**WHAT THIS STUDY ADDS:** This pictorial (Baxter Retching Faces) scale for measuring nausea severity has convergent and discriminant validity, and detected change after antiemetic treatment. Its use in the clinical and research setting may assist in nausea management in children.

**AUTHORS:** Amy L. Baxter, MD,<sup>a</sup> Mehernoor F. Watcha, MD,<sup>b</sup> William Valentine Baxter, PhD,<sup>c</sup> Traci Leong, PhD,<sup>d</sup> and Matthew M. Wyatt, MD<sup>e</sup>



0



2



4



6



8






10



Article

# Development and Validation of a Nausea Severity Scale for Assessment of Nausea in Children with Abdominal Pain-Related Functional Gastrointestinal Disorders

Alexandra C. Russell <sup>1,\*</sup> , Amanda L. Stone <sup>2</sup> , Andi Wang <sup>3</sup> and Lynn S. Walker <sup>1</sup> 

**Abstract:** The objective of this study was to develop a pediatric measure of chronic nausea severity, the Nausea Severity Scale (NSS), and evaluate its reliability and validity in youth with abdominal pain-related functional gastrointestinal disorders (AP-FGID). Pediatric patients (aged 11–17 years-old,  $n = 236$ ) presenting to an outpatient clinic for evaluation of abdominal pain completed the NSS, Children’s Somatization Inventory (CSI), Functional Disability Inventory (FDI), Abdominal Pain Index (API), Patient-Report Outcomes Measurement Information System (PROMIS), Anxiety and Depression Scales and the Pediatric Rome III Questionnaire for FGIDs. The NSS demonstrated good concurrent, discriminant, and construct validity, as well as good internal consistency. One-third (34%) of AP-FGID patients reported experiencing nausea “most” or “every day” in the previous two weeks. The severity of nausea was higher in females than males and correlated significantly with the severity of somatic symptoms, functional disability, anxiety, and depression. The NSS is a valid and reliable measure of nausea in children with AP-FGID.

## The Nausea Severity Scale (NSS)

1. In the last 2 weeks, how often have you had nausea (feeling like you might throw-up)?
  0. Not at all
  1. One or two days
  2. Three or four days
  3. Most days
  4. Every day
  
2. In the last 2 weeks, how many times a day did you usually have the nausea?
  0. None
  1. Once a day
  2. Two or three times a day
  3. Four or more times a day
  4. Constant during the day
  
3. In the last 2 weeks, when you had nausea, how long did it last?
  0. No nausea
  1. Less than 30 minutes
  2. Half an hour to an hour
  3. One to four hours
  4. Most or all of the day
  
4. In the last 2 weeks, when you had the nausea, how much did you usually have?

No Nausea    1   2   3   4   5   6   7   8   9 The most nausea possible



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## ASSESSMENT OF THE MULTIPLE DIMENSIONS OF NAUSEA: THE NAUSEA PROFILE (NP)

ERIC R. MUTH,\* ROBERT M. STERN,\*  
 JULIAN F. THAYER† and KENNETH L. KOCH‡

**Abstract**—Nausea, unlike emesis, is a subjective experience that is difficult to describe to others, be they clinicians or researchers. Previous research has been limited to examining the frequency, severity, and duration of nausea. The goal of this study was to design a questionnaire that would allow for the evaluation of the characteristics of nausea across individuals and situations. This study consisted of 4 stages: descriptors were generated, categorized into 3 dimensions, and reevaluated to verify their reliability; in the final stage, the developed checklist was compared to a visual-analogue-scale (VAS) report of nausea in subjects exposed to a rotating optokinetic drum to stimulate nausea. The overall nausea checklist score and the VAS score were highly correlated ( $r=0.71$ ,  $p<0.01$ ). The development and use of the nausea checklist are discussed.

### APPENDIX.—The Nausea Profile (NP)—brief description and scoring procedure

**Purpose:** The NP is a subjective symptom checklist with the goal of obtaining a more in-depth description of what patients are experiencing when they report the feeling of nausea. The NP evaluates the experience of 3 dimensions which are involved in the complex feeling of nausea: somatic distress; GI distress; and emotional distress.

**Procedure:** The NP can be easily administered before, during and after a session or treatment to evaluate how the experience of nausea differs within a given session/treatment or between different sessions/treatments.

**Descriptors:** The degree to which the patient felt/feels each of the following 17 descriptors during the nauseous period is rated by the patient on a scale of 0 (not at all) to 9 (severely).

Somatic Distress	GI Distress	Emotional Distress
fatigue	sick	nervous
weak	stomach awareness/discomfort	scared/afraid
hot	as if he/she might vomit	worry
sweaty	ill	upset
lightheaded	queasy	panic
shakiness		hopeless

### NAUSEA PROFILE

**Directions:** Rate the degree to which each of the following statements describes what you experienced while the drum was rotating (CIRCLE 1 NUMBER)

- I felt shaky  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt upset  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt lightheaded  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt sick  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt sweaty  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt queasy  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt worried  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt hopeless  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt fatigued/tired  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt panicked  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt nervous  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt scared/afraid  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt ill  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt awareness/discomfort in my stomach  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt as if I might vomit  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt weak  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely
- I felt hot/warm  
 | - + - + - + - + - + - + - + - + - |  
 0 1 2 3 4 5 6 7 8 9  
 not at all severely

# Laboratuvar / Görüntüleme

- ▶ Fonksiyonel bulantı düşünülen hastalarda ileri incelemeler (radyolojik inceleme, endoskopi) tanısal anlamda yol gösterici bulunmamış

*Tarbell SE, J Pediatr 2020*

- ▶ Mide boşalma sintigrafisi (özellikle bulantı öğünlerden sonra saatlerce sürüyorsa) yapılabilir
- ▶ Fonksiyonel bulantı düşünülen hastalarda tanı için endoskopi yapılması gerekli değil

Klinik özellikler  
Komorbid belirtiler = Tanısal yaklaşımı  
yönlendirir



# Laboratuvar / Görüntüleme

## Kronik kusma nedenleri

- ▶ SSS hastalıkları
- ▶ GİS anatomik bozukluklar
- ▶ Mukozal hasarlanmalar
- ▶ Safra kesesi hastalıkları
- ▶ GİS motilite bozuklukları
  - gastroparezi
  - intestinal psödoobstrüksiyon

# Gastroparezi

Mekanik obstrüksiyon olmadan mide boşalmasında gecikme ile karakterize GIS motilite bozukluğu

- ▶ Bulantı
- ▶ Kusma
- ▶ Erken doyunluk
- ▶ Şişkinlik (postprandial)
- ▶ Karında gaz, karında rahatsızlık hissi
- ▶ İştahsızlık
- ▶ Karın ağrısı

Enfeksiyon sonrası  
Cerrahi sonrası  
İdyopatik (~%80)

**Tanı:** Mide boşalması sintigrafisi

**Tedavi:** Semptomatik

Sık, az, ↓ yağ, ↓ lifli besinler

PPI

Prokinetikler

Cyproheptadine

Pilora botulinum toksin uygulaması

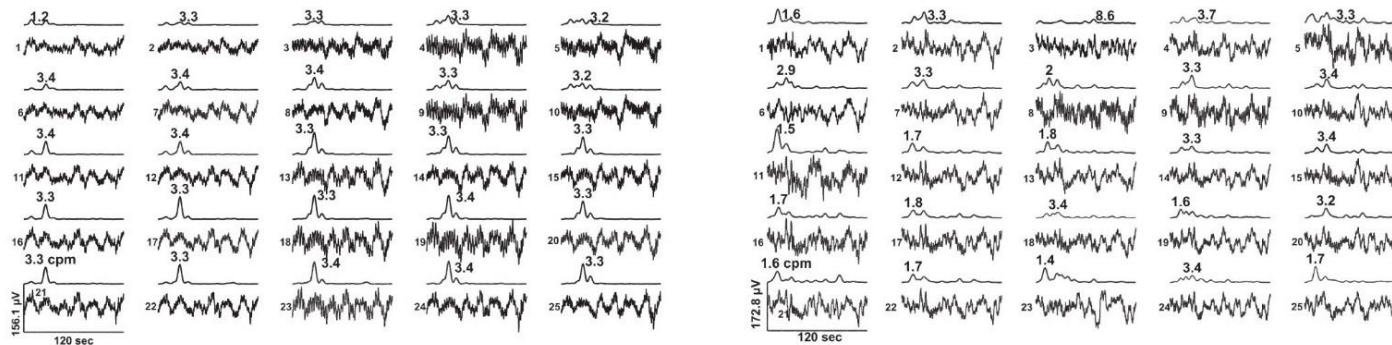
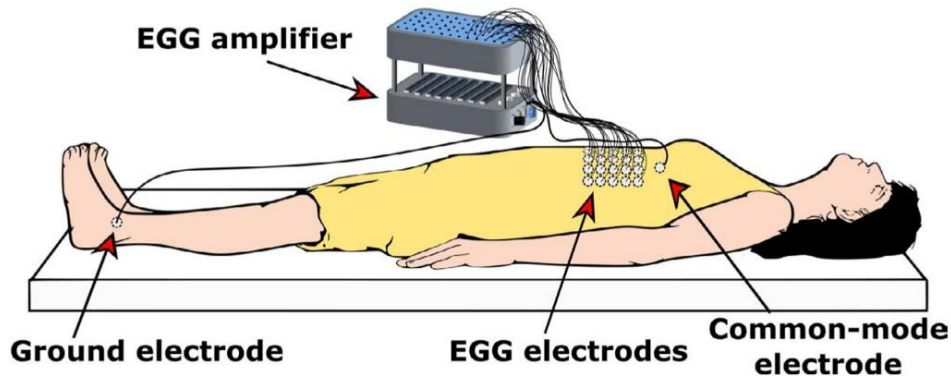
Mideye elektrik stimülasyonu

# The effect of chronic nausea on gastric slow wave spatiotemporal dynamics in children

Suseela Somarajan<sup>1,2</sup>  | Nicole D. Muszynski<sup>1,2</sup> | Joseph D. Olson<sup>1</sup> |  
Andrew Comstock<sup>1,3</sup> | Alexandra C. Russell<sup>4</sup> | Lynn S. Walker<sup>5</sup> | Sari A. Acra<sup>4</sup> |  
Leonard A. Bradshaw<sup>1,2,3</sup>

## Key Points

- High resolution electrogastrograms (HR-EGG) were measured in ten pediatric chronic nausea patients and ten healthy children.
- Gastric slow wave frequency and percentage power distribution analysis indicated abnormal slow wave activity and slow wave uncoupling.
- HR-EGG propagation patterns in nausea patients were retrograde, anterograde, or disrupted, and the preprandial mean slow wave propagation direction was significantly different.
- The analysis of slow wave activity using HR-EGG represents the first physiologically quantifiable noninvasive assessment method to distinguish pediatric chronic nausea from healthy children.





# Tedavi

**Bütüncül -interdisipliner yaklaşım gerekiyor**

**Psikolojik değerlendirme için psikolojik danışım önerilmeli**

**Çocuklarda tedavi açısından kanıta dayalı, büyük çalışmalar yok**

**Bilgiler kısıtlı**

**Ampirik yaklaşım**

*Russell AC. Children 2016*

*Tarbell SE. J Pediatr 2020*

*Browne PD. Expert Rev Clin Pharmacol 2018*

*Kovacic K, Di Lorenzo C. JPGN 2016*

# Tedavi

Ailenin bilgilendirilmesi, eğitimi, etkin iletişim

Yaşam biçimi değişiklikleri

Diyet düzenlemeleri

Psikoterapi, Bilişsel davranış tedavisi

Tamamlayıcı ve alternatif tedavi yöntemleri

İlaç tedavisi

Endoskopik / Cerrahi tedavi

*Russell AC. Children 2016*

*Tarbell SE. J Pediatr 2020*

*Browne PD. Expert Rev Clin Pharmacol 2018*

*Orsagh-Yentis DK. Neurogastroenterology & Motility 2021*

*Kovacic K, Di Lorenzo C. JPGN 2016*



# Ailenin Bilgilendirilmesi, Eđitimi

Stresin rolü

Beyin-GİS iliřkisi

Biyopsikososyal model

Baş etme stratejileri

Normal yaşantının sürdürülmesi

Okula devamın sağlanması birinci hedef olmalı



# Yaşam Biçimi Değişiklikleri

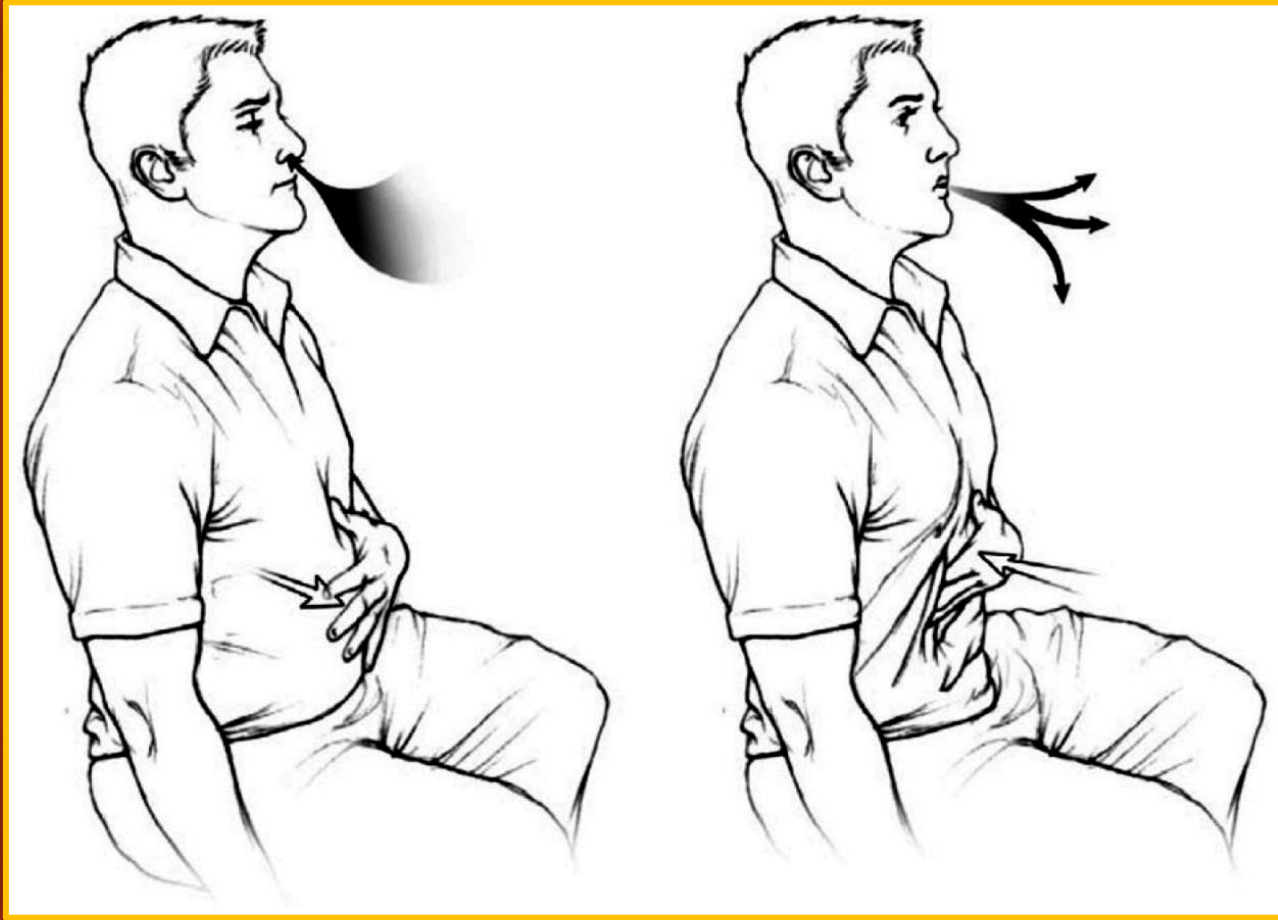
Hidrasyon

Tuz alımı

Düzenli-yeterli uyku

Düzenli egzersiz

# Diyafragmatik Soluk Alma Tekniđi





# Diyet Düzenlemeleri

- ▶ Az yağlı besinler tüketilmesi
- ▶ Kalorili içeceklerin azaltılması
- ▶ Sık öğünler (postprandiyal bulantıda etkili olabilir)

## Use of Cluster Analysis to Identify Sub-Types of Pediatric Functional Nausea

Erin C. Sullivan, BS<sup>1</sup>, John E. Fortunato, MD<sup>1,2</sup>, Elizabeth Gray, MS<sup>3</sup>, Sally E. Tarbell, PhD<sup>4, 5</sup>

### Abstract

**Objective:** To evaluate whether there are clinical subtypes in children with functional nausea based on comorbidities and responses to the Nausea Profile questionnaire.

**Methods:** Patients from the Neurointestinal and Motility Program clinical registry at Lurie Children's Hospital were included if they met Rome IV criteria for functional nausea. Patients completed the Nausea Profile, a multidimensional measure of nausea with gastrointestinal, emotional and somatic subscales. Comorbidities were assessed by chart review and self-report measures. Latent class analysis was used to identify patient groups based on comorbidities. To assess if model-identified groups were predictive of differences in nausea quality, Nausea Profile subscale means were compared between groups and used to predict group membership. Conversely, k-means analysis was used to divide the sample into groups based upon Nausea Profile subscale scores, to determine if identified groups had different comorbidities.

**Results:** Seventy-two patients (n=53 females) with a mean age (+ SD) 14.5 + 2.9 were included. Two clinical subtypes were identified based on comorbidities, with responses on the emotional subscale of the Nausea Profile predicting group membership (p <.04). When patients were grouped by nausea quality, the resulting clusters differed on psychiatric comorbidities (p <.001)

**Conclusions:** Our findings support the existence of nausea subtypes within the broad diagnosis of functional nausea. One such subtype is an emotional predominant nausea supporting the notion that anxiety and depression comprise a subset of patients with nausea. Thus, patients may benefit from a treatment approach that integrates both GI assessment and psychiatric support in their care.

### What is New:

- Cluster analysis identified two clinical subtypes based on grouping of comorbidities
- Anxiety and depression may inform a clinical phenotype of nausea
- The assessment of extra-intestinal comorbidities and screening for anxiety and depression are essential in the evaluation of pediatric functional nausea.

**Table 1. Most common comorbidities in patient population (n=72)**

Comorbidity	N (%)
Headache	60 (83.3)
Orthostatic Intolerance	58 (80.6)
Fatigue	55 (76.4)
Disturbed Sleep	50 (69.4)
Anxiety	44 (61.1)
Constipation	41 (56.9)
Vomiting	37 (51.4)
Hypermobility	26 (36.1)
Depression	17 (23.6)



# Psikoterapi

## Psikolojik deęerlendirmenin yapılması

- ▶ Bilişsel davranış tedavisi
- ▶ Relaksasyon teknikleri
- ▶ Baş etme yöntemlerinin geliştirilmesi



# A review of psychological treatments for vomiting associated with paediatric functional gastrointestinal disorders

Curr Opin Pediatr 2019, 31:630–635

Bradley Jerson<sup>a,b</sup>, Katherine Lamparyk<sup>c</sup>, and Miranda A.L. van Tilburg<sup>d,e,f</sup>

## Purpose of review

Vomiting can be a primary symptom or associated with various other functional gastrointestinal disorders (FGIDs). The purpose of this review was to discuss the evidence for psychological treatments for vomiting in pediatric FGID.

## Recent findings

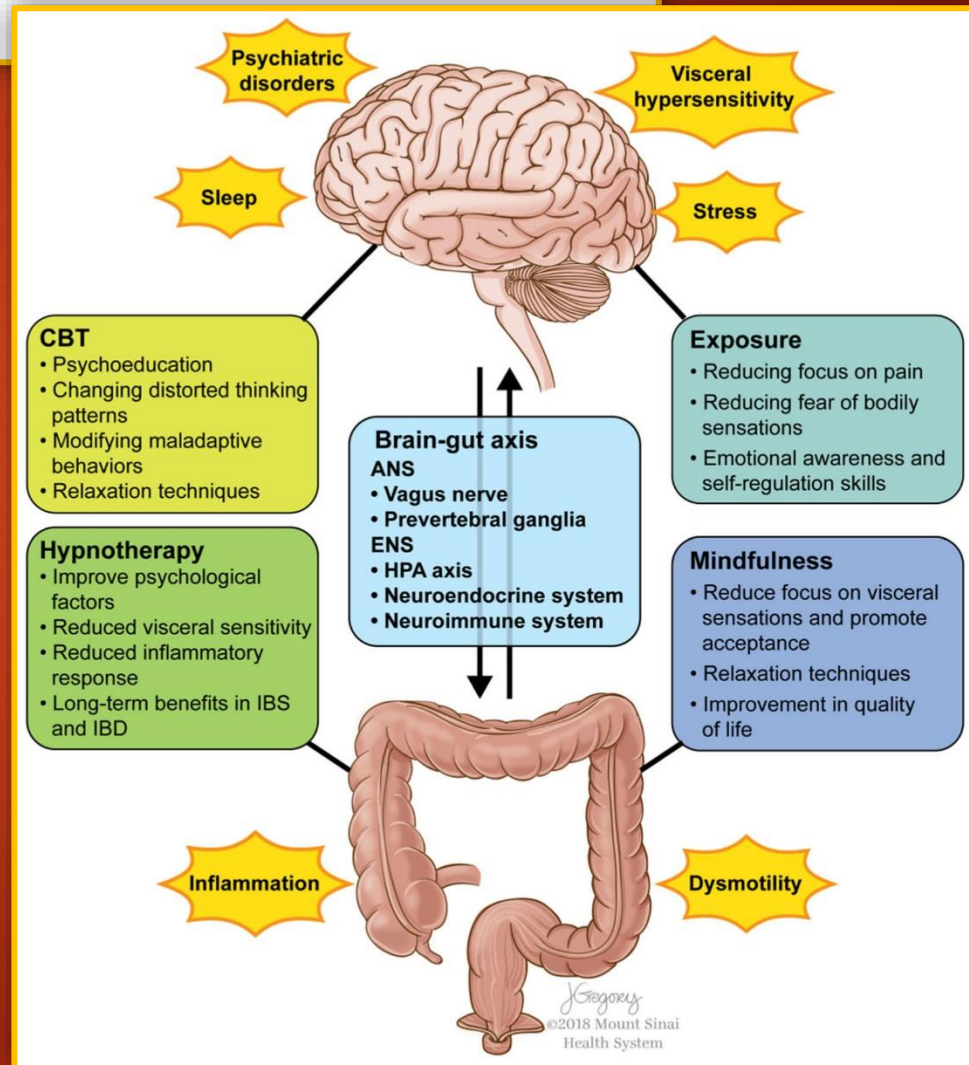
Vomiting of functional origin is an increasingly recognized symptom among children and adolescents. It is highly aversive and associated with disability and poor quality of life. Cognitive behavioral therapy, lifestyle modification (especially sleep), diaphragmatic breathing, and hypnosis can be helpful in preventing vomiting episodes and reducing disability. However, no randomized clinical trials have been performed. An evidence base for psychological treatments in children with vomiting of functional origin is highly needed.

## Summary

Increased evidence is demonstrating value and efficacy of incorporating psychogastroenterology practices into ongoing treatment plans for digestive conditions. Current psychological treatments are focused on prevention of vomiting through stress reduction and lifestyle modification, reduction of disability by limiting avoidance behaviours, as well as counteracting biological factors. However, psychological treatments have not been shown to be helpful during an acute vomiting episode. More research is needed to build an evidence base for psychological treatments in vomiting disorders.

## Brain-Gut Therapies for Pediatric Functional Gastrointestinal Disorders and Inflammatory Bowel Disease

Hannibal Person<sup>1</sup> • Laurie Keefer<sup>2</sup>







# Tamamlayıcı ve Alternatif Tedaviler

Konvansiyonel olmayan tedavi yöntemleri  
ve ürünleri

Akupunktur

Akupressure

Hipnoz

Yoga

Biofeedback

Fitoterapi

Aromaterapi

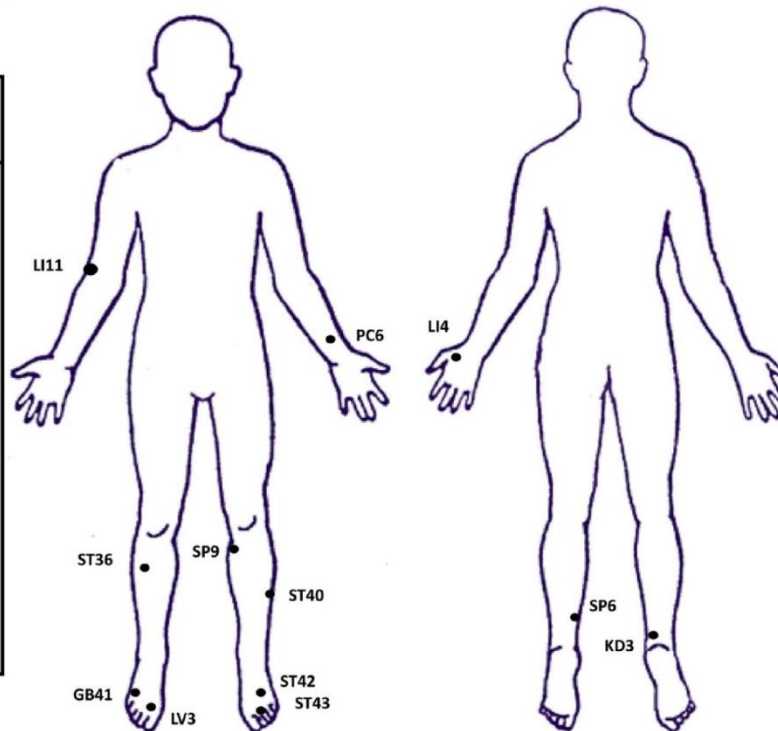
# Intraoperative Multipoint Acupuncture for Reducing Postoperative Nausea and Vomiting in High-Risk Children: A Case Series

Jaime A. Ralston-Wilson, DAOM, LAc, EAMP,\* and Joelle B. Karlik, MD†‡

Acupuncture studies have demonstrated varying effects on pediatric postoperative nausea and vomiting (PONV). Unanswered questions include whether the type of therapy, number of points used, or timing of treatments vary the effect of acupuncture. We present a case series of intraoperative multipoint acupuncture treatments for high-risk pediatric patients. Fourteen patients were included, and 19 treatments were provided. Twelve patients (85.7%) had previous PONV. Patients who received intraoperative acupuncture reported no early phase PONV, and 3 patients (15.8%) reported late-phase PONV. One patient required postoperative antiemetics. Intraoperative multipoint acupuncture may be a safe and efficacious adjunct for PONV in high-risk pediatric patients. (A&A Practice. 2020;14:40–3.)

## Acupuncture Points Used

Acupuncture Point	Overall Use
PC6 (Neiguan)	19 (100%)
ST36 (Zusanli)	19 (100%)
SP6 (Sanyinjiao)	17 (89.5%)
LI4 (Hegu)	14 (73.7%)
LV3 (Taichong)	13 (68.4%)
SP9 (Yinlingquan)	7 (36.8%)
ST43 (Xianggu)	7 (36.8%)
ST42 (Chongyang)	6 (31.6%)
KD3 (Taixi)	4 (21.1%)
LI11 (Quchi)	1 (5.3%)
ST40 (Fenglong)	1 (5.3%)
GB41 (Zulinqi)	1 (5.3%)





[mskcc.org](http://mskcc.org)

RESEARCH

Open Access

# Complementary and alternative medicine modalities used to treat adverse effects of anti-cancer treatment among children and young adults: a systematic review and meta-analysis of randomized controlled trials

Dana C. Mora<sup>1\*</sup>, Grete Overvåg<sup>2</sup>, Miek C. Jong<sup>1</sup>, Agnete E. Kristoffersen<sup>1</sup>, Debbie C. Stavleu<sup>3</sup>, Jianping Liu<sup>4</sup> and Trine Stub<sup>1</sup>

## Abstract

**Background:** Dealing with the symptom burden of cancer diagnosis and treatment has led parents to seek different self-management strategies including Alternative and Complementary Medicine (CAM). The aim of this study was to perform a systematic review and meta-analysis about the use and effect of CAM modalities to treat adverse effects of conventional cancer treatment among children and young adults.

**Methods:** Six scientific research databases were used to identify randomized controlled trials (RCTs) from 1990 to September 2020. Included studies investigated the use of CAM to treat cancer treatment related adverse effects in children and young adults compared to controls.

**Results:** Twenty RCTs comprising 1,069 participants were included in this review. The included studies investigated acupuncture, mind–body therapies, supplements, and vitamins for chemotherapy-induced nausea and vomiting (CINV), oral mucositis, and anxiety among children and young adults who underwent conventional cancer treatment. Seven studies (315 participants) were included in the meta-analysis. The overall effect of CAM (including acupuncture and hypnosis only) on chemotherapy-induced nausea and/or vomiting and controls was statistically significant with a standard mean difference of -0.54, 95% CI [-0.77, -0.31]  $I^2 = 0\%$  ( $p < 0.00001$ ). There was a significant difference between acupuncture and controls ( $n = 5$ ) for intensity and/or episodes of CINV with an SMD -0.59, 95% CI [-0.85, -0.33] ( $p < 0.00001$ ). No significant difference was found between hypnosis and controls ( $n = 2$ ) for severity or episodes of CINV with an SMD -0.41, 95% CI [-1.09, 0.27]  $I^2 = 41\%$  ( $p = 0.19$ ).

**Conclusion:** Current evidence from this meta-analysis of randomized controlled trials shows that CAM, including acupuncture and hypnosis only, is effective in reducing chemotherapy-induced nausea and vomiting in children and

## BMJ Open Gut-directed hypnotherapy versus standard medical treatment for nausea in children with functional nausea or functional dyspepsia: protocol of a multicentre randomised trial

BMJ Open 2019;9:e024903. doi:10.1136/bmjopen-2018-024903

Pamela D Browne,<sup>1</sup> Bibiche den Hollander,<sup>1</sup> Esther M Speksnijder,<sup>1</sup> Herbert M van Wering,<sup>2</sup> Walther Tjon a Ten,<sup>3</sup> Elvira K George,<sup>4</sup> Michael Groeneweg,<sup>5</sup> Nanja Bevers,<sup>6</sup> Margaretha M S Wessels,<sup>7</sup> Maartje M van den Berg,<sup>8</sup> Joery Goede,<sup>9</sup> Sarah T A Teklenburg-Roord,<sup>10</sup> Carla Frankenhuis,<sup>1</sup> Marc A Benninga,<sup>1</sup> Arine M Vlieger<sup>11</sup>

- ▶ Hipnotik bir durum yaratılarak fizyolojik, bilişsel ve duygusal süreçlerin ve davranışın düzenlenmesi
- ▶ Beyin-GİS aksı, visseral hipersensitivite üzerine etkili
- ▶ Gastrointestinal (motilite), psikososyal (anksiyete, depresyon) ve otonomik sinir sistemi üzerine olumlu etkileri var
- ▶ Kemoterapinin neden olduğu bulantı ve kusmada, IBS ve fonksiyonel karın ağrısında etkili bulunmuş
- ▶ İyi tolere ediliyor, yan etkisi Ø
- ▶ Fonksiyonel bulantıda da etkili olabilir mi?

# Skills or Pills: Randomized Trial Comparing Hypnotherapy to Medical Treatment in Children With Functional Nausea

Pamela D. Browne,<sup>\*,a</sup> Clara M. A. de Bruijn,<sup>\*,†,a</sup> Esther M. Speksnijder,<sup>\*</sup> Bibiche den Hollander,<sup>\*</sup> Herbert M. van Wering,<sup>§</sup> Margreet M. S. Wessels,<sup>||</sup> Michael Groeneweg,<sup>||</sup> Joery Goede,<sup>#</sup> Carla Frankenhuis,<sup>\*</sup> Ellen Tromp,<sup>\*\*</sup> Marc A. Benninga,<sup>\*</sup> and Arine M. Vlieger<sup>††</sup>

Clinical Gastroenterology and Hepatology 2021

**BACKGROUND & AIMS:** The potential effectiveness of gut-directed hypnotherapy (HT) is unknown for pediatric chronic nausea. This randomized controlled trial compared HT with standard medical treatment (SMT).

**METHODS:** One hundred children (ages, 8–18 y) with chronic nausea and fulfilling functional nausea (FN) or functional dyspepsia (FD) criteria were allocated randomly (1:1) to HT or SMT, with a 3-month intervention period. Outcomes were assessed at baseline, at the halfway point, after treatment, and at the 6- and 12-month follow-up evaluation. Children scored nausea symptoms in a 7-day diary. The primary outcome was treatment success, defined as a reduction in nausea of 50% or more, at the 12-month follow-up evaluation. Secondary outcomes included adequate relief of nausea.

**RESULTS:** After treatment and at the 6-month follow-up evaluation, there was a trend toward higher treatment success in the HT group compared with the SMT group (45% vs 26%,  $P = .052$ ; and 57% vs 40%,  $P = .099$ , respectively). At 12 months, treatment success was similar in both groups (60% in the HT group and 55% in the SMT group;  $P = .667$ ). In the FN group, significantly higher success rates were found for HT, but no differences were found in patients with FD. Adequate relief was significantly higher in the HT group than in the SMT group at the 6-month follow-up evaluation (children: 81% vs 55%,  $P = .014$ ; parents: 79% vs 53%;  $P = .016$ ), but not at the 12-month follow-up evaluation.

**CONCLUSIONS:** HT and SMT were effective in reducing nausea symptoms in children with FN and FD. In children with FN, HT was more effective than SMT during and after the first 6 months of treatment. Therefore, HT and SMT, applied separately or in combination, should be offered to children with FN as a treatment option (Clinical trials registration number: NTR5814).

## What You Need to Know

### Background

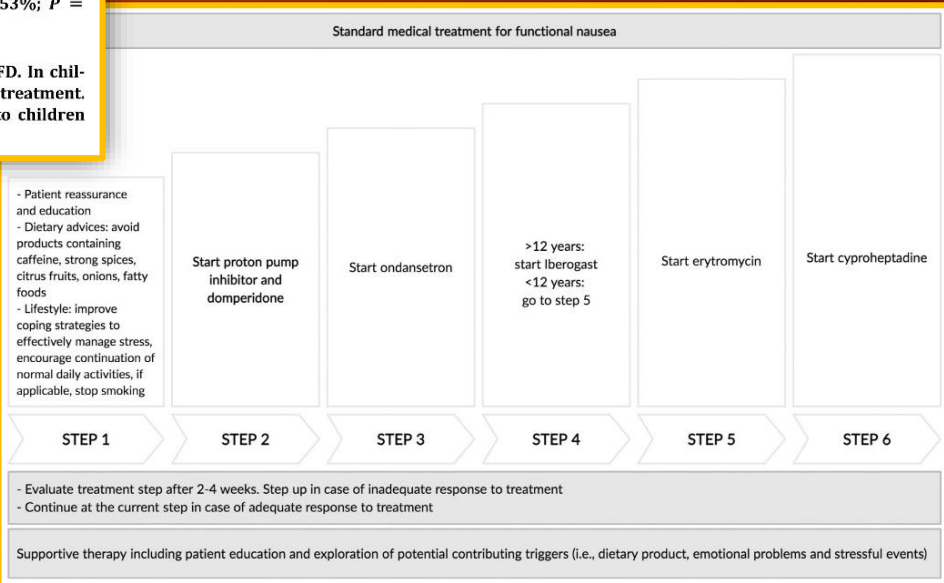
Hypnotherapy is a valuable treatment in children with functional abdominal pain. To the best of our knowledge, no studies have been performed examining the efficacy of hypnotherapy in the treatment of nausea, a debilitating symptom in children with functional nausea and functional dyspepsia.

### Findings

In children with functional nausea, hypnotherapy was more effective than standard medical treatment during and after the first 6 months of treatment to reduce nausea symptoms.

### Implications for patient care

Hypnotherapy, applied separately or in combination with standard medical treatment, should be offered to children with functional nausea as a treatment option.



# Fitoterapi

## ▶ Zencefil

- Mide boşalmasını iyileştiriyor
- Mide antral kontraksiyonları stimüle ediyor
- [Zencefil + Enginar] dolgunluk hissini iyileştiriyor



## ▶ Peppermint oil (nane yağı) [nane yağı, rezene, pelinotu]



## ▶ STW 5 (bitkisel ürün)



# Review article: the physiological effects and safety of peppermint oil and its efficacy in irritable bowel syndrome and other functional disorders

B. P. Chumpitazi<sup>1</sup>  | G. L. Kearns<sup>2</sup> | R. J. Shulman<sup>1,3</sup>

## Summary

**Background:** Peppermint oil has been used for centuries as a treatment for gastrointestinal ailments. It has been shown to have several effects on gastrointestinal physiology relevant to clinical care and management.

**Aim:** To review the literature on peppermint oil regarding its metabolism, effects on gastrointestinal physiology, clinical use and efficacy, and safety.

**Methods:** We performed a PubMed literature search using the following terms individually or in combination: peppermint, peppermint oil, pharmacokinetics, menthol, oesophagus, stomach, small intestine, gallbladder, colon, transit, dyspepsia, nausea, abdominal pain, and irritable bowel syndrome. Full manuscripts evaluating peppermint oil that were published through 15 July 2017 were reviewed. When evaluating therapeutic indications, only randomised clinical trials were included. References from selected manuscripts were used if relevant.

**Results:** It appears that peppermint oil may have several mechanisms of action including: smooth muscle relaxation (via calcium channel blockade or direct enteric nervous system effects); visceral sensitivity modulation (via transient receptor potential cation channels); anti-microbial effects; anti-inflammatory activity; modulation of psychosocial distress. Peppermint oil has been found to affect oesophageal, gastric, small bowel, gall-bladder, and colonic physiology. It has been used to facilitate completion of colonoscopy and endoscopic retrograde cholangiopancreatography. Placebo controlled studies support its use in irritable bowel syndrome, functional dyspepsia, childhood functional abdominal pain, and post-operative nausea. Few adverse effects have been reported in peppermint oil trials.

**Conclusion:** Peppermint oil is a natural product which affects physiology throughout the gastrointestinal tract, has been used successfully for several clinical disorders, and appears to have a good safety profile.



*Palliative and Supportive Care*

[cambridge.org/pax](http://cambridge.org/pax)

**Original Article**

*Palliative and Supportive Care* **18**, 158–163.

Aromatherapy improves nausea, pain, and mood for patients receiving pediatric palliative care symptom-based consults: A pilot design trial

Meaghann S. Weaver, M.D., M.P.H., F.A.A.P.<sup>1</sup>, Jacob Robinson, M.S.<sup>1</sup> and Christopher Wichman, PH.D.<sup>2</sup>

- ▶ Koku uygulanmasıyla olfaktör bulbus, serebral korteks, hipotalamus ve limbik sistemin aktive edilmesine dayanıyor
- ▶ Zencefil, kakule, nane, rezene, biberiye, günlük otu, bergamot
- ▶ Psikolojik durumu iyileştirme, bulantıyı azaltmada etkili
- ▶ İleri çalışmalar yapılmalı

# İlaç Tedavisi

- ▶ **Fludrocortisone**  
(ortostatik intoleransa bağlı gastrik disritmide etkili)
- ▶ **Cyproheptadine, diğer antihistaminikler**  
(serotonin, histamin, muskarinik reseptör antagonisti; mide akomodasyonunu artırıyor, iştahı uyarıyor)
- ▶ **Amitriptyline (TCA)**  
(GABA-erjik nörotransmisyonu kolaylaştırır, endojen opioid sistemi güçlendirir)
- ▶ **Ondansetron**  
(5-HT<sub>3</sub> reseptör antagonisti; yararı az)
- ▶ **Antimigren ilaçları**  
( $\beta$  bloker, antiepileptikler - topiramet, levetirasetam)

# İlaç Tedavisi

- ▶ **Buspiron (anksiyolitik)**  
(gastrik akomodasyonu iyileştiriyor)
- ▶ **PPI**  
(dispepside etkili; fonksiyonel bulantıda destekleyici veri yok)
- ▶ **Prokinetikler (metoclopramide, eritromisin)**  
(mide boşalmasında gecikme varsa)
- ▶ **Mirtazapin**  
(antiserotonerjik, antihistaminik)
- ▶ **Aprepitant**  
(neurokinin-1 reseptör antagonisti)

ORIGINAL RESEARCH ARTICLE

# Effect of Mirtazapine on Nausea in Children with Functional Nausea and Functional Dyspepsia Postprandial Distress Syndrome

Ivonne M. Iglesias-Escabi<sup>1,2</sup> · David Kleesattel<sup>3</sup> · Lee S. McDaniel<sup>4</sup> · Erin Reuther<sup>2</sup> · Colleen LeBlanc<sup>1,2</sup> · Paul E. Hyman<sup>1,2</sup> · Neha R. Santucci<sup>3,5</sup> 

## Abstract

**Objective** The objective of this study was to assess the clinical response and safety of mirtazapine in the pediatric population with a diagnosis of functional nausea and nausea associated with functional dyspepsia postprandial distress syndrome.

**Methods** This was a retrospective chart review to evaluate the safety and efficacy of mirtazapine for pediatric nausea and nausea associated with functional dyspepsia postprandial distress syndrome. Clinical response was classified as complete response, partial response, and no response. We also identified the prescribed doses, side effects, and weight changes during mirtazapine therapy.

**Results** Among the 57 total patients, 67% were females and ages ranged from 7 to 19 years with a mean of  $14 \pm 3$  years. Clinical (complete and partial) response was reported in 82% of patients. Nausea resolved in 82% and insomnia in 77% of the patients. Eighty-four percent gained weight with a mean of  $4 \pm 7$  kg. Sixty-five percent did not report adverse effects. The most common adverse effects were undesired weight gain (16%) and dysphoria (9%). Two patients discontinued the medicine after the first dose because of adverse effects. There was a significant correlation between the initial dose and weight ( $r_s = 0.478$ ;  $p = 0.0002$ ). The median initial and final doses were 15 mg, respectively.

**Conclusions** Mirtazapine is an option for treating children and adolescents with functional nausea and nausea associated with functional dyspepsia post-prandial distress syndrome, especially for a select group of patients with concurrent weight loss, anxiety, and insomnia.



## Pharmacological treatments for functional nausea and functional dyspepsia in children: a systematic review

Pamela D. Browne, Sjoerd C. J. Nagelkerke, Faridi S. van Etten-Jamaludin, Marc A. Benninga & Merit M. Tabbers

### Abstract

**Introduction:** Chronic idiopathic nausea (CIN) and functional dyspepsia (FD) cause considerable strain on many children's lives and their families.

**Areas Covered:** This study aims to systematically assess the evidence on efficacy and safety of pharmacological treatments for CIN or FD in children. CENTRAL, EMBASE and Medline were searched for Randomized Controlled Trials (RCTs) investigating pharmacological treatments of CIN and FD in children (4-18 years). Cochrane risk of bias tool was used to assess methodological quality of the included articles.

**Expert Commentary:** Three RCTs (256 children with FD, 2-16 years) were included. No studies were found for CIN. All studies showed considerable risk of bias, therefore results should be interpreted with caution. Compared to baseline, successful relief of dyspeptic symptoms was found for omeprazole (53.8%), famotidine (44.4%), ranitidine (43.2%) and cimetidine (21.6%) ( $p=0.024$ ). Compared with placebo, famotidine showed benefit in global symptom improvement (OR 11.0; 95% CI 1.6-75.5;  $p=0.02$ ). Compared to baseline, mosapride versus pantoprazole reduced global symptoms ( $p=0.011$ ;  $p=0.009$ ). One study reported no occurrence of adverse events. This systematic review found no evidence to support the use of pharmacological drugs to treat CIN or FD in children. More high quality clinical trials are needed.



# Endoskopik / Cerrahi Tedavi

- ▶ Endoskopik botulinium enjeksiyonu
- ▶ İntraabdominal gastrik pacemaker implantasyonu

# Gastric electrical stimulation improves symptoms and need for supplemental nutrition in children with severe nausea and vomiting: A ten-year experience

Danielle K. Orsagh-Yentis<sup>1</sup> | Kelsey Ryan<sup>1,2</sup> | Nicole Hurwitz<sup>1,2</sup> |  
Karen A. Diefenbach<sup>3</sup> | Steven Teich<sup>4</sup> | Hayat Mousa<sup>5</sup> | Neetu Bali<sup>1</sup> | Karla Vaz<sup>1</sup> |  
Desale Yacob<sup>1</sup> | Carlo Di Lorenzo<sup>1</sup> | Peter L. Lu<sup>1</sup>

Konvansiyonel tedaviye  
cevap vermeyen ciddi  
bulantı ve kusmada  
gastrik elektrik  
stimulasyonu tedavi  
yöntemi olarak umut  
verici

## Abstract

**Background:** Gastric electrical stimulation (GES) is a promising therapy for children with severe nausea and vomiting, but information on long-term outcomes is limited. We sought to evaluate the long-term efficacy and safety of GES and to describe patient benefit and satisfaction.

**Methods:** Using a prospective registry, we identified patients aged <21 years treated with GES at our institution between 2009 and 2019. Encounters were selected at baseline prior to GES and at follow-up at 1 month, 12 months, and the most recent visit. We compared symptoms, route of nutrition, and medication usage at baseline to follow-up timepoints. Factors associated with improvement were evaluated. We recorded complications and need for battery replacement. We contacted families to administer the Glasgow Children's Benefit Inventory (GCBI) and a parent satisfaction questionnaire.

**Key Results:** Eighty-five patients (68.2% female, median age 15.8 years) completed a trial of temporary GES due to severe nausea and vomiting. Seventy-seven (90.6%) had a positive response and underwent permanent stimulator placement. Use of tube feeding or parenteral nutrition (PN) decreased from 72.7% at baseline to 29.9% at the most recent follow-up ( $p < 0.001$ ). Higher baseline vomiting severity was associated with the ability to stop supplemental nutrition by 1 month ( $p < 0.05$ ). Fourteen patients (18.2%) had complications, primarily due to stimulator-associated discomfort, and 29 (37.7%) required battery replacement. Median GCBI was +52.1, indicating health-related benefit.

**Conclusions and Inferences:** Children with severe nausea and vomiting treated with GES experienced significant and durable improvement in symptom severity and their ability to tolerate oral nutrition.

# Son Sözlür

- ▶ Bulantı yakınmasıyla sık karşılaşıyoruz
- ▶ Tam karakterize edilemeyen bir belirti
- ▶ Fonksiyonel bulantının fizyopatolojisi multifaktöryel (otonomik, santral, gastrointestinal, psikolojik)
- ▶ Objektif belirteç yok
- ▶ Konu hakkında çocuklarda bilgi birikimi sınırlı
- ▶ Tümüyle etkili bir tedavi yöntemi yok
- ▶ Psikolojik değerlendirme ve danışım önemli
- ▶ Hasta-aile-doktor için zor bir durum
- ▶ Uzun vadede olumsuz etkileri sürüyor (komorbiditeler, psikolojik durum)
- ▶ Hedefe yönelik etkili tedavi yöntemlerinin geliştirilmesi için kapsamlı çalışmalara gereksinim var