Gastrointestinal (GI) Problems in Children with ASD

STAR Presentation
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Disclosure

I do not have any conflicts of interest or financial relationships with commercial interests relevant to this presentation.

There are no relationships to disclose.
Objectives

• To discuss common GI concerns in children with ASD.
• To discuss treatment of common GI problems.
• To briefly discuss some of the theories about the relationship of ASD to the GI tract.
Categorization & Questions

- GI problems
- Feeding problems
- Nutritional problems
- Relationship of GI problems to underlying cause of ASD/DD
- Dietary intervention in children with ASD
GI Problems are Common in Children with ASD

• GI disorders and associated symptoms are commonly reported in individuals with ASD
  – In recent meta-analysis, children with ASD > 4x likely as typically developing peers to have GI problems such as abdominal pain, diarrhea, or constipation.
    [McElhanon BO, Pediatrics 2014]
  – In a recent study of children with ASD seen in clinical setting 49% were reported to have one or more GI complaints
    [Kang, Autism Research, 2014]
  – 26% had constipation and 22% exhibited diarrhea
  – 13% bloating / gassy
  – 10% vomiting / gastroesophageal reflux

• Prevalence not established

• Communication difficulties make recognizing and characterizing symptoms challenging
Most Common GI Problems

- Chronic constipation
- Chronic diarrhea
- Abdominal pain
- Bloating, excessive gas
- Vomiting, gastroesophageal reflux

These are often functional disorders

- Selective eating
Possible Causes of GI Problems

- Abnormal diet due to food selectivity/preferences
- Exaggerated sensory response
- Behavioral factors
- Medications
- Underlying GI conditions that are seen in general population such as Celiac Disease, food allergies or intolerances
- Neurenteric dysregulation (abnormal nervous system regulation of GI tract)
- Genetic factors that contribute to ASD and GI problems
- Mitochondrial dysfunction
- Underlying intrinsic abnormality of GI tract (increased permeability or inflammation, altered gut microbiome) that contributes to development of ASD
Findings that May Prompt further Evaluation

- Weight loss or growth stunting
- Blood in the stool
- Fever (unexplained)
- Persistent vomiting
- Persistence/duration of symptoms and severity
- Anemia
- Laboratory markers of inflammation
- Family history (especially of inflammatory bowel disease)
- Abnormal physical findings
Empiric Treatment

• Abdominal pain/GERD: Trial of proton pump inhibitor (PPI) for 2 to 4 weeks
  – ex. Prevacid (lansoprazole), Prilosec (omeprazole)

• Abdominal pain/Constipation: Trial of Miralax (polyethylene glycol) for 4 weeks

• Abdominal pain/Gas: Trial of lactose-free diet for 2 weeks
Diagnostic Considerations

• Radiology:
  – X-ray of abdomen to assess constipation
  – Upper GI series to assess anatomy/function

• Stool studies
  – Infectious: enteric pathogens, ova/parasites, Giardia, C. Diff toxin
  – Inflammation: blood, calprotectin, lactoferrin
  – Malabsorption: fecal fat, α-1-antitrypsin

• Blood tests:
  – CBC to look for anemia, iron deficiency, white blood cell count
  – Markers of inflammation: CRP, ESR
  – Other markers of nutritional status: protein, albumin, vitamin D
  – Markers of liver disease, pancreatic disease
  – Serologic testing: gluten-sensitive enteropathy, food allergies

• Endoscopy: upper endoscopy (EGD), colonoscopy
Functional Abdominal Pain or Irritable Bowel Syndrome

Could present with:

- Behavioral indicators of pain
- Disordered sleep
- Diarrhea
- Constipation
- Bloating
- Flatulence

Could be due to neurenteric dysregulation
Behavioral Indicators of Pain or Discomfort

• Vocal behaviors
• Motor behaviors
• Changes in overall state

• Vocal behaviors:
  – Clearing of throat, swallowing, tics
  – Screaming, sobbing, sighing, whining, moaning, groaning
  – Delayed echolalia that includes reference to pain or stomach
  – Direct verbalizations, eg, “tummy hurts”
Behavioral Indicators of Pain or Discomfort

• Motor behaviors:
  – Facial grimacing, gritting teeth, wincing
  – Constant eating/drinking/swallowing (grazing behavior)
  – Application of pressure to abdomen
  – Tapping behavior or finger tapping on throat
  – Unusual posturing: jaw thrust, neck torsion, arching of back, odd arm position, abdominal sensitivity/flinching
  – Agitation: pacing, jumping up and down
  – Unexplained increase in repetitive behavior
  – Self-injurious behaviors: biting, hitting/slapping face, head-banging
  – Aggression: onset of, or increase in, aggressive behavior

• Changes in overall state:
  – Sleep disturbance
  – Increased irritability (exaggerated responses to stimulation)
  – Noncompliance with demands that typically elicit an appropriate response (increased oppositional behavior)
Suspected Malabsorption (maldigestion)

• Consider upper endoscopy with measurement of disaccharidases

• Lactose intolerance is common in general population, so consider
  – Lactase supplementation
  – Dietary restriction of lactose
Theories

− Immune or inflammation-mediated mechanism specific to ASDs
  − Possibly genetically-determined altered immune response
  − Possibly vaccine-triggered in setting of abnormal immune function
  − Possibly Increased gut permeability (“leaky gut”)
    • Suggested by study finding ileal nodular lymphoid hyperplasia and/or chronic colitis on colonoscopy

• Wakefield in 1998 reported association between ileocolitis and developmental regression in 12 children and called it “autistic enterocolitis”
  − No control group. These findings are common in normal children.
  − He has since been discredited.
Theories

- Increased gut permeability – basis for gluten-free, casein-free diet
- Abnormal gut microbiome (gut bacteria)
- Nutrient deficiency – abnormal plasma amino acid profile
- Malabsorption – basis for taking pancreatic enzymes
Top 20 CAM Treatments for Children with an ASD

- Chelation [C]
- MB12 injections [D]
- Melatonin [A]
- B12, oral [D]
- HBOT [B]
- Digestive enzymes [D]
- Fatty acids [C]
- MB12, nasal [D]
- Cod liver oil [C]
- Vitamin B6 [C]
- Zinc [N]
- B6/magnesium [C]
- Folic acid [D]
- Vitamin B3 [N]
- Vitamin C [B]
- DMG [D]
- TMG [D]
- Transfer factor [D]
- Vitamin A [D]
- 5-HTP [D]
Consensus Report

• Evaluation, Diagnosis and Treatment of Gastrointestinal Disorders in Individuals with ASDs: A Consensus Report [Buie T et al. Pediatrics 2010;125:S1-S18]

• Consensus opinion of the panel was that evidence-based recommendations cannot be made, yet.

• #1 Individuals with ASD deserve the same thoroughness and standard of care in the diagnostic workup and treatment of gastrointestinal concerns as should occur for patients without ASD.

• #2 GI conditions are commonly reported in individuals with ASD.
  – GI conditions that commonly reported in individuals with ASD include chronic constipation, abdominal pain, diarrhea, encopresis.

• #3 Prevalence of GI conditions in individuals with ASD is incompletely understood.

• #4 The existence of a GI disturbance specific to persons with ASDs has not been established.
Consensus Statements Continued

• #5 Evidence for abnormal GI permeability is limited.
• #6 Individuals with ASDs and GI symptoms are at risk for problem behaviors.
• #7 For a person with ASD and problem behavior, should consider possibility that GI symptom is precipitating factor.
• #8 Education of caregivers and health care providers is necessary, including knowledge of how to recognize signs and symptoms.
• #9 Pediatricians and other primary care providers should be alert to potential nutritional problems.
• #10 Primary care nutritional assessment should include weight for height or BMI, weight for age, height for age, and any marked changes in growth rate.
• #11 There may be a subgroup of individuals with ASD who respond to dietary intervention.
• **#12** Available research does not support the use of casein-free diet, a gluten-free diet, or a combined gluten-free, casein-free diet as primary treatment for ASD.

• **#13** For patients with ASD, a detailed history should be obtained to identify potential associations between allergen exposure and GI and/or behavioral symptoms.

• **#14** Standardized definitions of adverse reactions to foods would be helpful.

• **#15** A detailed history and physical exam should be performed to accurately identify potential comorbid allergic disease.

• **#16** Involvement of specialists such as allergists, gastroenterologists, dietitians, and feeding therapists may be beneficial.

• **#17** Immunologic aberrations in individuals with ASD have been reported, however, a direct cause-and-effect relationship between immune dysfunction and ASDs has yet to be proven.
Consensus Statements Continued

- **#18** The role of immune responses in the pathogenesis of GI disorders in ASD warrants additional investigation.
- **#19** The role of gut microflora in the pathogenesis of GI disorders in ASD is not well understood.
- **#20** It is imperative that the phenotype of study subjects be well defined in future studies.
- **#21** Studies of GI disorders in ASD should include genetic testing of all participants.
- **#22** Prevalence and characterization of specific GI symptoms should be examined in well-defined genetic syndromes with high rates of ASD.
- **#23** Clinical trials of treatment of GI symptoms should include banking of DNA samples.
Defining a Pediatric Feeding Disorder

A child has a feeding disorder when he/she has significant difficulty consuming adequate nutrition by mouth.

- Feeding disorders are a heterogeneous group of disorders due to multiple factors including medical, developmental, psychosocial factors and environmental factors, often leading to maladaptive feeding/eating behaviors.

- Measures of severity might include:
  - Poor weight gain/failure to thrive
  - Inadequate intake by mouth (tube fed or at risk for malnutrition)
  - Severely limited variety of foods consumed (nutritional deficiency or at risk)
  - Disruption to child/parent/family life (tantrums, excessive meal duration, etc.)
  - Significant difficulty advancing to normal (or developmentally appropriate) solid food textures

- We do not include children who eat non-food items (pica) or children with obesity/hyperphagia.
- Not to be confused with eating disorders, i.e. anorexia nervosa and bulimia.
Presentation of Feeding Disorders

- Underweight or malnourished
- Inappropriate mealtime behaviors
- Excessive meal duration
- Food refusal
- Food selectivity (restricted diet)
- Inadequate self-feeding
- Vomiting
- Gagging, choking, or coughing with feeds
- Respiratory problems due to aspiration

Underlying Factors

• Developmental Delays
  – Delayed feeding skills can be seen with other delays - consider whether feeding skills are commensurate with other abilities.
  – Can be associated with prematurity, birth defects, genetic syndromes, brain injury, etc.
  – Feeding problems common in Autism Spectrum Disorders and other NDD. Contributing factors include:
    • Hypersensitivity / hyposensitivity, oral aversion/defensiveness
    • Selectivity
    • Maladaptive behavior

• Dysphagia (difficulty swallowing)
  – Due to Cerebral Palsy or other neurological disorders (e.g. disorders affecting brainstem or cranial nerves, myopathies)
  – Can be seen in some children with central hypotonia and NDD.
Underlying Medical Factors

• **Structural Abnormalities**
  – Malocclusion, macroglossia, tracheo-esophageal fistula, esophageal atresia, intestinal atresias strictures, etc.

• **GI Motility Disorders**
  – Gastroesophageal reflux disease, impaired gastric emptying, functional constipation.

• **GI Diseases**
  – Reflux esophagitis, eosinophilic esophagitis, food allergy or intolerance, celiac disease, inflammatory bowel disease, cyclic vomiting syndrome

Hyman et al. Gastroenterology 2006; 130:1519-1526
Underlying Medical Factors

- Other medical conditions
  - Especially severe conditions in early life that limit ability to eat by mouth
  - Congenital heart disease, chronic lung disease, renal disease, cancer/tumors, metabolic disorders

- Other medical factors
  - Prolonged illness / hospital stays (ICU)
  - Multiple medical procedures around face and mouth
  - Side effects of medications

Other Factors Underlying Pediatric Feeding Disorders

• **Psychosocial Factors**
  – Limited family resources, parental conflict, divorce/separation, parental depression, incompetent parenting
  – Child may have phobias, anxiety, depression

• **Environmental Factors**
  – Setting in which child is fed, overstimulation or distractions, seating

• **Behavioral Factors**
  – All of the previously discussed influences can lead to maladaptive behaviors that affect feeding
Consequences of Pediatric Feeding Disorders

- Failure to thrive / poor growth
- Increased susceptibility to infection / illness
- Dehydration
- Less than optimal cognitive development
- Dependence on tube feeds
- Negative parent-child interactions in other areas
- Social impact on the child and family
- Economic impact

Pediatric Feeding Disorders Program: The Interdisciplinary Team

- Medicine
  - Pediatrician & pediatric nurse practitioners
  - Nursing
- Nutrition
- Occupational Therapy
- Speech-Language Pathology
- Behavioral Psychology
- Social Work
Pediatric Feeding Disorders Program at Kennedy Krieger Institute

- Feeding Disorders Clinic
  - Interdisciplinary evaluation
  - Initial evaluation and follow-up visits

- Outpatient Treatment
  - Outpatient Behavioral Psychology
  - Outpatient OT and/or SLP

- Intensive Feeding Therapy Program
  - Day Treatment
  - Inpatient Treatment