Pediatric Chronic Diarrhea and Malabsorption

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Learning Objectives

- Define chronic diarrhea and malabsorption in pediatric patients
- Develop a differential diagnosis based on age and presentation
- Recognize key features of pediatric celiac disease
- Understand the pathophysiology of malabsorption
- Apply clinical reasoning to pediatric cases

Pediatric Case Discussion

- A 4-year-old boy presents with chronic loose stools for 6 months
- Parents report abdominal distension, irritability, and poor weight gain
- Symptoms began after transition to a wheat-rich diet
- Physical exam: pallor, muscle wasting, decreased growth velocity
- How can basic science guide the diagnosis?

Clinical Reasoning from Basic Knowledge

- Chronic diarrhea suggests prolonged intestinal dysfunction
- Failure to thrive indicates impaired nutrient absorption
- Iron deficiency anemia may explain pallor
- Temporal relationship with gluten exposure suggests celiac disease
- Combining physiology and history narrows the differential diagnosis

Definition of Chronic Diarrhea in Children

- Diarrhea lasting longer than 2–4 weeks
- Characterized by increased stool frequency, liquidity, or volume
- May affect growth, hydration, and nutrition
- Etiology varies by age group and nutritional status

Definition of Malabsorption

- Defective digestion or absorption of nutrients
- Can involve fats, carbohydrates, proteins, vitamins, or minerals
- Results in poor growth and nutritional deficiencies
- Common pediatric manifestations include steatorrhea and failure to thrive

Classification of Chronic Diarrhea

- Osmotic diarrhea: improves with fasting
- Secretory diarrhea: persists during fasting
- Inflammatory diarrhea: blood/mucus and systemic symptoms
- Malabsorptive diarrhea: bulky, greasy stools with poor growth

Differential Diagnosis of Pediatric Chronic Diarrhea

- Infectious: Giardia, chronic enteric infections
- Malabsorptive: celiac disease, lactose intolerance, cystic fibrosis
- Inflammatory: inflammatory bowel disease
- Functional: toddler's diarrhea
- Immune and congenital enteropathies

Differential Diagnosis of Pediatric Malabsorption

- Mucosal disease: celiac disease
- Pancreatic insufficiency: cystic fibrosis
- Disaccharidase deficiency: lactose intolerance
- Bile acid disorders and cholestatic liver disease
- Short bowel syndrome and lymphatic disorders

Approach to the Pediatric Patient

- Assess growth charts carefully
- Evaluate stool characteristics and dietary history
- Look for extraintestinal manifestations
- Family history may reveal autoimmune disease
- Consider age-specific causes of diarrhea

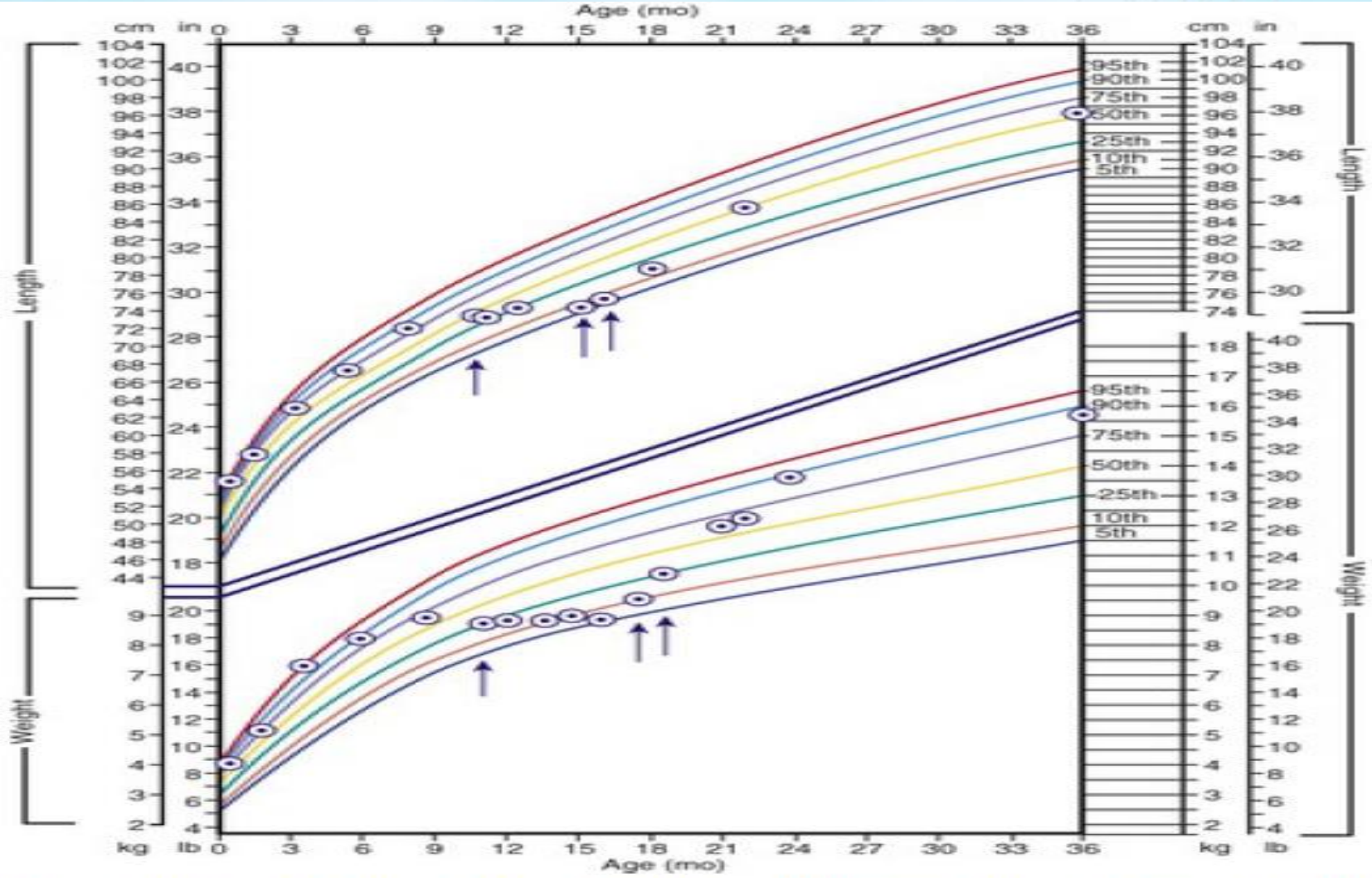


FIG. 364.3 Gluten-sensitive enteropathy. Growth curve demonstrates initial normal growth from 0 to 9 mo, followed by onset of poor appetite with intermittent vomiting and diarrhea after initiation of gluten-containing diet *(single arrow)* . After biopsy conformed diagnosis and treatment with gluten-free diet *(double arrow)* , growth improves.

Introduction to Pediatric Celiac Disease

- Immune-mediated enteropathy triggered by gluten
- Occurs in genetically susceptible children
- Gluten is found in wheat, barley, and rye
- Leads to small intestinal villous injury and malabsorption

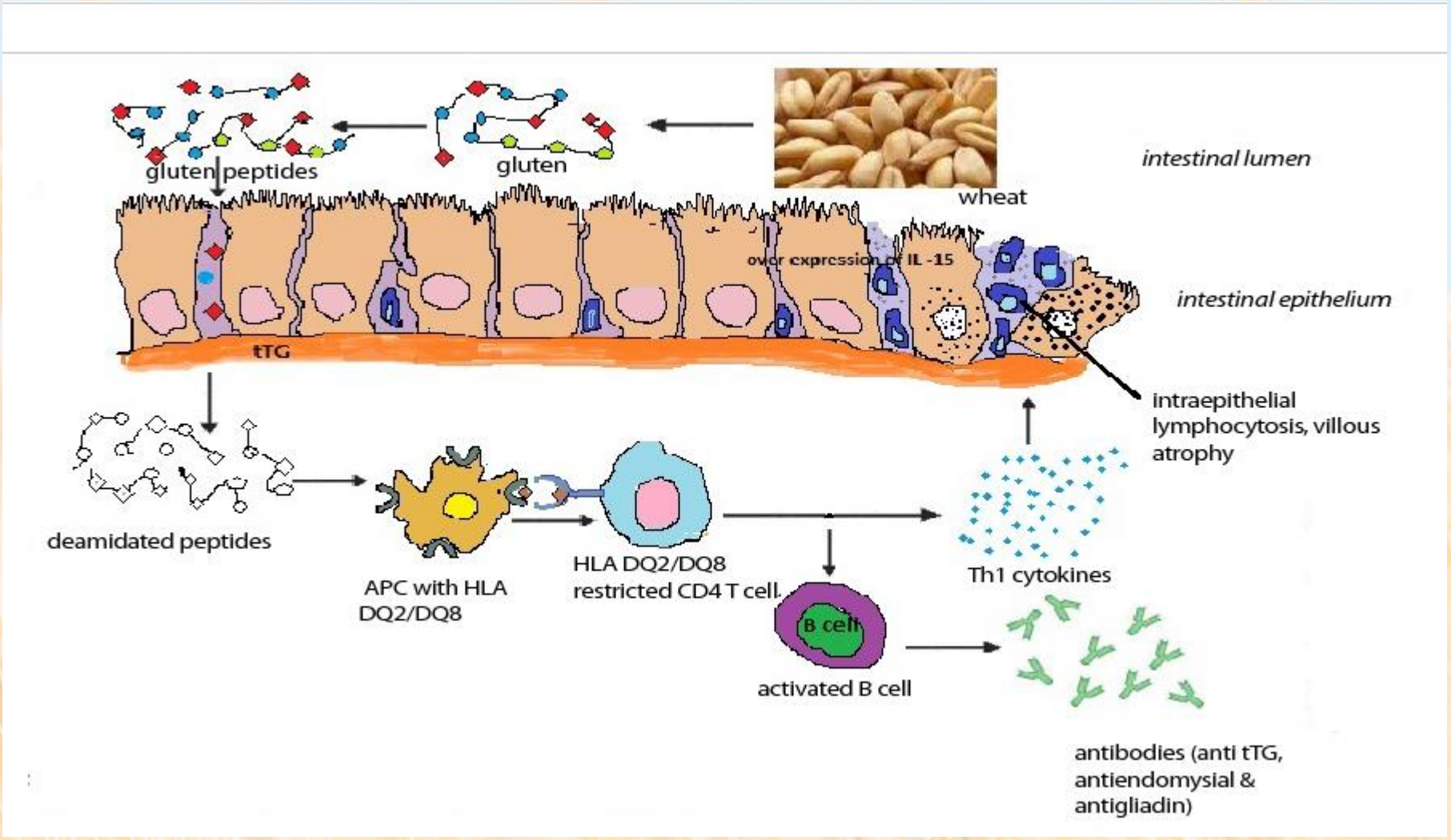
Epidemiology

- Prevalence approximately 1% worldwide
- Can present after gluten introduction in infancy or childhood
- Associated with HLA-DQ2 and HLA-DQ8
- Higher prevalence in type 1 diabetes and Down syndrome

Pathophysiology of Celiac Disease

- Gliadin peptides trigger immune activation
- Tissue transglutaminase modifies gluten peptides
- Activated T cells damage intestinal mucosa
- Villous atrophy reduces absorptive surface area

Genetics and Pathogenesis



Why Do Children Become Malnourished?

- Flattened villi impair nutrient absorption
- Fat malabsorption leads to energy deficiency
- Iron and folate deficiency cause anemia
- Calcium and vitamin D deficiency affect bone growth

Clinical Manifestations in Children

- Chronic diarrhea or constipation
- Abdominal bloating and pain
- Failure to thrive and weight loss
- Irritability and fatigue
- Short stature and delayed puberty

Extraintestinal Manifestations

- Iron deficiency anemia
- Dental enamel defects
- Dermatitis herpetiformis
- Low bone mineral density
- Behavioral or neurologic symptoms

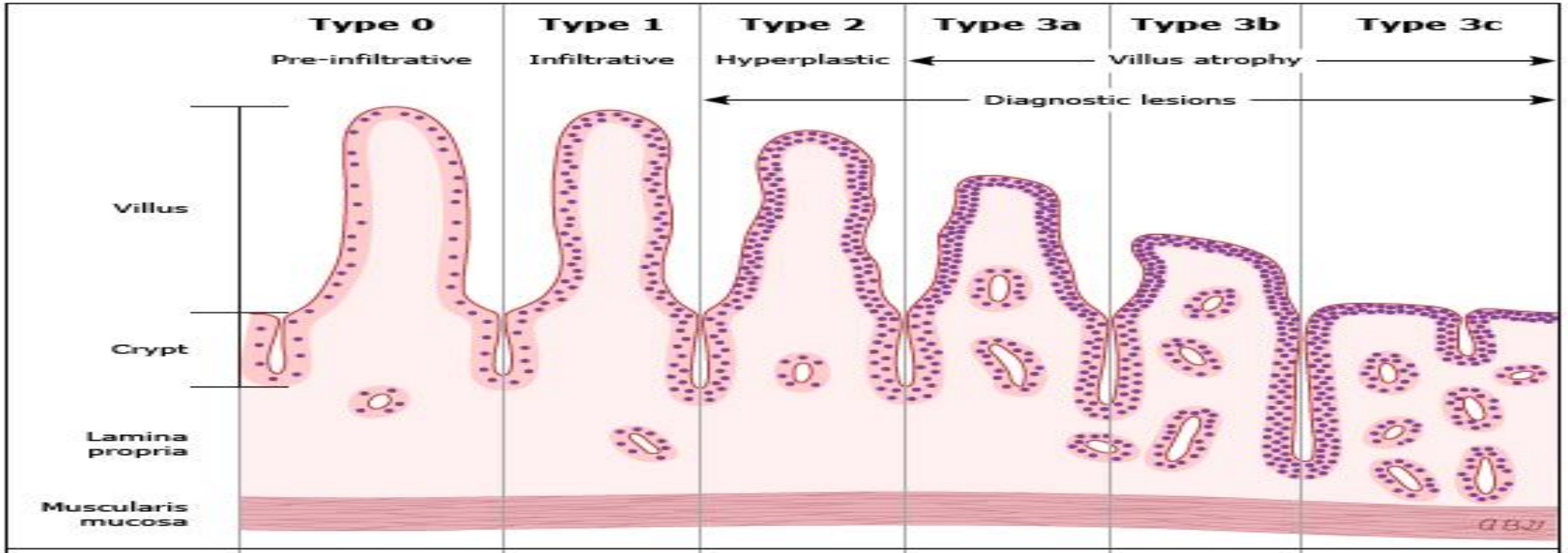
Diagnostic Evaluation

- First-line test: anti-tTG IgA
- Measure total serum IgA level
- Endoscopy with small bowel biopsy confirms diagnosis
- Children should remain on gluten-containing diet before testing

Histologic Findings

- Villous atrophy
- Crypt hyperplasia
- Increased intraepithelial lymphocytes
- Histologic improvement occurs after gluten-free diet

Marsh classification



Villus	Normal	Normal	Normal	Mild atrophy	Moderate atrophy	Severe atrophy
Crypt	Normal	Normal	Hyperplasia	Hyperplasia	Hyperplasia	Hyperplasia
Ratio, villus height: crypt depth	3:1	3:1	<3:1	<2:1	1:1	<1:1
IEL/ 100 EC	<40	>40	>40	>40	>40	>40

Management

- Strict lifelong gluten-free diet
- Avoid wheat, barley, and rye
- Correct nutritional deficiencies
- Multidisciplinary care including dietitian support

Treatment

- The only treatment for CD is lifelong strict adherence to a gluten-free diet.

Follow-Up in Pediatric Patients

- Monitor growth velocity and BMI
- Repeat serology to assess compliance
- Evaluate symptom resolution
- Monitor for micronutrient deficiencies

Complications of Untreated Celiac Disease

- Persistent growth failure
- Delayed puberty
- Osteopenia and fractures
- Psychosocial difficulties
- Long-term malignancy risk in adults

Key Take-Home Messages

- Chronic diarrhea in children requires systematic evaluation
- Growth failure is a major clue to malabsorption
- Celiac disease is common and treatable
- Basic science knowledge improves pediatric diagnosis
- Early recognition prevents long-term complications


Thank you!