

# Chronic diarrhea

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## Death in <math>\lt; 6 \text{ mo}</math>

- ▶ 1980: 1 death each 8 sec
- ▶ 2011: 1 death each 45 sec
- mainly due to improved sanitation practices and introduction of oral rehydration therapy (1979)



# DEFINITIONS

- ▶ **Diarrhea:** loose or watery stools at least three times in 24h (any deviation from the child's usual pattern)
  - ▶ volume >20 grams/kg/day in young infants
  - ▶ >10 grams/kg/day in older infants and toddlers
  - ▶ >200 grams/day in older children
- ▶ **WHO:** “passage of loose or watery stools at least 3 times in a 24 hour period” (change in consistency)

**the change in consistency over frequency and allows flexibility for the provider to decide whether the child has true diarrhea**



0  **Acute Gastroenteritis**  
1 wk

0  **7----13 days**  
1 wk  **Prolonged Diarrhea**  
2 wk

0    **Persistent Diarrhea (Chronic)**  
2 wk

0     **Chronic Diarrhea**  
4 wk



# DEFINITIONS

- ▶ An arbitrary limit has been set at 14 days to delineate acute from chronic diarrheal episodes
- ▶ The terms chronic, persistent, and protracted diarrhea are often used interchangeably (some consider 4 weeks for chronic)
- ▶ Persistent or protracted can infer a more acute onset initially
- ▶ Intractable diarrhea of infancy is used to describe a symptom complex comprising multiple etiologies.



# pathophysiology

- ▶ Incomplete absorption of water from the intestinal lumen is the basic mechanism of all diarrheas
- ▶ Either because of a reduced rate of net water absorption (related to impaired electrolyte absorption or excessive electrolyte secretion) or because of osmotic retention of water within the lumen
- ▶ Reduction of net water absorption by as little as 1 percent may be sufficient to cause diarrhea.
- ▶ Two core processes are classically described: secretory and osmotic diarrhea

## Differentiation of two main process

- ▶ Classically, osmotic and secretory diarrhea can be differentiated through calculation of the stool osmotic gap
- ▶  $290 - 2 \times [\text{Na} + \text{K}]$
- ▶ High osmotic gap ( $>100$  mOsm) : osmotic diarrhea  
( either an exogenous substance or a nutrient that is not being absorbed)
- ▶ Low osmotic gap ( $<50$  mOsm): secretory diarrhea  
(also a high stool sodium (e.g.,  $>90$  mM) is suggestive of a secretory component)



## Osmotic diarrhea

- ▶ If diarrhea stops with bowel rest or is not present at night, an osmotic diarrhea is most likely
- ▶ Nocturnal defecation is a sign of a secretory diarrhea





# Osmotic diarrhea

- ▶ Carbohydrate malabsorption is a common cause of osmotic diarrhea
- ▶ Colonic bacteria metabolize indigestible or malabsorbed carbohydrates that reach the colon to produce organic acids including lactic acid and shortchain fatty acids
- ▶ If this system is overwhelmed, osmotic release and thus diarrhea, and high gas production by the colonic bacteria occurs
- ▶ The salvage mechanism can also be affected by antibiotics, which alter the colonic microbiota, thereby reducing bacterial carbohydrate metabolism
- ▶ Medicine like PEG and lactulose do so



# Osmotic diarrhea

- ▶ Decreased absorptive area through either decreased intestinal length (e.g., SBS) or inflammation (e.g., celiac dis.) can also lead to malabsorption and osmotic diarrhea
- ▶ Increased motor activity of the gut can lead to malabsorption by functionally decreasing the absorptive surface (diarrhea seen in diseases of autonomic dysfunction and diarrhea predominant IBS)



# Secretory diarrhea

- ▶ when there is excess fluid secretion compared to absorption
- ▶ Most often the result of impaired electrolyte transport, activation of chloride channels (e.g. CFTR) is a common final pathway resulting in increased electrolyte and water secretion
- ▶ Mediators like :cAMP, cGMP, Ca
- ▶ *Vibrio cholerae* toxin, heat-stable *Escherichia coli* toxin, rotavirus, HIV, *Cryptosporidium parvum* and *Giardia lamblia*
- ▶ VIP (vasoactive intestinal peptide), serotonin, histamine, serotonin, prostaglandins, or interleukin  $\gamma$  (IL- $\gamma$ ).



- ▶ **Many disorders lead to a mixed secretory and osmotic diarrhea**
- ▶ Allergic dysmotility due to non-IgE-mediated food allergy has been described and involves antigen-induced degranulation of mast cells and eosinophils leading to abnormal gut motility. In most cases, however, abnormal motor activity is secondary, aggravating existing diarrhea that is the result of increased fluid secretion and inflammation



# ASSESSMENT OF THE PATIENT WITH PROTRACTED DIARRRHEA

# CLINICAL HISTORY

- ▶ At every **age**, chronic infection or infectious enteritis with postinfectious complications must be considered
- ▶ Toddlers most commonly have toddler's diarrhea, celiac disease, and allergic enteritis
- ▶ For older children, inflammatory bowel disease becomes more common, although celiac disease and IBS are also prevalent



# CLINICAL HISTORY

- ▶ Distinguish timing and severity of symptom onset
- ▶ Character of the stools:
  - ❑ Large volume, watery stools often point to a small bowel etiology with inability to absorb nutrients that then pass into the colon
  - ❑ Smaller volume stools with blood : colonic inflammation
- ▶ Stools that float that are increased in frequency with high-fat diet point to steatorrhea



# CLINICAL HISTORY

- ▶ Nocturnal bowel movements are associated with a secretory diarrhea and is a concerning element in the history
- ▶ The presence of weight loss or poor growth is extremely important in recognizing the possibility of an underlying inflammatory or autoimmune component.
- ▶ Presence of blood in the stool elicits a higher level of concern

