ACUTE GASTROENTERITIS IN CHILDREN

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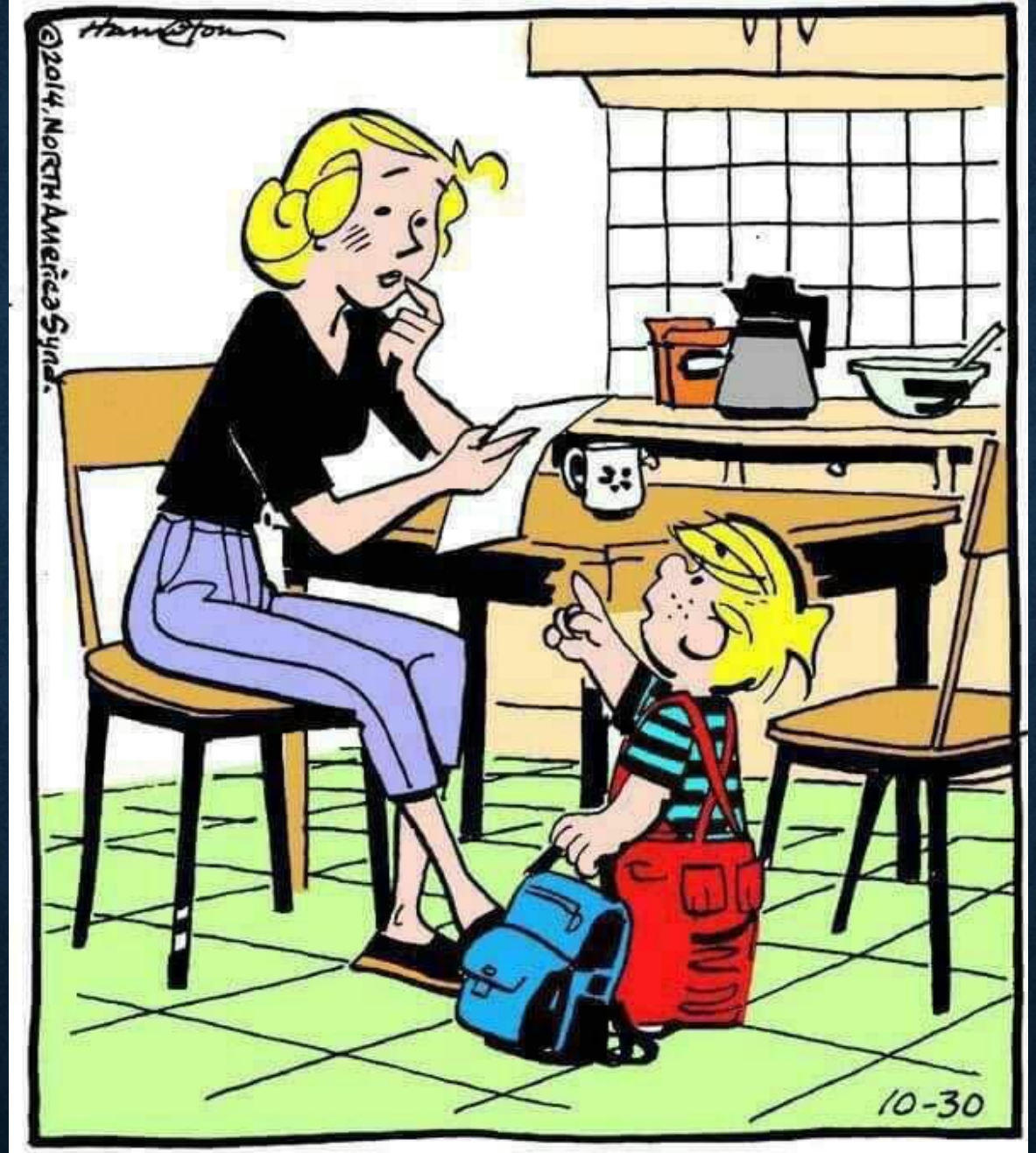

"DON'T WORRY ABOUT WHAT THE TEACHER SAYS. SHE'S BEEN IN KINDERGARTEN FOR 15 YEARS."

DEFINITION

- Gastroenteritis is generally defined as a decrease in the consistency of stools (loose or liquid) and/or an increase in the frequency of evacuations (typically ≥3 in 24 hours), with or without fever or vomiting;
- Acute gastroenteritis typically lasts <7 days and not >14 days.

EPIDEMIOLOGY

- The incidence of AGE ranges from 0.5 to 2 episodes per child per year in children <3 years (Europe).
- AGE is a major reason for hospitalization in this age group.
- Worldwide Rotavirus is the most frequent agent of AGE followed by Norovirus. Other viral causes include adenovirus, enteroviruses.
- The most common bacterial agent is either Campylobacter or Salmonella depending on country. Others include shigella, E coli, Cholera etc
- Community acquired *Clostridium difficile* is increasing in frequency.
- Protozoans in developing countries.

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INITIAL ASSESSMENT

- History and physical examination is the primary basis for the diagnosis of AGE
- Identify any red flags and consider differentials
- Identify underlying conditions which can put these children at risk for severe AGE and its complications
- Clinical assessment for the presence and degree of dehydration (none, some or severe)

RED FLAGS IN CHILDREN WITH AGE

The following features may occur in gastroenteritis, but should prompt careful consideration of differentials diagnoses:

- severe abdominal pain or abdominal signs
- persistent diarrhoea (> 10 days)
- blood in stool
- very unwell appearance
- bilious (green) vomit
- vomiting without diarrhoea

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DIFFERENTIALS

Consider important differential diagnoses:

- UTI
- Appendicitis
- Other infections such as Meningitis and other types of sepsis
- Other surgical causes of acute abdomen – strangulated hernia, Intussusception
- Any cause of raised intracranial pressure
- Diabetic ketoacidosis
- Inborn errors of metabolism
- Inflammatory bowel disease
- Haemolytic uraemic syndrome.

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RISK FACTORS

- short gut syndrome, ileostomy
- complex/cyanotic congenital heart disease
- renal transplant or renal insufficiency
- very young (<6 months)
- poor growth
- use of fortified feeds (concentrated feeds or caloric additives)
- recent use of potentially hyperosmolar fluids (eg Lucozade)
- other chronic disease such as sickle cell disease
- Immunosuppressed states

CLINICAL DEHYDRATION SCALE (CDS)

Characteristics	0	1	2
• General appearance	Normal	Thirsty, restless or lethargic but irritable when touched	Drowsy, limp, cold or sweaty comatose
• Eyes	Normal	Slightly sunken	Extremely sunken
• Mucous membranes (tongue)	Moist	Sticky	Dry
• Tears	Tears	Decreased tears	Absent tears

LABORATORY TESTS

- Lab tests **not be routinely performed** in children with signs and symptoms of AGE.
- Stool culture may be considered in children with blood and mucus in the stool and have underlying conditions (eg, immunodeficiency, malignancy, SCD, IBDs, etc), infants <3 months, toxic or septic, prolonged symptoms and travel history.
- Blood electrolytes and glucose should be done in severe dehydration, renal disease, altered conscious state, 'doughy' skin (suggesting hypernatraemia), home therapy with excessively hypertonic fluids (eg sports drinks) or excessively hypotonic solutions (prolonged water or diluted formula), profuse or prolonged losses

AMBULATORY TREATMENT – REHYDRATION FLUIDS

- Reduced osmolarity ORS (50/60 mmol/L Na) should be used as first-line therapy for the management of children with AGE
- Reduced osmolarity ORS is more effective than fullstrength ORS as measured by such important clinical outcomes as reduced stool output, reduced vomiting, and reduced need for supplemental IV therapy.
- Improved taste / flavoured ORS / Enriched ORS
- Fruit juices and soft drinks are inappropriate because of the minimal sodium content & the excessive glucose content and hence excessive osmolality, worsen diarrhoea.
- Sports drinks have varying sodium and carbohydrate levels, and are considered inappropriate as rehydration solutions.

CHILD WITH NO DEHYDRATION WITH/WITHOUT VOMITING

- Managed at home
- Use of the child's preferred, usual, and age appropriate diet and fluids
- Offer commercial oral rehydration solution (ORS), if tolerated and if losses exceed intake (AT RISK)
- Offer about 10 mL/kg of ORS for each loose stool or vomiting episode
- Small amount of ORS more frequently – 0.5 to 1ml /kg /hr given every 5 minutes
- Not recommended - Diluted milk or formula , Lactose-free formula, unless previously-known lactose intolerance is present , Restrictive diest, Mixing ORS with other drinks

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CHILD WITH SOME DEHYDRATION / MILD TO MODERATE DEHYDRATION

- Most of these children can be managed at home with ORS eg. PedialyteTM
- Rapid rehydration 30 – 90ml /kg of ORS over 4 to 6 hours – small amount frequently
- Continue breast feeding but hold other feeds through the rehydration period.
- Consider antiemetic's and trial of fluid (aim 10 to 20m/kg over 1 hour) if persistent vomiting
- Consider NG rehydration in case of persistent vomiting and profuse diarrhea
- Consider probiotics

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NUTRITIONAL MANAGEMENT

- Early feeding (as soon as rehydrated) reduces stool output, and aids gastrointestinal tract recovery.
- Recommend usual diet once rehydrated.
- If diarrhoea worsens in setting of formula feeding, consider the temporary (2 weeks) use of lactose free formula.
- The bread, rice, apple, toast (BRAT) diet has not been studied and is not recommended.
- Beverages with a high sugar content should not be used

PHARMACOLOGICAL THERAPY

- **Antiemetic's**
- Antimotility or Antiperistaltic Drugs (Loperamide)
- Adsorbents - **Diosmectite**, kaolin–pectin and attapulgite-activated charcoal
- Antisecretory Drugs – **Racecadotril**, Bismuth Subsalicylate and Zinc
- **Probiotics**
- Synbiotics
- Prebiotics
- Micronutrients
- Gelatine tannate

ANTIEMETICS

- Ondansetron, at the dosages 2mg/4mg/8mg and administered orally or intravenously, is effective in young children with vomiting related to AGE.
- One of the most common adverse effects of ondansetron is increased frequency of diarrhea.
- Patients with "electrolyte abnormalities (eg, hypokalemia or hypomagnesemia)" who are receiving ondansetron may be at risk for developing prolongation of the QT interval, which can lead to an abnormal and potentially fatal heart rhythm

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OTHER ANTIEMETICS

- There is no evidence to support the use of metoclopramide, and
- There is only limited evidence that granisetron or dimenhydrinate stops vomiting.
- No evidence for use of Domperidone and possible cardiac effects by domperidone.

PROBIOTICS

- Active treatment with **selected** probiotics, in adjunct to ORS, is effective in reducing the duration and intensity of symptoms of gastroenteritis.
- The use of the following probiotics should be considered in the management of children with AGE as an adjunct to rehydration therapy:
- *L rhamnosus* GG, Lactobacillus reuteri DSM and *S boulardii* (I, A)
- Enterogermina?
- *Bacillus clausii*

ANTIBIOTIC THERAPY - SALMONELLA

- Antibiotic therapy is not effective on symptoms and does not prevent complications.
- It is associated with a prolonged fecal excretion of Salmonella.
- Therefore, antibiotics should not be used in an otherwise healthy child with Salmonella gastroenteritis
- Antibiotics are suggested in high-risk children to reduce the risk of bacteremia and extraintestinal infections
- These include neonates and young infants (<3 months) and children with underlying immune deficiency, anatomical or functional asplenia, corticosteroid or immunosuppressive therapy, IBD, or achlorhydria
- Choice – Ceftriaxone / azithromycin / cotrimoxazole for 5 days

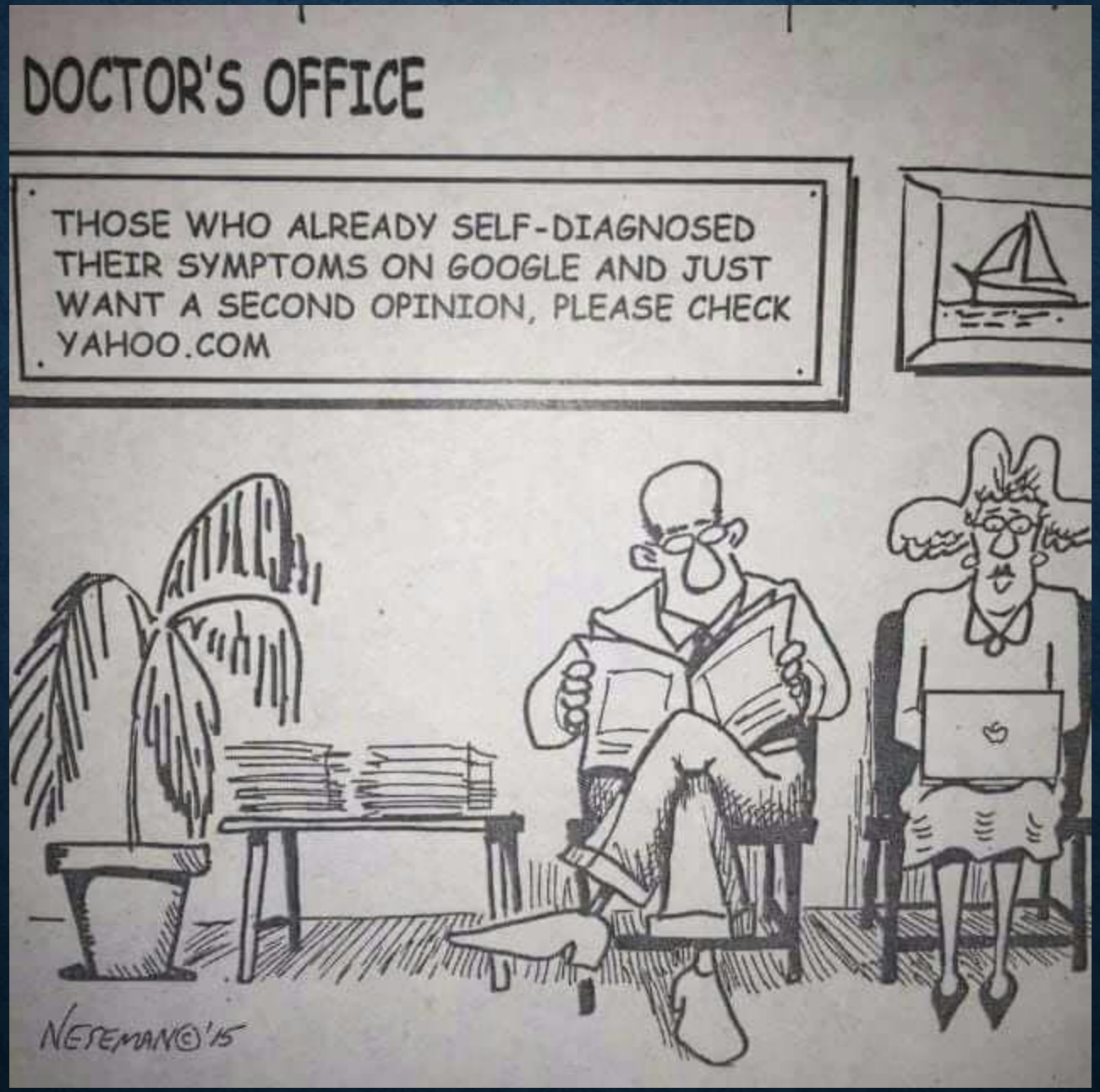
ATIBIOTICS THERAPY – OTHER INFECTIONS

- Antibiotic therapy is recommended for culture-proven or suspected Shigella gastroenteritis
- The first-line treatment for shigellosis is azithromycin for 5 days
- Antibiotic therapy for Campylobacter gastroenteritis is recommended mainly for the dysenteric form and to reduce transmission in day-care centers and institutions.
- It reduces symptoms if instituted in the early stage of the disease (within 3 days after onset)
- The drug of choice is azithromycin for 5 days

REFERRAL WHEN INDICATED

Indications for hospital admission

- Shock
- Severe dehydration (>9% of body weight)
- Neurological abnormalities (lethargy, seizures, etc)
- Intractable or bilious vomiting
- Failure of oral rehydration
- Suspected surgical condition
- Conditions for a safe follow-up and home management are not met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