Acute Gastroenteritis

Definitions Epidemiology Clinical presentation Diagnostics

Therapy

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Definitions

Acute gastroenteritis (AGE):

- Loose or liquid stools ≥ 3 times daily (better: change in stool consistency - babies!)
- Lasts for < 7 days
- Optional: fever, vomiting, abdominal pain

Prolonged diarrhoea: 7-14 days

Persistent diarrhoea: 2-4 weeks

Chronic diarrhoea: > 4 weeks



- 0.5-2 episodes per year per child (< 3 years of age, in Europe)
- 66 / 10 000 children hospitalized a year (<5 years of age, UK)

Aetiology

- <u>Rotavirus</u>
- <u>Calici viruses</u>
- Astroviruses
- Adenovirus
- 2. Bacterial

1. Viral

- <u>Campylobacte</u>r
- <u>Salmonella</u>
- <u>E. coli (ETEC,</u> EHEC, EIEC, ...)
- Shigella
- Yersinia
- C. difficile

- 3. Protozoal
 - Giardia lamblia, Cryptosporidium, Entamoeba

Whyte LA, et al. Arch Dis Child Educ Pract Ed 2015;100:308–312.

Clinical presentation

• Short latency is typical: 12-96 hrs

- Frequency, consistency, volume of stool blood, mucus
- Accompanying signs (fever, vomits, pain)
- Degree of dehydration
- Differential diagnostics

- Small intestine type, large volume watery: viral origin more probable. Rotavirus, all other viruses, ETEC
- Colitis type, fecal blood, small volume, tenesmus, abdo pain, T>40°C: bacterial origin probable. Shigella, Campylobacter, EIEC, EHEC
- Vomiting, coryza: more probably viral
- <3 yrs: predominantly viral agents
- >3 yrs: bacteria, protozoa more frequent

Hints only, no features can surely differentiate!

Risk factors for severe disease

• <u>Age <6 months:</u>

more severe diarrhoea, more persistant diarrhoea, more with severe dehydration,

- <u>Breast-feeding</u>: less severe disease
- <u>Chronic diseases</u> e.g. immunodeficiency, IBD, malnutrition, oncology: risk for more severe, more persistant diarrhoe

Rotavirus

Compared to other viral AGE cases:

- More epizodes of diarrhoea
- More likely febrile
- Higher risk for severe dehydration
- Higher risk for persistant diarrhoea (>14 d)

Complications

- Severe dehydration, hypovolaemic shock
- Electrolyte disturbances, acidosis
- Convulsions (febrile c., \downarrow Na, neuroinfection?)
- Bacteraemia osteomyelitis, meningitis, etc.
- Prolonged/persistant diarrhoea (small intestinal bact. overgrowth SIBO, lactose intolerance, malnutrition, etc.)
- Post-infective immune mediated diseases
- Haemolytic uraemic syndrome EHEC with shigatoxin, Shigella dysenteriae

Diagnostics

Bacterial – stool culture

Toxins by immunoassays: C. difficile, Shiga toxin of E. coli

Viral – stool quick tests (immunoassays) Recently: PCR tests

Protozoa – stool microscopy

Recently: immunoassays and PCR tests

Giannattasio et al. F1000Research 2016, 5(F1000 Faculty Rev):206

Microbiology tests indicated

Baseline: not needed!

Indicated:

- Severe symptoms
- Very high fever
- Dysentery syndrome (e.g. fecal blood)
- Underlying chronic conditions
- Prolonged diarrhoea (and weight loss)

Other diagnostics

Electrolytes, when:

- severe dehydration
- before and during intravenous fluid therapy

Blood count, CRP, PCT:

• not needed, unlikely to change management

Stool markers (calprotectin, lactoferrin)

• not indicated, not informative

Endoscopy not indicated unless IBD suspected

Treatment

Fluid and electrolyte management modified (hypoosmotic) ORS isotonic iv fluids discussed separately Hygiene and isolation precautions Nutritional management Pharmacological therapy

Nutritional management

What did your grandmother teach you? when to eat? what to eat initially? what medicines to take?

Early feeding

(immediate or after fluids were tolerated) results in shorter duration of diarrhoea no adverse effects

No diet is proved superior, only expert advice no fruit juices and high sugar content drink lactose free diet: only in severe or prolonged diarrhoea free diet otherwise!

Antiemetics

Ondansetron effective precautions: electrolytes, QT

No other antiemetic drugs were found useful dimenhydrianate, domperidone, etc. + considerations re. side effects

Antiperistaltic drugs

e.g. loperamide Contraindicated in young children effective, but: serious adverse effects, mortality in trials

Adsorbent & Antisecretory drugs

Diosmectite – absorbent decreased stool output shorter duration by one day **Racecadotril** – encephalinase inhibition decreased stool output shorter duration Many other drugs were not approved

Probiotics

Well studied, beneficial Certain probiotics reduce the intensity of diarrhoea reduce the duration of diarrhoea

The effect is strain specific!

| Strain(s) | Quality of evidence | Recommendation | Dose |
|---|---------------------|---------------------|---|
| Probiotics with a positive recommendation | | | |
| LGG | Low | Strong | $\geq 10^{10}$ CFU/day (typically 5–7 days) |
| Saccharomyces boulardii | Low | Strong | 250-750 mg/day (typically 5-7 days) |
| Lactobacillus reuteri DSM 17938 | Very low | Weak | $10^8 - 4 \times 10^8$ (typically 5-7 days) |
| Heat-killed Lactobacillus acidophilus LB* | Very low | Weak | Minimum 5 doses of 10 ¹⁰ CFU |
| | | | for 48 h; maximum 9 doses of |
| | | | 10^{10} CFU for 4.5 days |
| | Quality of evidence | Recommendation | Reason |
| Probiotics with a negative recommendation | | | |
| Enterococcus faecium (SF68 strain) | Low | Strong | Safety issues (a possible |
| | | | recipient of the vancomycin- |
| | | | resistance genes) |
| | | | Reason for a lack of |
| | | Quality of evidence | recommendation |
| Probiotics with a lack of recommendation | | | |
| E coli Nissle 1917 | | Very low | Methodological issues |
| L acidophilus | | Very low | No strain identification |
| L acidophilus rhamnosus 573L/1, 573L/2, 573 | 5L/3 | Moderate | Only 1 RCT available |
| L paracasei ST11 | | Moderate | Only 1 RCT available |
| L acidophilus, L rhamnosus, B longum, S boulardii | | Moderate | Only 1 RCT available; no |
| | | | strain identification |
| L helveticus R0052, L rhamnosus R0011 | | Very low | Only 1 RCT available |
| Bacillus mesentericus, Clostridium butyricum, | | Very low | Only 1 RCT available; no |
| Enterococcus faecalis | | | strain identification |
| L delbrueckii var bulgaricus, L acidophilus, | | Very low | Only 1 RCT available |
| Str thermophiles, B bifidum (strains LMG-P | 17550, | | |
| LMG-P 17549, LMG-P 17503, and LMG-P | 17500) | | |
| Bifidobacterium lactis Bb12 | | No data | Lack of data |
| <i>B lactis</i> Bb12, <i>Str thermophiles</i> TH3 | | Very low | Only 1 RCT available |
| Bacillus clausii (O/C84, N/R84, T84, SIN84) | | Low | Only 1 RCT available |
| L acidophilus, L paracasei, L bulgaricus, L pl | antarum, | Very low | Only 1 RCT available; no |
| B breve, B infantis, B longum, Str thermoph | ules | | strain identification |
| L acidophilus, B infantis | | Very low | No strain identification |
| L acidophilus, B bifidum | | Very low | No strain identification |

Guarino et al. J Pediatr Gastroenterol Nutr. 2014 Jul;59(1):132-52.

TABLE 6. Probiotics for treating acute gastroenteritis (recommendations developed by the ESPGHAN Working Group on probiotics/prebiotics)

Main recommendation:

- Lactobacillus rhamnosus GG
- Saccharomyces boulardii

Considerations:

antibiotic sensitivity – ineffective? associated severe infections antibiotic resistant gene exchange

Prebiotics, synbiotics: no evidence

Antibiotics

Usually not necessary Only in selected cases < 2-3 months of age immunodeficient/suppressed based on culture results

| Pathogen | Indication for antibiotic therapy | Drug of choice* |
|---|---|---|
| Shigella spp | Proven or suspected shigellosis significant clinical benefit reduced infectivity less complications incuding HUS | Oral: azithromycin (12 mg/kg on day 1, followed by 6 mg/kg for 4 days); parenteral, IV, IM: ceftriaxone (50 mg/kg for 2–5 days) [†] |
| Salmonella spp (nontyphoidal) no clinical benefit same complications prolonged carriage | Antibiotic therapy is indicated <u>only in high-risk children[§]</u> to reduce the risk of bacteremia and extraintestinal focal infections | $\frac{\text{Ceftriaxone (50-100 mg} \cdot \text{kg}^{-1} \cdot \text{day}^{-1})}{\text{kg}^{-1} \cdot \text{day}^{-1})}$ |
| Campylobacter spp some clinical benefic reduced infectivity | Antibiotic therapy is recommended mainly for the dysenteric <i>Campylobacter</i> gastroenteritis and most <u>efficacious</u> when started within 3 days after onset of the disease | Azithromycin (10 mg · kg ⁻¹ · day ⁻¹ for 3 days, or a single dose of 30 mg/kg) |

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| Pathogen | Indication for antibiotic therapy | Drug of choice* |
|---|---|---|
| Shiga toxin-producing Escherichia coli | Antibiotic therapy is not recommended | |
| Enterotoxigenic; Escherichia coli | Antibiotic therapy is recommended, mainly for traveler's diarrhea | Azithromycin (10 mg \cdot kg ⁻¹ \cdot day ⁻¹ for 3 days) |
| with little exce | eption, E. coli indicates no antibiotics | |
| | | |
| Vibrio cholerae | Antibiotic therapy is recommended for confirmed or suspected case by travel history | Azithromycin (10 mg \cdot kg ⁻¹ \cdot day ⁻¹ for 3 days, or a single 20 mg/kg dose) |
| Clostridium difficile | Antibiotic therapy is recommended for moderate and severe cases | Metronidazole (30 mg \cdot kg ⁻¹ \cdot day ⁻¹ for 10 days) |

PO = per os.

* Depends on local antibiotic susceptibility profile, which should be monitored. † TMP/SMX, trimethoprim–sulfamethoxazole.

[‡]Ciprofloxacin is usually not recommended in the pediatric age group, but it can be used in children <17 years when an alternative is not feasible.

Guarino et al. J Pediatr Gastroenterol Nutr. 2014 Jul;59(1):132-52.

Vaccination

Two oral live Rotavirus vaccines

recommended from 6 weeks of age

30-45% reduction in hospitalization 60-70% reduction in A&E visits with Rotavirus AGE

Thank you for your attention!

Recommended literature:

CLINICAL GUIDELINES

European Society for Pediatric Gastroenterology, Hepatology, and Nutrition/European Society for Pediatric Infectious Diseases Evidence-Based Guidelines for the Management of Acute Gastroenteritis in Children in Europe: Update 2014

> *Alfredo Guarino (Coordinator), [†]Shai Ashkenazi, [‡]Dominique Gendrel, *Andrea Lo Vecchio, [†]Raanan Shamir, and [§]Hania Szajewska

> > JPGN 2014;59: 132-152

Ami hiányzik

- terjedés módja
- ételmérgezések
- kit vegyünk fel a kórházba
- OEK bejelentés