

Nutritional Management of Diarrhea in Adults



*Sabeen Siddiqui, RD, CRCP
Senior Clinical Dietitian (SIUS),
EC & Web Committee Chair PNDS.*



☞ No conflict of interest.

Upcoming 45 min...



- ❧ Definition
- ❧ Common symptoms
- ❧ Types of diarrhea with their dietary mgt
- ❧ Screening for diarrhea
- ❧ 2 case presentations with their dietary management

Definition



☞ A condition in which faeces are discharged from the bowels frequently and in a liquid form

(Oxford Dictionary)

☞ Measured stool volume $>10\text{ml/kg/day}$, including changed consistency of stool (loose or watery) and frequency (≥ 3 episodes within 24H)

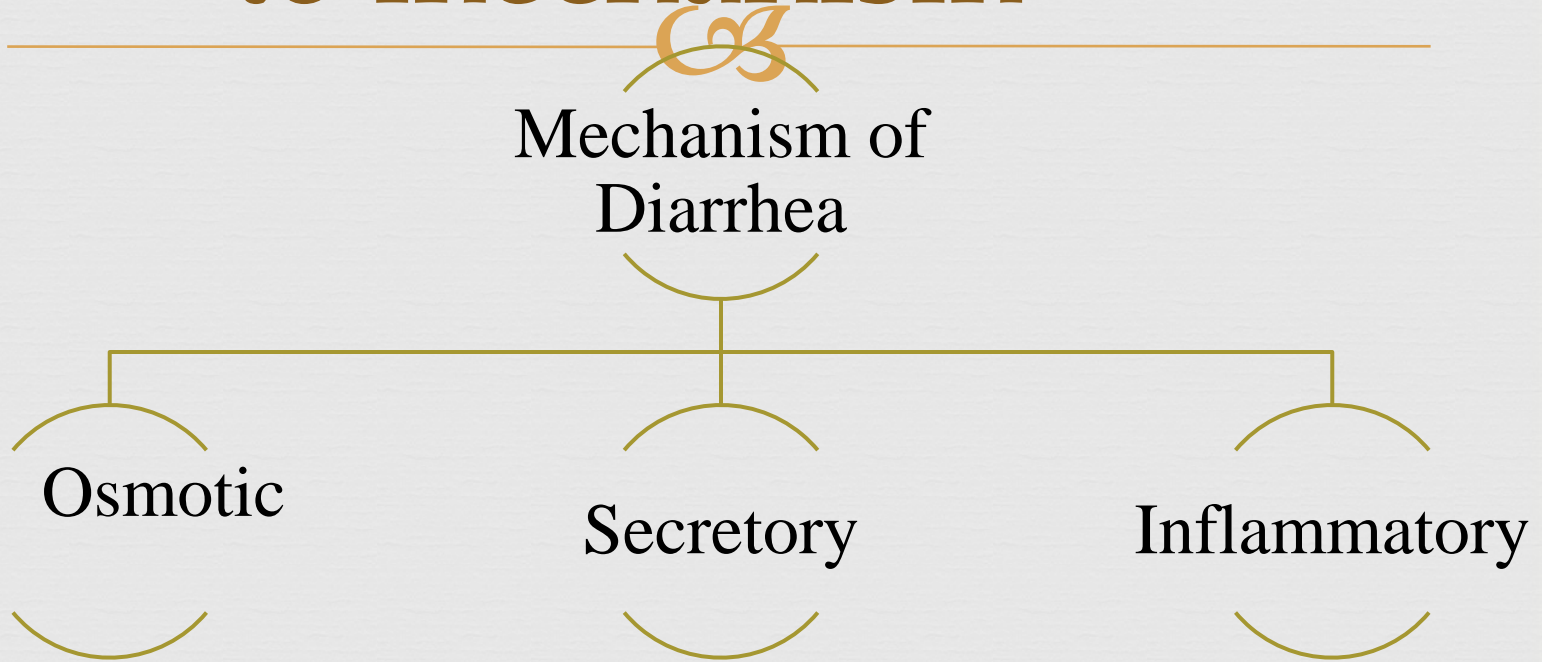
Practical pediatric, 5th edition, Churchill & Livington, 2003

Symptoms Of Diarrhea



- ❖ Crampy abdominal pain (or stomach pain)
- ❖ Bloating
- ❖ Nausea
- ❖ An inability to control the bowels (fecal incontinence)
- ❖ Fever
- ❖ Chills
- ❖ Muscle aches or pain
- ❖ Headache
- ❖ Low heart rate
- ❖ Joint pain
- ❖ Alternating constipation
- ❖ Blood in stool
- ❖ Mucus in stool.

A. Classification according to mechanism



Osmotic Diarrhea



occurs when too much water is drawn osmotically into the bowels.

- ❧ Ingestion of non absorbable substance like laxative(Mgso₄,mg containing antacid)
- ❧ Generalized malabsorption-nutrient stays in gut and create osmotic influence (celiac Disease, lactase deficiency)
- ❧ Large amounts of artificial sweeteners containing sorbitol.
- ❧ Hyperosmolar Nutritional supplement to severely malnourished or IBS/SBS patients(1.5-2k.cal/ml formulas).

***Cessation on fasting**

Secretory Diarrhea



Active increased intestinal secretions of fluid and electrolytes, as well as decreased absorption.

- ❧ **Abnormal mediators** such as enterotoxins(e.g cholera, E.coli, C.difficile) , bile salts(in the colon) following ileal resection.
- ❧ **Drugs may stimulate intestinal secretions**(quinidine,castor oil, prostaglandins) or indirect impairing fat absorption(orlistat)

Kumar P and Clarke M (2012) Kumar and Clarks Clinical Medicine. 8th edition, Saunders.

Cont..



- ❧ **Various endocrine tumors produce secretagogues,** including vipomas (vasoactive intestinal peptide), gastrinomas (gastrin) etc.
- ❧ **Reduced contact time/surface area:** (Rapid intestinal transit and diminished surface area impair fluid absorption and cause diarrhea. small-bowel or large-bowel resection or bypass, gastric resection, and inflammatory bowel disease.

The Hallmark of secretory diarrhea is continuation of diarrhea on fasting.

Kumar P and Clarke M (2012) Kumar and Clarks Clinical
Medicine. 8th edition, Saunders.

Inflammatory / Exudative Diarrhea

Damage to the mucosal lining or brush border,

- ❧ passive loss of protein-rich fluids,
- ❧ decreased ability to absorb these lost fluids

The presence of blood and pus in the stool:

- ❧ inflammatory bowel diseases, such as Crohn's disease or ulcerative colitis, and
- ❧ several infections(Shigella)

B . Classification according to time period

∞ Acute diarrhea: $< 2/52$

∞ Persistent diarrhea: 2-3/52

4 weeks— cut off point

∞ Chronic diarrhea: $> 4/52$

Practical pediatric, 5th edition, Churchill & Livington, 2003

Acute Diarrhea

CAUSES:



❧ Viral infection:

Norovirus, rotavirus

❧ Bacterial infection

Salmonella, Campylobacter, or Shigella sp; Escherichia coli;
Clostridium difficile

❧ Parasitic infection

Giardia sp, Entamoeba histolytica, Cryptosporidia sp

❧ Food poisoning

Staphylococci, Bacillus cereus, Clostridium perfringens

❧ Drugs

Laxatives, Mg-containing antacids and many antibiotics.

Drug Can Cause Diarrhea

- ❧ Antibiotics.(20% in pt receiving broad spectrum)
- ❧ Antidepressants.
- ❧ Antacids.
- ❧ Proton pump inhibitors, such as omeprazole & lansoprazole
- ❧ Medicines used to treat cancer (chemotherapy).



- e.g Antibiotics
Erythromycin(increases gut motility)
- *Penicillin* (its breakdown products can act as osmotic laxative)
 - *Tetracycline* (inhibits fat absorption)
 - *Neomycin* (affects bile salt absorption)

Dietary Management and Goals (Acute)

- ❧ Oral rehydration solutions (ORS) or similar commercially available solutions containing (sodium, potassium and glucose) should be used for rehydration
- ❧ Substitute foods with fluids:
 - ❧ *Diluted fruit juices and flavored soft drinks along with salted crackers and broths or thin soups may also be acceptable till symptom resolves*
- ❧ Avoid fatty, greasy or stimulant(caffeine)
- ❧ Boiled starches and cereals :
 - ❧ *eg, potatoes, noodles, rice, wheat, and oats) with salt are recommended if you have watery diarrhea; crackers, bananas, soup, and boiled vegetables may also be eaten*

Chronic Diarrhea

CAUSES:

❧ Drugs: (same as discussed earlier)

❧ Functional

Irritable bowel syndrome

❧ Dietary factors: (in upcoming slides..)

❧ Inflammatory bowel disease:

Crohns disease and ulcerative colitis

❧ Surgery:

Intestinal or gastric bypass or resection

❧ Malabsorption syndromes:

Celiac and lactose intolerance

❧ Endocrine tumors:

Gastinomas

❧ Endocrine

Hyperthyroidism, Diabetes(pancreatic insufficiency, autonomic neuropathy)

Dietary Goals(chronic)

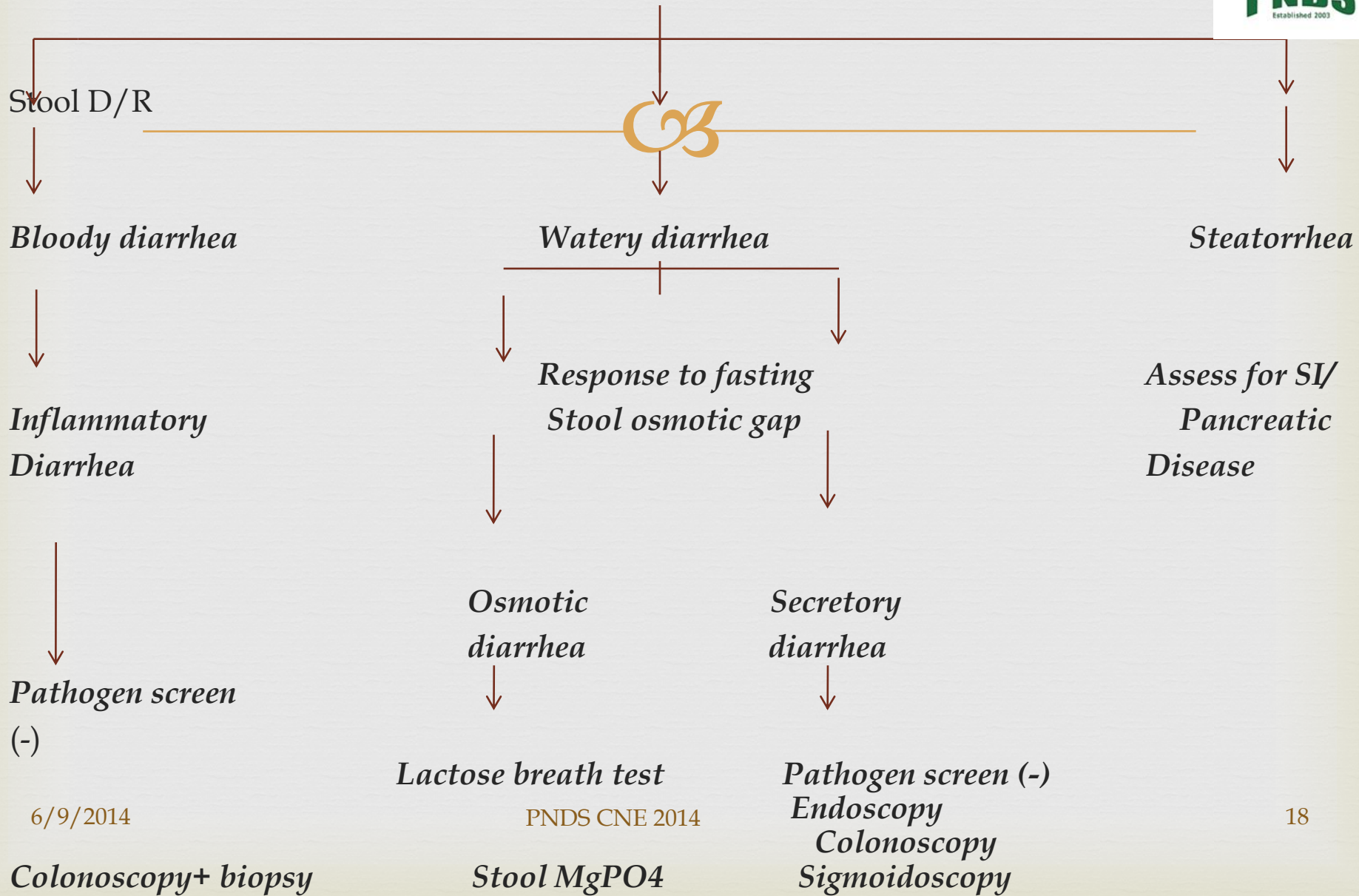


- ❧ Dietary treatment of the primary disorder(e.g gluten restriction for Celiac Disease)
- ❧ Dietary measures to provide symptom relief
- ❧ Daily replacement of large losses of fluid and electrolytes
- ❧ Restoration of optimal nutritional status

Dietary Management (Chronic)

- ❧ Maintain good fluid intake(10-15C/day) choice of drinks as per individual tolerance.
- ❧ Soft easily digested food(white Toast, soup, rice pudding)extend variety up on good tolerance
- ❧ Small frequent meals and snacks
- ❧ Avoid spicy/ greasy foods
- ❧ Special diets accordingly(lactose free/ gluten free/low residual diet)

Screening For Diarrheal causes



Case 1



50 yrs male came up in tx ward Hx of L/M 2/12 with c/o

∞ ↓ appetite

∞ ↑ feeling of cold

∞ ↑ frequency of L/M 2weeks

∞ Dizziness

∞ Wt loss of 11 kg in 3 months (55kg → 44kg)

Clinical findings



- ⌘ Bp: 90/60mmHg
- ⌘ ESR: 53
- ⌘ Hb: 9.9G%
- ⌘ MCV: 28.3
- ⌘ Plt:312 perem
- ⌘ TLC: 5.1
- ⌘ Urea: 54 mg%
- ⌘ S.cr: 3.45(2.23) mg%
- ⌘ S.k+: 2.2 mEq/L
- ⌘ TFT: WNL
- ⌘ LFT's: WNL
- ⌘ Stool D/R: num pus cells
- ⌘ Stool for crypto: -ve

EGD and Colonoscopy

MICROSCOPIC EXAMINATION:

13-316: Sections examined from the T. ileum biopsy reveal fragments of small bowel mucosa with features of mild nonspecific inflammation. No infective organism is seen.

13-317: Sections examined from descending colon biopsy reveal fragments of large bowel mucosa with features of mild chronic nonspecific inflammation. No infective organism is seen.

13-318 to 13-320: Sections examined from the rectosigmoid colon and caecal biopsies reveal fragments of large bowel mucosa with focally eroded lining epithelium. Moderate mixed inflammatory cell infiltrate is seen in the lamina propria. Lining epithelial cells show reactive nuclear changes. A few endothelial cells are enlarged and contain intranuclear eosinophilic viral inclusions. Features are of CMV colitis. No evidence of TB or tumor is seen.

CONCLUSION:

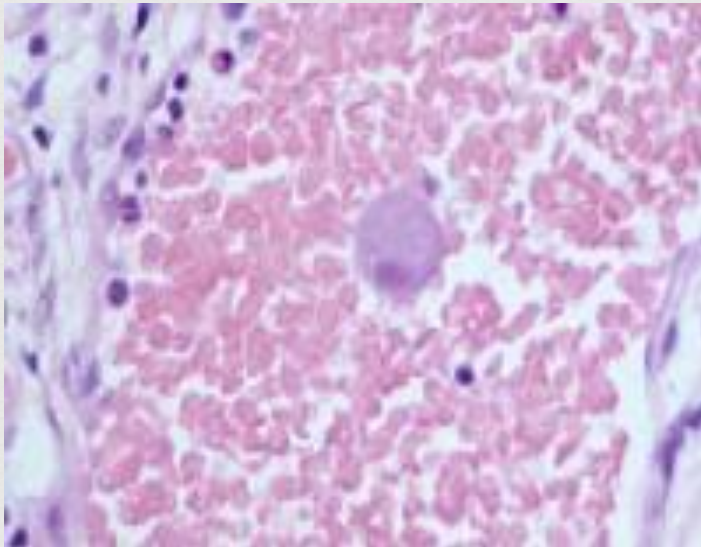
T.ileum biopsy: Features are of mild nonspecific inflammation. No infective organism is seen.

D.colon biopsy: Features of mild chronic nonspecific inflammation. No infective organism is seen.

Rectosigmoid and caecal biopsies: Features are of CMV colitis. No evidence of TB or tumor is seen.



Giant cell with inclusion body
characteristic of cytomegalovirus colitis.



Gross specimen of bowel showing
ulceration secondary to cytomegalovirus
colitis.

Etiology

-
- Between 50% and 80% of the world's population is seropositive for CMV
 - Rare in immuno-competent patients.
 - 2-16% of patients who have received solid organ transplants
 - Transplantation patients (especially patients receiving CMV-positive organs)

[URL:http://emedicine.medscape.com/article/173151-followup#a2651](http://emedicine.medscape.com/article/173151-followup#a2651)

Rx:



- ❧ Ciprofloxacin
- ❧ Flagyl
- ❧ Gangcyclovoir
- ❧ I/v hydration and maintaining electrolytes

Assessment



- Wt:44kg(usual wt: 55kg)
- Ht:155cm
- BMI:18.3kg/ m²(22.9kg/ m²)
- EER: approx 1800- 1850k.cal/ day (HBE X 1.2 X 1.3-1.4)

Nutrition Therapy

- Unless a patient has severe diarrhea, no special diet is needed.
- Patients with severe diarrhea may require bowel rest until the diarrhea subsides.
- Parenteral nutritional support may be needed.

[http://emedicine.medscape.com/article/173151-treatment#a1130\(2012\)](http://emedicine.medscape.com/article/173151-treatment#a1130(2012))

- ☞ Fruit juices diluted
- ☞ Yogurt (probiotic)
- ☞ Water based Lassi

Hydrat
fluid in

Supple:

☞ Pept
180 r

(full s

Provision of adequate
calories approx 1500k.cal
initially was given.

Day 2



LAB:

- ☞ S.cr:2.99mg%
- ☞ S.k+: 2.8 mEq/L

- ☞ c/o diarrhea continued & vomiting(6 episodes) with further wt loss of 3 kg (Rx: antiemetics added)
- ☞ Diet continued with the same towards more liquid
- ☞ Encourage for K⁺ rich fruits like banana.
- ☞ Supplement frequency increased to 5 times/day (intake was approx 1200k.cal/day)
- ☞ I/v hydration continued with electrolytes replacement.

Day 3



- ❧ c/o diarrhea persists
- ❧ Wt. static
- ❧ Intake was 1100 k.cal
- ❧ Supplement and diet continued

LAB:

- ❧ S.cr: 2.68mg%
- ❧ S.k+: 3.0mEq/L

Day 4



LAB:

∞ S.cr:2.51mg%

∞ S.k+: 3.1mEq/L

- ∞ Diarrhea still present increased (15-20 episodes)
- ∞ Intake worsen to approx. 460 k.cal from diet & 370 k.cal from supplement (BD).
- ∞ After discussion, PN support along with oral initiated (as pt. was unable to take supplement as advised and was meeting just 45% of his EER).

PN plan: (DIR :0.85) (non protein calorie to nitrogen ratio : 118:1)

Total Volume: 1000ml

Composition

D10W: 500ml

10% Aminoplasmal : 300ml

20% Liposyn : 200ml

(690 k.cal, 30 gm. protein)

Day 7



- ❧ c/o diarrhea resolving (6-7 episodes).
- ❧ Tolerating orally, soft diet (800 k.cal)
- ❧ K+ rich Fruits continued.
- ❧ Peptamen BD.
- ❧ PN continued.

LAB:

- ❧ S.k+: 3.3mEq/L

Day 8



- ❧ c/o L/M resolving (3-4 episodes).
- ❧ Orally took 1100 k.cal.
- ❧ c/o vomiting with peptamen?
- ❧ Formula switched to iso-osmolar formula ISOCAL 150 ml BD (full strength).
- ❧ PN d/c

LAB:

❧ S.k+: 3.9mEq/L

Day 9



- ❧ c/o L/M settled
- ❧ Tolerating soft and gradually progression to regular diet
- ❧ Nutrition supplement cont..

Day 10



- ☞ Pt. D/c at 42 kg wt.
- ☞ With the counseling of probiotic use(at least 2C /day)

Now with in an year pt. is on his usual body wt. i.e. 55kg

Case 2



- ☞ 39 yr old female came to oncology clinic with c/o wt loss of 15 kg in 9-10 months, decreased app., weakness, abdominal pain.
- ☞ U/S and CT: found large abdominal pelvic mass
- ☞ BX : diffuse large B cell NHL
- ☞ EBV :+ve
- ☞ Planned to give CHOP 1

LABS:

- ☞ Hb: 11.2G%
- ☞ Plt:559 perem
- ☞ TLC: 8.7
- ☞ Urea:21mg%
- ☞ S.crt:0.88mg%
- ☞ Na:
135mEq/L
- ☞ K:3.4mEq/L
- ☞ Stool D/R: (N)

Assessment and Intervention

- ☞ Ht:165cm
- ☞ Wt:46kg(usual 60 -62kg)
- ☞ BMI:17.5kg/ m²
- ☞ EER: approx. 1950-2050k.cal/ day (HBE X 1.2 X 1.1-1.6)
- ☞ Nutrition assessment done suggested high calorie high protein diet + Ensure 6 scoops BD

Chemotherapy



Composition of CHOP:

- ☞ Prednisolone
- ☞ Doxorubicin
- ☞ Cyclophosphamide

Other drugs:

- ☞ Tab: Maxalon
- ☞ Tab: omeprazole

Day 2 after CHOP



- ❧ c/o diarrhea (6-7 episodes)
- ❧ Rx: Tab: ciprofloxin , flagyl
- ❧ DIET: Soft Low Residual Diet supplement (ensure)d/c
- ❧ Encouraged oral fluids and probiotics intake approx. (1 ½ C yogurt)

Diagnosis



- ❧ Chemotherapy induced diarrhea.
- ❧ 1.3% of Asian population has chemotherapy induced diarrhea.

Dietary Management:



☞ increased fluids intake:

clear broth, apple juice, fruit nectars
(apricot, peach, pear, papaya, mango,
or banana) & water.



☞ Increase soluble fiber intake:

Bananas, white rice, white toast, applesauce, oatmeal, mashed potatoes,
noodles, canned fruits without the skins, cream of rice (Farina)cereal, pancakes.

☞ Small frequent meals and snacks:

well-cooked eggs, chicken or fish(not fried), soups made from clear broth, white bread,
oatmeal, pudding, gelatin, custard, yogurt, cottage cheese (unless lactose intolerant), waffles
and sherbat.

Lactaid® milk or soymilk. Try Ensure®, Boost®, apple or grape juices, or fruit nectars.

☞ Eat foods with probiotics.

☞ Not all diarrhea is a result of lactose-intolerance.

Foods to Avoid



❧ Citrus and citric beverages:

Irritate stomach and worsens diarrhea

❧ Insoluble Fiber:

laxative effect and add bulk to the diet, do not dissolve in water, so they pass through the GIT, and speed up the passage of food and waste through your gut

❧ Fatty and greasy foods:

Delayed digestion aggravate diarrhea

Cont..



☞ Caffeine:

Can speed up gut motility and food moves quickly the body

☞ Olestra and Olean:

Artificial fat (sucrose 6- 8 FA) cause diarrhea

☞ Sorbitol and sugar free foods:

Act as laxatives



Role of Zinc?



- ❧ Improves the absorption of water and electrolytes,
- ❧ Improves regeneration of the intestinal epithelium,
- ❧ Increases the levels of brush border enzymes, and
- ❧ The immune response,
- ❧ Allow better clearance of the pathogens.

Indian J Pharmacol. 2011 May-Jun; 43(3): 232-235.doi: [10.4103/0253-7613.81495](https://doi.org/10.4103/0253-7613.81495)

Cont...



Zinc and diarrheal disease: current status and future perspectives.

- ☞ **Summary:** Faced with rising antibiotic resistance and the lack of effective antidiarrheal vaccines, oral zinc provides substantial benefit in the reduction of stool output and disease duration combined with safety, selectivity of action, and low cost. Thus, oral zinc supplementation is a practical therapeutic intervention for the treatment of diarrhea in children, and by extension, should be provided to adults.

[Curr Opin Clin Nutr Metab Care](#). 2008 Nov;11(6):711-7. doi: 10.1097/MCO.0b013e3283109092.

Clinical trial (results not published)

Zinc Supplementation to Reduce Diarrhea Rates in Adults in Western Kenya.

- ❧ **Objective:** to determine the efficacy of Zn-supplementation on diarrhea incidences in a vulnerable adult population.
- ❧ **Methodology:** The study will be carried out in Kombewa division, Kisumu District and will involve 500 adults aged 18-55 years. They will be randomly assigned to receive Zn supplement (or placebo) on a daily basis over a 3 month period. Morbidity information will be collected daily for 4 months, while anthropometric measures and laboratory data will be obtained at study onset, end of supplementation and study conclusion. In addition, HIV and malaria tests will be carried out during the study as they are important confounders. The significant differences in diarrhea incidence between the Zn-group and the placebo-group will be determined using SPSS. The results are expected to provide the scientific basis and common pathway for development of an anti-diarrheal supplement for vulnerable populations such as environmental refugees, deprived and displaced persons, and troops prior to deployment.

Probiotics?



Lactobacillus and *Bifidobacterium*

- ☞ help to maintain a healthy gut microbiota
- ☞ help enhance immune function to help protect the body from infection.

Probiotics and Diarrhea

- Probiotics reduce the duration of diarrhea by around **25 hrs** and reduced the incidence of diarrhoea lasting four or more days by **59 %**.

Allen SJ, et al (2010) Probiotics for treating acute infectious diarrhoea. *Cochrane Database Sys Rev.* 2010;11:CD003048.

- probiotics can lead to a relative risk reduction of antibiotic associated diarrhea (AAD) of 42 to 47 per cent and 66 to 71 per cent for *C. difficile* associated diarrhea (CDAD)

Avadhani A and Miley H (2011) Probiotics for prevention of antibiotic-associated diarrhea and *Clostridium difficile* associated disease in hospitalized adults – a meta-analysis. *Journal of the American Academy of Nurse Practitioners.* 2011;23(6):269-274.

WGO states(2011):

- Antibiotic associated diarrhea,, ‘there is strong evidence of efficacy for *S.boulevardii* or *L. rhamnosus* GG in adults or children who are receiving antibiotic therapy.
- study indicated that *L. casei* DN-114 001 is effective in hospitalized adult patients for preventing antibiotic associated diarrhoea and *C. difficile* diarrhoea.’

World Gastroenterology Organization (2011) *Practice Guideline. Probiotics and Prebiotics.* Munich, Germany: WGO. Available online at: www.worldgastroenterology.org[Accessed 10 January 2013]

Probiotics



☞ Yogurt:

Goat's milk and cheese are particularly high in probiotics like thermophilus, bifidus, bulgaricus and acidophilus.

☞ Kefir:

Fermented dairy product is a unique combination of goat's milk and fermented kefir grains. High in lactobacilli and bifidus bacteria. (is rich in antioxidants too.)

☞ Sauerkraut:

Made from fermented cabbage (and sometimes other vegetables), sauerkraut is not only extremely rich in healthy live cultures, but might also help with reducing allergy symptoms. Sauerkraut is also rich in vitamins B, A, E and C.

☞ Miso Soup:

Made from fermented rye, beans, rice or barley, adding a tablespoon of miso to some hot water makes an excellent, quick, probiotic-rich soup, full of lactobacilli and bifidus bacteria.

Some pickles are also included.

THANK YOU!
for a good
listening

QUESTIONS???