Constipation / diarrhea

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Colon-functions

Four Main Jobs of the Colon

1. Fluid Absorption
2. Bacterial Action
3. Stool Formation
4. Stool Elimination

Salvage, Metabolism, and Storage

- Proximal colon
  - More saccular
  - Acts as a reservoir
  - Fluid moves through quickly, solid material slower
  - Principal site for SCFA production
- Distal colon
  - More tubular
  - Acts as a conduit
  - Protein degradation
- Haustral segmentation facilitates mixing, retention of luminal material, formation of solid stool

Transport of Electrolytes

- Presented 1-2 L of water/day
  - Absorbs 90%
  - Only 100-150 mL eliminated in stool
  - Can increase to 5-6 L/day when challenged
- Important in recovery of salts
  - Absorbs sodium and chloride
    - Sodium absorbed against concentration and electrical gradients
  - Secretes bicarb and potassium
Regulation
Prevalence and Incidence of Constipation in the United States

- **Prevalence**
  - Estimated 55 million Americans (prevalence, 28%)$^1$
  - Men, 12%$^2$
  - Women, 16%$^2$
  - Elderly individuals, 40%$^2$

- **Onset rate** 40 per 1000 person-years$^4$

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Chronic Constipation Is More Than Stool Frequency

- Straining: 81%
- Hard stools: 72%
- Incomplete evacuation: 54%
- Abdominal bloating: 37%
- <3 BM/wk: 36%

N = 1149.
Definition

Rome III criteria:
- Straining
- Lumpy Hard Stools
- Incomplete Evacuation
- Use of Digital Rectal Maneuvers
- Sensation of Anorectal Blockage
- < 3 Bowel Movements per week

is a symptom, NOT a disease.

has many causes

may be a sign of undiagnosed disease.
# Stool Form Correlates to Intestinal Transit Time

## The Bristol Stool Form Scale

<table>
<thead>
<tr>
<th>Slow Transit</th>
<th>Rapid Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Separate hard lumps, like nuts</td>
</tr>
<tr>
<td>Type 2</td>
<td>Sausage-like but lumpy</td>
</tr>
<tr>
<td>Type 3</td>
<td>Like a sausage but with cracks in the surface</td>
</tr>
<tr>
<td>Type 4</td>
<td>Like a sausage or snake, smooth and soft</td>
</tr>
<tr>
<td>Type 5</td>
<td>Soft blobs with clear-cut edges</td>
</tr>
<tr>
<td>Type 6</td>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>Type 7</td>
<td>Watery, no solid pieces</td>
</tr>
</tbody>
</table>

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Functional Subtypes: Primary Constipation

- Slow transit constipation, 47%
- Dyssynergic defecation, 59%
- Irritable bowel syndrome, 58%

Slow transit constipation and constipation-predominant IBS (IBS-C) overlap in half of each group.

Constipation: Primary Causes

- **Dyssynergic defecation**
  - Inability to coordinate abdominal, rectoanal and pelvic floor muscles to facilitate defecation

- **Slow-transit constipation**
  - Absent or decreased number of pacemaker cells (interstitial cells of Cajal) and enteric neurons
  - Decreased colonic motility and frequency of mass movements
  - Blunted response to meals and laxatives

Rome Diagnostic Criteria for IBS

Rome III criteria (2006)
- At least 3 months, with onset at least 6 months previously of recurrent abdominal pain or discomfort** associated with 2 or more of the following:
  - Improvement with defecation; and/or
  - Onset associated with a change in frequency of stool; and/or
  - Onset associated with a change in form (appearance) of stool

**Discomfort means an uncomfortable sensation not described as pain.

Rome II criteria (1999)
- 12 weeks or more in the last 12 months of abdominal discomfort or pain with 2/3 of the following
  - Relieved by defecation
  - Associated with a change in frequency of stool
  - Associated with a change in consistency of stool

The second group of criteria included in Rome I are now considered supportive rather than mandatory in the diagnosis.
Causes of constipation

**General:**
- inadequate fiber / fluid intake
- disordered colonic transit
- altered anorectal function
- ↓*exercise*: bedridden, coma
- ↑*age*: slow metabolism
- change in routine (travel)
- *ignoring urge to defecate*
Causes of constipation

**Systemic:** hypothyroidism, DM, uremia, pregnancy, hypercalcemia, hypokalemia

**Neurological:** Stroke, Parkinsonism, Multiple sclerosis, senility

**GI-related:** IBS, Hemorrhoid, Anal fissure, Anorectal & Colorectal carcinoma, obstruction

**Medication:** Opiate, Anticholinergics, Iron, Al. containing antacids, cholestyramine, antihypertensive drugs (CCBs, diuretics), relaxants, antidepressants, chronic use of laxatives, antiepileptics, progestron

**Uncertain:** idiopathic chronic constipation
## Diagnostic Assessment of Chronic Constipation

<table>
<thead>
<tr>
<th>Routine Workup</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient history</strong></td>
<td>Nature of symptoms, duration and characteristics, laxative use, family</td>
</tr>
<tr>
<td></td>
<td>history of bowel disturbance, assessment of emotional distress or affective</td>
</tr>
<tr>
<td></td>
<td>disorders</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
<td>Abdominal examination, anorectal and perianal examination, assessment of</td>
</tr>
<tr>
<td></td>
<td>neurologic function</td>
</tr>
<tr>
<td><strong>Laboratory tests</strong></td>
<td>Glucose, electrolytes including calcium and thyroid function tests</td>
</tr>
<tr>
<td><strong>Rule out obstruction</strong></td>
<td>Sigmoidoscopy, colonoscopy</td>
</tr>
<tr>
<td><strong>Specialized testing as needed</strong></td>
<td>Barium enema, colonic transit time, anorectal manometry, balloon expulsion</td>
</tr>
<tr>
<td></td>
<td>and barium defecography</td>
</tr>
</tbody>
</table>

Take a Good History

- **Stool**: Quality/Frequency/Effort/Associated Symptoms
- **Foods and Fluids**: Fiber and White Food
- **Medical**: Laxative Use, other Meds, Thyroid gl. function

**RED FLAGS**: rectal bleeding, weight loss, change in bowel habits, family history of CRC.

**Tools**: Bowel Diary (see Symptom Diary on web), Transit time trial ... corn, beets, or other identifiable food
Red Flags to Suggest Organic Gastrointestinal Conditions

- History
  - Unintentional weight loss
  - Onset in older patient (>50 years)
  - Family history of cancer or IBD/celiac disease
  - Rectal bleeding

- Physical
  - Abnormal examination
  - Rectal bleeding/obstruction
  - Positive FOBT
  - Flexible sigmoidoscopy or colonoscopy

- Initial laboratory tests
  - ↓ Hb
  - ↑ WBC
  - ↑ CRP
  - Abnormal chemistry
  - Abnormal TSH

Constipation: Physical Exam

- Thyroid examination
- Abdominal examination for visible distension, tenderness and masses
- Anorectal examination
  - External and internal hemorrhoids
  - Anal fissures
  - Pelvic descent
  - Anal sphincter tone
  - Paradoxical pelvic floor contraction
  - Blood in stool
  - Rectal prolapse
  - Rectocele
Diagnostic Tests

- Routine diagnostic screening tests
  - CBC, chemistry panel, TSH
  - Consider colon examination if ≥50 years old, alarm signs, FH colon cancer
- If suspect slow transit constipation
  - Colon transit study: Slow colon transit (>72 hours) particularly involving right colon
- If suspect pelvic floor disorder
  - Anorectal manometry with balloon expulsion test
  - Consider defecography, pelvic MRI
- If suspect IBS with constipation
  - Positive diagnosis with Rome III symptom criteria
- Some patients have overlapping conditions
Assessment of Colorectal Structure and Motility

- **Colonic transit studies**
  - Measures time for stool to pass through colon
  - Different methodologies
  - Useful to document slow transit constipation
  - Can also show transit within segments of colon
  - Abnormal Sitz marker study: >5 (20%) markers at 120 hours

- **Anorectal manometry (balloon expulsion test)**
  - Good screening test for pelvic floor dyssynergia
  - Abnormal when patient takes >1 minute to expel a 50-mL water-filled balloon

- **Defecography**

Diagnosis of Chronic Constipation

Constipation

Assess presence of red flags

Yes → Evaluate further
No

Occasional constipation

Treat empirically if needed and follow up

<3 months

Duration of symptoms

≥3 months

Chronic constipation

Primary constipation

Secondary constipation

Abdominal pain

No → Chronic constipation

Yes → IBS-C
PREVENTION OF CONSTIPATION

- **High fibre diet** - beans, whole grains, cereals, fresh fruits (contain the natural laxative sorbitol), vegetables

- **Limit foods with no fiber** (cheese, meat, sweets, processed foods)

- **Minimum fluid consumption of 1500mL daily**

- **Regular, private toilet routine**

- **Use of a laxative** if using constipating medication or in presence of diseases associated with constipation
Treatment options

Two approaches to consider:

- Non-drug Approach
- Drug Approach
Management

- Initial treatment
  - Lifestyle modification - ↑fluid intake
  - >25 g of fiber/day
    - Fiber-bulk/distension-stool propulsion
    - Effect may take weeks.
    - Adverse effects: bloating, flatulence

- Exercise
  - Regular bowel regimen pattern
Therapeutic options

**Drug Measures:**

- **Bulk-forming Agents**
- **Emollients/Stool Softeners** - Provide moisture to stool
- **Osmotics** - Draw water into colon
- **Hyper-osmotics**
- **Stimulants** - Cause muscle contractions in intestines
Treatment options - laxatives

- **Bulk-Forming Agents:**
  - the safest agents
  - suitable for long-term use
  - administered with a full glass of water or juice
  - Do not use if patient is dehydrated or fluid restricted
  - drug of choice for prevention; not for immediate relief

- Increase volume of stool
- Stimulate natural intestine peristalsis
- Lasts 12-24 h (even 3 days)
  - Psyllium, Methylcellulose, Dextran
Emollients/Stool Softeners

- Example: Docusate
- Used for prevention;
- not for immediate relief
- “makes it easier to go”

Anionic surfactants
- Decrease stool surface tension,
- Increase fluid secretion into intestine
- Lasts 1-3 days

SE: GI cramp
Lubricants

- Liquid Parafine
- Inhibition of fluid reabsorbtion from colon
- Stimulation of peristaltic activity
- Softening of stool
- Post MI, Post surgery
- lasts 6-8 h
- 15-45 ml PO, or rectal

SE: malabsorption (lipid soluble vit.), Anal pruritus
Osmotics:
Milk of Magnesia

- Limitations: frequent diarrhea, electrolyte abnormalities.
- Administered with sufficient water to prevent dehydration.
- Not used very often
Hyper-Osmotics:

- **PEG** - the loosest stool, greatest efficacy.
  - Drug of choice, safe, no side effects
  - + in patients unresponsive to other treatments, facilitates the discontinuation of other laxatives.
  - May take 2-4 days to see an effect.

**Lactulose** - very safe to use long term; takes 1-2 days to work.
- SE – bloating, flatulence, abdominal cramp, electrolyte imbalance

**Glycerin suppositories** - quicker onset of action (30-60 minutes). Less effective if the stool is dry and hard.
Stimulant laxatives
– Senna, Bisacodyl (Dulcolax)

- Stimulates myenteric mucosal nerve plexus of the colon – rhythmic muscle contractions
- Intermittent use - if osmotic laxatives fail or are not tolerated.
- Usually given at bedtime (Oral: 6-8hr, Supp: 15-60min) – provide overnight relief
- Interactions: Milk, Antacids (EC)
- **SE**: Cramp, fluid and electrolyte imbalance
- Contraindication: pregnancy, lactation.
Acute constipation

- Glycerin suppository
- Sorbitol powder
- Bisacodyl
- Anthraquinones (C-lax)
- Saline laxative (MOM)
- Tap-water enema

If laxative treatment is required for > 1 week, refer to a physician
Caster oil

Usually for bowel preparation

- Active metabolite: Ricinoleic acid
- Onset: 1-3 hr

Gliceryn

very safe and acceptable for intermittent basis

- Supp: 1g, 3g
- Onset: less than 30 min

Tap-water enema

- 200 ml - bowel movement within 0.5 hr
Constipation

Primary constipation

Acute constipation (<3 months)

Fecal impaction
- Yes
  - Alarm features
    - Yes
      - See diagnosis algorithm
    - No
      - Enemas, suppositories, large volume PEG, stimulant laxatives, disimpaction with sedation
- No
  - See diagnosis algorithm

Chronic constipation (>3 months)

Education + lifestyle modifications, high-fibre diet, bulk laxatives, increased fluid, exercise
- Effective
- Continue
- Ineffective

Stool softeners and/or osmotic laxatives, PEG
- Effective
- Continue
- Ineffective

Suspicion for dyssynergia
- Yes
- Stimulant laxatives (added to osmotic laxatives) or lubiprostone (used alone)
- No
- Physiological testing (see diagnosis algorithm)

Physiological testing (see diagnosis algorithm)

Normal tests
- Education, behavioural therapy, laxatives

Slow transit constipation
- Optimise drug management, consider surgery if colonic neuropathy present

Dyssynergic defecation
- Biofeedback therapy
Diarrhea

- Increase in frequency (> 3 loose stools/day), size (> 200 g /day) or loosening of bowel movements.

Timing:
- Acute diarrhea: < 2 weeks
- Persistent diarrhea: 2-4 weeks
- Chronic diarrhea: > 4 weeks

Pathophysiology
- Increased active anion secretion
- Decreased absorption of water and electrolytes
Acute diarrhea

- Infections - 90% - fecal-oral route
- Food allergies
- Food poisoning/bacterial toxins
- Medications
- Initial presentation of chronic diarrhea

Inf. diarrhea

- + abdominal cramps, nausea, vomiting, rarely fever.
- Stools do not usually contain mucus or blood, weakness, dehydration
- Usually subsides spontaneously within 1–5 days
Infectious diarrhea

**Bacterial - Watery**
- Enterotoxigenic- Vibrio cholera, Enterotoxigenic E.coli
- Food borne toxins- Bacillus cereus, Clostridium perfringens, Mycobacterium avium-intracellular complex

**Bloody**
- Invasive- Campylobacter jejuni
- Destructive- Shigella, Enteropathogenic E.coli, Clostridium difficile

**Viral** – Rotavirus, Adenoviruses, Caliciviruses, Astroviruses, Norwalk agents.

**CMV**- Immunocompromised

**Parasitic**- Entameba histolytica, Giardia lamblia, Cryptosporidium, Isospora

**Protozoa**- Giardia lamblia, Entamoeba histolytica, Cryptosporidium

**Helminths**- Ascaris lumbricoides, Ancylostoma, Strongyloides stercoralis, Trichinella spiralis
Acute diarrhea

- Mild, self-limited
- Susp. infectious – microbiol. exam. of the stool
- Susp. non-inf.- structural exam. of the colon

Dg. – profuse, dehydration, bloody, fever, >48 h, AB use, community outbreaks, severe abd. pain + >50 years of age, >70 y., immunocompromised
Risk groups

1. Travelers – E.coli, Shigella, Campylo., Salmonella


3. Immundef.- primary (IgA def., CVID) sec. – HIV, drugs, senescence)

4. Daycare attendees

5. Institutionalized persons- nosocomial (Clostrid. diff).
Systemic manifestations

- Reiter’s sy. - arthritis, urethritis, conjunctivitis
- Yersinia – thyreoiditis, pericarditis, glomerulonephritis
- Shigella - HUS
- Postinf. IBS

Reiter’s syndrome

Triad of:
- Asymmetrical arthritis
- Urethritis/cervicitis or Diarrhoea
- Conjunctivitis

May be associated with:
- Mucocutaneous disease
- (balanitis, ulcers, keratoderma)
Medications / toxins

- Acid-reducing agents (H2 blockers, PPIs)
- Magnesium-containing antacids
- Anti-arrhythmic (eg, digitalis, quinidine)
- Antibiotics
- Anti-neoplastic agents
- Antiretrovirals
- Beta blockers
- Colchicine
- Levothyroxine

- SSRIs
- Furosemide
- Metformin
- NSAIDs, ASA
- Prostaglandin analogs (ie, misoprostil)
- Theophylline
- Amphetamines
- Caffeine
- Alcohol
- Narcotic/opioid withdrawal
Treatment- rehydration

Oral rehydration:
fluids containing glucose, Na+, K+, Cl–, and bicarbonate or citrate
inexpensive, safe, highly effective.

Fluids: at rates of 50–200 mL/kg/24 h.

Intravenous fluids (lactated Ringer's sol.)
Treatment - antidiarrheal Agents

- **Loperamide** – preferred; non-febr., non-bloody
  Dose: 4 mg initially, followed by 2 mg after each loose stool (maximum: 16 mg/24 h)

- **Bismuth subsalicylate** : 2 tb., or 30 mL four times daily (traveler's diarrhea)

- **Codeine** - addictive potential - generally avoided except in cases of intractable diarrhea. Dose: 15–60 mg every 4 hours as needed;

- **Anticholinergic agents** are contraindicated in acute diarrhea
Antibiotic Therapy

Specific AB treatment - not generally recommended.

- clearly recommended: shigellosis, cholera, extraintestinal salmonellosis, "traveler's" diarrhea (oral quinolone), *C. difficile* infection (Metronidazole, Oral Vancomycin), giardiasis (Metronidazole), amebiasis

Empiric treatment - fluoroquinolones (eg, ciprofloxacin, 500 mg twice daily) for 5–7 days.

Alternative agents:
- trimethoprim-sulfamethoxazole: 2x160/800 mg
- erythromycin: 4x250–500 mg.
Treatment – acute diarrhea

AB profil

Travel to high risk regions + high risk patients

- Start **food** as soon as possible - avoid high-fiber foods, fats, milk products, caffeine, and alcohol.

- Frequent feedings of fruit drinks, tea, "flat" carbonated beverages, and soft, easily digested foods (eg, soups, crackers).

- **Hospitalization** - severe dehydration, toxicity, or marked abdominal pain.
Causes of chronic diarrhea

- Infections
- Endocrine
- Chronic nonspecific diarrhea
- Dietary
- Immune defects
- Metabolic defects
- Small intestine
- Pancreas
- Chronic Diarrhea

Viral, parasitic, bacterial,

- Hyperthyroidism
- Adrenal insufficiency
- Celiac disease
- Cystic fibrosis
- Familial chloride diarrhea

Carbohydrate deficiency
- Lactase deficiency
- Glucose-lactose malabsorption
- Cow’s Milk/soy protein intolerance
- Cow’s Milk/soy protein intolerance
- IgA deficiency
- AIDS
- Lactase deficiency
- Glucose-lactose malabsorption
- Cow’s Milk/soy protein intolerance
- IgA deficiency
- AIDS
Types of chr. diarrhea - osmotic

Ingestion of poorly absorbed osm. active substance –
retains fluid in the lumen –
exceeds the reabs. capacity of the colon

- stool volume decreases with fasting;
- increased stool osmotic gap
Causes – osmotic diarrhea

- Carbohydrate malabsorption (eg, lactase deficiency)
- Acquired / congenital defect in the brush border disaccharides or other enzymes

- Osmotic laxatives (Mg, PO4, SO4)
Secretory Diarrhea

Disordered electrolyte / fluid transport

- Net secretion of anions (Cl or bicarbonate)
- Net inhibition of Na (+H2O) absorption
- Large volume, watery, painless diarrhea

1. Hormonally mediated
2. Exogen secretagogues – cholera toxin, ethanol)
3. Loss of intestinal surface area
4. Medications
5. Factitious diarrhea (laxative abuse)
6. Absence of ion transporter (cong.chloridorrhea)
Causes - Watery (Secretory) Diarrhea

- Bacterial toxins
- Abnormal motility
  - DM-related dysfunction
  - IBS
  - Post-vagotomy diarrhea
- Diverticulitis
- Ileal bile acid malabsorption – Crohn's, postcholecystectomy

↓ intestinal surface area (celiac; entero-colic fistulae)

- Malignancy
  - Colon CA
  - Lymphoma
- Vasculitis

- Inflammatory
  - Microscopic colitis

- Endocrinopathies
  - Hyperthyroidism
  - Adrenal insufficiency
  - Carcinoid syndrome
  - Gastrinoma, VIPoma, Somatostatinoma
  - Pheochromocytoma

- Idiopathic
  - Epidemic (Brainerd)
  - Sporadic

- Medications, stimulant laxative abuse, toxins
Fatty diarrhea- steatorrhoea

Fat malabsorption – osm. effect of fatty acids

- Bloating, flatulence,
- greasy malodorous stools, difficult to flush,
- weight loss,
- s/s of vitamin deficiencies (periph neuropathy, easy bruising) - ADEK
- Anemia, coagulopathy, hypoalbuminemia, osteopenia
**Diff. Dg. Fatty Diarrhea**

**Maldigestion** = inadequate breakdown of triglycerides

- Pancreatic exocrine insufficiency (eg, chronic pancreatitis)
- Inadequate luminal bile acid concentration (eg, PBC)

**Malabsorption** = inadequate mucosal transport of digestion products

- Mucosal diseases (eg, Celiac sprue, Whipple’s disease)
- Mesenteric ischemia
- Structural disease (eg, short bowel syndrome)
- Small intestinal bacterial overgrowth (bile salt deconjugation)
Inflammatory diarrhea
Exsud., malabs., altered fluid/electrolyte abs., hypersecre., hypermotility

Inflamm. citokines, infl. mediators

- Blood, mucus, pus, abd. pain, fever,
- Positive fecal leukocytes, calprotectin,
- Gross or occult blood,
- ESR/CRP, leukocytosis
Causes of Inflammatory Diarrhea:

- IBD (Crohn’s, UC)
- Ischemic colitis
- Malignancy
  - Colon CA
  - Lymphoma
- Diverticulitis
- Radiation colitis

Infectious:
- Invasive bacterial (Yersinia, TB)
- Invasive parasitic (Amebiasis, strongyloides)
- Pseudomembranous colitis (C. diff.)
- Ulcerating viral inf. (CMV, HSV, HIV)
- Protozoal:
  Cryptosporidium
Dysmotility

Abnormal intestinal motility due to systemic disorders, surgery or to stasis of intestinal contents with bacterial overgrowth resulting in malabsorption

1. **Postsurgical**: vagotomoy, partial gastrectomy, blind loop with bacterial overgrowth

2. **Systemic disorders**: scleroderma, DM, hyperthyroidism, carcinoid sy.

3. **IBS – D**: prev. 10%, disordered intestinal /colonic motor /sensory response to stimuli

4. **Drugs**
Initial Evaluation: History

- Duration, pattern, epidemiology
- Stool volume & frequency
- Stool characteristics (appearance, blood, mucus, oil droplets, undigested food particles)
- Relationship to meals, specific foods, fasting, & stress
- Nocturnal symptoms
- Fecal urgency, incontinence
- Associated sy. (abd pain, cramps, bloating, fever, weight loss, …)
- Severity, dehydration
- Medical, surgical, travel, water exposure history
- Recent hospitalizations, antibiotics
- History of radiation
- Current/recent medications
- Diet (excessive fructose, sugar alcohols, caffeine)
- Possibility of laxative abuse
- Extra-intestinal symptoms
Physical exam.

**Vital signs**
- Orthostatic signs, hyperventilation, fever

**Volume status**
- Skin tenting, dry mucous surfaces, tachycardia, hypotension, mental status

**Abdominal and rectal exam.**
- Distension
- Bowel sounds
- Tenderness
- Masses, evidence of prior surgeries
Physical exam - chr. diarrhea

- Malnutrition
  - Weight loss
  - Muscle wasting
  - Tetany
  - Oral and skin lesions
  - Peripheral neuropathy
  - Ataxia
  - Edema
Blood Tests

Routine lab. tests—CBC, serum electrolytes, liver function tests, calcium, phosphorus, albumin, TSH, total T4, and prothrombin time.

- **Anemia** - in malabsorption sy. (vitamin B12, folate, iron) and inflammatory conditions.

- **Hypoalbuminemia** - in malabsorption, protein-losing enteropathies, and inflammatory diseases.

- **Hyponatremia and non–anion gap metabolic acidosis** - profound secretory diarrhea.

- **Malabsorption of fat-soluble vitamins** may result in an abnormal prothrombin time, low serum calcium, or abnormal serum alkaline phosphatase.

- **Hormone levels** - gastrin, VIP, somatostatin, cortisol, neurokinins, calcitonin
  - Carcinoid- serotonin, urine 5-hydroxyindoleacetic acid
Evaluation - stool

- 24 h. stool collection
- stool weight > 300 g/24 h - diarrhea
- >1000–1500 g : secretory process.
- >fecal fat in excess of 10 g/24 h – malabsorption.
- Stool culture: positive: only 40 to 60%
- Stool for ova and parasites
- Stool for Clostridium difficile toxin
- Stool Sudan test for fat
- Stool pH-<7 indicates carbohydrate malabsorption
- Stool osmolality – osmotic gap confirms osmotic diarrhea.
- Stool laxative screen – stool Mg, P, S levels
- Fecal leukocytes – inflammatory diarrhea.
Imaging

- Calcification on a plain **abdominal radiograph** - chronic pancreatitis.

- **Upper gastrointestinal series or enteroclysis:** Crohn's disease, lymphoma, or carcinoid syndrome.

- **Colonoscopy** - colonic inflammation due to IBD.

- **Upper endoscopy with small bowel biopsy** - useful in suspected malabsorption due to mucosal diseases.

- **Abdominal CT** - to detect chronic pancreatitis or pancreatic endocrine tumors.
Treatment – chronic diarrhea

- Correct dehydration and electrolyte deficits
- Empiric course of antibiotics is not useful
- Empiric trials of (in appropriate clinical setting):
  - Dietary restrictions (GSE, lactose)
  - Pancreatic enzyme supplementation
  - Opiates (codeine, morphine, loperamide)
  - Bile acid binding resins
  - PPI (gastrinoma)
  - Octreotide (carcinoid sy., other endocrinopathies, dumping syndrome, chemotherapy-induced diarrhea, AIDS-related diarrhea)
  - Loperamide, diphenoxylamin, codein.