Chronic Bowel Diseases

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Chronic inflammatory bowel disease (IBD) includes:

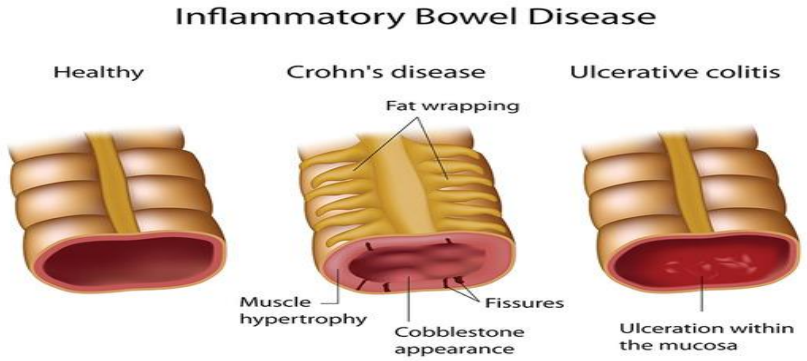
(ulcerative colitis & Crohn's disease).

Inflammatory response indicates alteration of mucosa &submucosa

(anal canal → cecum)

(mouth → terminal part of ilium)

- **Corticosteroids:** prednisolone.
  - ↳ for any inflammatory disease
- **Immunosuppressive agents:** azathioprine , 6mercaptopurine.
- **Aminosalicylates.** ⇒ antiinflammatory effect like NSAIDs



Aminosalicylates

Up to 80% of unformulated, aqueous 5-

ASA is absorbed from the small intestine & does not reach the distal small bowel or colon in appreciable quantities.

- **Azo compounds:**

5-ASA bound by an azo (N=N) bond to an inert compound or to another 5- ASA molecule.

Azo markedly reduces absorption of the parent drug from the small intestine.

In terminal ileum & colon, bacteria cleave the azo bond by azo reductase, releasing the active 5-ASA.

- **Sulfasalazine:** (5-ASA "Active moiety" +Sulfapyridine "side effects").
- **Olsalazine:** (two molecules of 5-ASA).
- **Balsalazide:** (5-ASA + 4-aminobenzol-β- alanine).

Mesalamine compounds

Package of 5-ASA itself in various ways to deliver it to different segments of the small or large bowel.

Pentasa: contains timed-release microgranules that release 5- ASA throughout the small intestine.

Asacol: has 5-ASA coated in pH-sensitive resin that dissolves at pH 7 (the pH of the distal ileum & proximal colon).

Rowasa (enema formulations) &

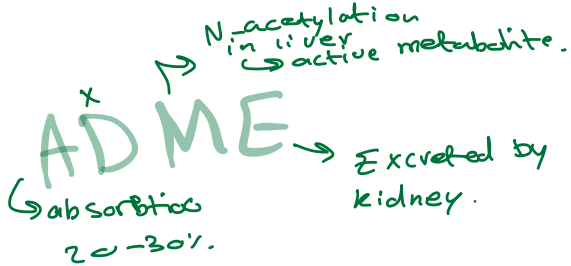
Canasa (suppositories): To deliver high concentration of 5-ASA to the rectum & sigmoid colon.

Pharmacokinetics:

Mesalamine:

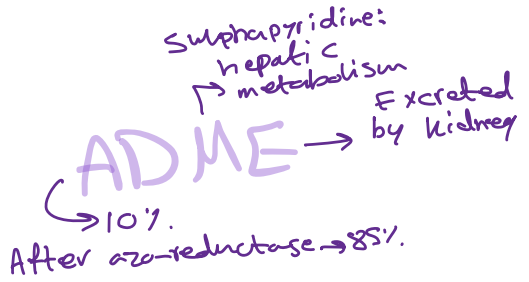
- 20-30% of 5-ASA is absorbed.
- 5-ASA undergoes N-acetylation in the liver and gut epithelium.
- Metabolite is excreted by the kidneys.

Convert it into active metabolite



Sulfasalazine

- 10% is absorbed.
- After azoreductase, >85% of sulfapyridine is absorbed.
- Sulfapyridine undergoes hepatic metabolism.
- Metabolite is excreted by the kidney.

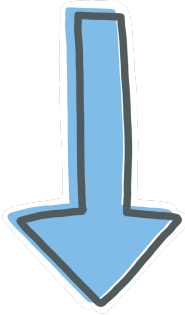


Balsalazide:

- <1% is absorbed.
- After azoreductase, small amount of systemic absorption occurs.

Mechanism of action

- ✓ 5-ASA inhibits inflammatory mediators derived from both the cyclooxygenase &lipooxygenase pathways. COX↓ LOX ↓
- ✓ Interferes with the production of inflammatory cytokines. cytokines ↓
- ✓ Inhibits the activity of nuclear factor-k_B (NF-k_B), an important transcription factor for pro-inflammatory cytokines.
- ✓ Inhibits cellular functions of natural killer cells, mucosal lymphocytes, and macrophages.
- ✓ It may scavenger reactive oxygen metabolites.



Aminosalicylates – Mechanism of Action

Activation:

- Aminosalicylates are activated after reaching the mucosa of the gastrointestinal tract (GIT).
- Note: They are activated in the liver & in the mucosa of the GIT.

1. Binding to PPAR-γ (Peroxisome Proliferator-Activated Receptor Gamma):

- Once activated, aminosalicylates bind to PPAR-γ, a nuclear receptor involved in regulating inflammation.
- This binding leads to suppression of the gene expression of various inflammatory mediators.

As a result, it decreases the production of:

- TNF-α (Tumor Necrosis Factor-alpha)
- IL (Interleukins)
- COX (Cyclooxygenase enzymes)
- LOX (Lipoxygenase enzymes)

2. Suppression of Immune Cell Function:

- Inhibits the activity of immune cells such as:
- Natural Killer (NK) cells
- Macrophages
- Lymphocytes

Effects:

- ↓ Immune response
- ↓ Inflammatory response

Therapeutic uses

mild-moderate → AS A
severe → corticosteroid

1. First-line agents for treatment of mild to moderate active ulcerative colitis
2. Crohn's disease involving the small bowel ***mesalamine*** compounds, which release 5-ASA in the small intestine, have the advantage over azo compounds.
3. Ulcerative colitis or Crohn's colitis that extends to the proximal colon, both azo & mesalamine compounds are useful.
4. Ulcerative colitis or Crohn's disease confined to the rectum or distal colon, suppositories or enema are useful.

So:-

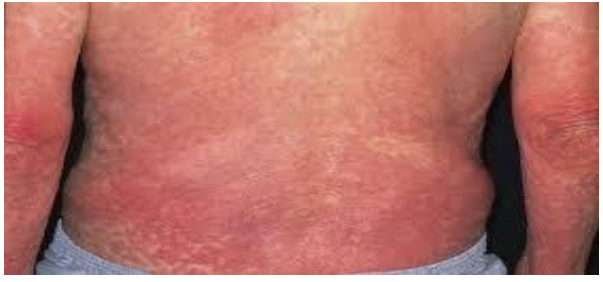
* if the lesion found (terminal part of small intestine → cecum) we use pentasa or asacol
* if the lesion found (ascending ,descending ,transverse colon)we use mesalamine or azo compounds both are recommended
* if the lesion found (sigmoid ,rectum ,anal)we use Rowasa or Canasa

Adverse effects

ASA—>maximum cause secretory diarrhea as aside effect
Other side effects are because of the other components in AZO combounds

Sulfasalazine (→ sulfapyridine) has high incidence of side effects , >40% cannot tolerate therapeutic doses:

1. GIT upset, headache, arthralgia, bone marrow suppression & malaise
2. Hypersensitivity(fever, exfoliative dermatitis, pancreatitis, pneumonitis, hemolytic anemia, pericarditis, or hepatitis).
3. Reversible oligospermia ⇒ decrease the number of sperms
4. Impairs folate absorption ⇒ inhibits the conversion of folic acid to folinic acid
   So anemia either microcytic or macrocytic ,iron deficiency may occur
   So in case of using sulfasalazine—>folate supplements is recommended



Other aminosalicylate formulations

Are well tolerated:

Olsalazine may cause secretory diarrhea (10%). Hypersensitivity (rare).

Interstitial nephritis (rare, high doses of ***mesalamine***).

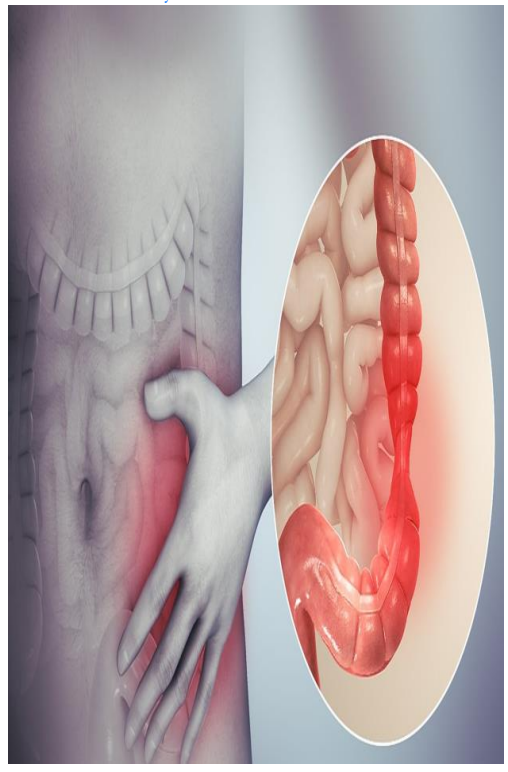
There is no alteration or abnormality neither in mucosa nor mucosa

Irritable bowel syndrome: IBS

Idiopathic chronic, relapsing disorder, characterized **by:**

- مدة مرتبة ٣ شهور حتى نشخصه بالـ irritable bowel disease .
- التشخيص يتم بالـ exclusion لانه الـ symptoms confused with other diseases

There is abnormality in the connection between the GIT&CNS



- Abdominal discomfort (pain, bloating, distention, or cramps).
- Alteration of bowel habits (diarrhea, constipation, or both).

Goal of therapy: Relieving abdominal pain, discomfort with improving bowel function.

Symptoms increased with some types of food such as, spicy food,egg,بقوليات,beans

To decrease the symptoms the patient must have a high fiber diet however he suffers from diarrhea or constipation

A-Predominant diarrhea (Diarrhea-predominant IBS):

Morphine:opioids act in (u' meo' receptor)—>(inhibition of the GIT motility)

- Anti-diarrheal agents, **loperamide.**
- **Alosetron** (5-HT_3 antagonist): for women with severe diarrhea-predominant IBS.
  - 5-HT_3 antagonist.
  - Binds with higher affinity and dissociates more slowly from 5-HT_3 R than other 5-HT_3 antagonists (long duration).
  - **Uses:** Women with sever irritable bowel syndrome with diarrhea.
  - **Dose** : 1mg once or twice daily.

antagonist أنا بيي أقلل ال motality إذا، ع، أستخدم ← 5-HT4 & 5-HT3 بيزودوا ال motality

+may Cause depedency

Side effects of Alosetron:

Rare but serious G.I.T. toxicity may occur:

Constipation (↑30%).

Episodes of ischemic colitis (3 per 1000).Restricted to women with severe diarrhea-predominant IBS.

B-Predominant constipation (Constipation-predominant IBS

- Fiber supplements (however, ↑gas production may exacerbate bloating and abdominal discomfort).
- Osmotic laxatives, ***milk of magnesia.***
- ***Tegaserod*** (partial 5-HT_4 agonist).

Never use stimulant laxative for Predominant constipation patients

For short-term treatment of women withconstipation-predominantt IBS.

C- Chronic abdominal pain:

- Low doses of Tricyclic antidepressants **TCAs** (amitriptyline or desipramine, 10-15mg/d).
- At these doses, these agents have no effect on mood but may alter central processing of visceral afferent information.
- Anti-cholinergic effects → reduce stool frequency & liquidity of stool.
- Alter receptors for enteric neurotransmitters such as serotonin, affecting visceral afferent sensation.

4)Spasmolytics (Antispasmodics):

- **Parasympathetic depressants:**
  - Atropine.
  - Atropine substitutes:

Propantheline.

Hyoscine-N-butyl bromide (Buscopan).

Metixene (Spasmocanulase).

Dicyclomin&hyoscyamine (inhibit M receptors in enteric plexus & on smooth muscle).

Direct spasmVolatile

Volatiles oils.

Khellin.

Papaverine.

Aminophylline.

Nitrites.

Mebeverine (Colspasmin).

لجنة الطب والجراحة

بالتوفيق،بارك الله في وقتكم و إنجازكم وهمتكم🩶