Biomedicine: Human Sciences

Lecture 8:
Digestive System
Part Two
Learning Outcomes

In today’s topic you will learn:

- The signs, symptoms, investigation procedures & some orthodox treatments of digestive system pathologies

What is the difference between a disease and a syndrome?
Oral Thrush

• A fungal infection of the mouth which is not contagious.

• A sign of low immunity.

• Risk of spread (systemic candidiasis)

CAUSES:
• Candida albicans is a fungus seen in cases of compromised immunity (cancer patients, diabetics, HIV/AIDS)

• After broad spectrum antibiotics or immunosuppressant drugs (steroids)

• Nutritional deficiencies (iron, zinc, vit. B_{12}) mouth wash

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Oral Thrush

SIGNS & SYMPTOMS:
• White patches (plaques) on the oral mucosa
• “Cottage cheese” consistency that can be wiped/brushed off
• Red/raw appearance to the underlying tissue (with cracks in corners of mouth and a painful burning sensation)
• Loss of taste or an unpleasant taste

ALLOPATHIC TREATMENT:
• Antifungals (often harmful & toxic)

ALTERNATIVE TREATMENT:
• Hygiene, restoration of mucosal flora

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Mouth Ulcer

• Areas of ulceration within the oral cavity that are generally painful (loss of the mucosal layer)

CAUSES:
• Physical trauma and hot food/liquids
• Nutritional deficiencies: Iron, zinc, folate and vitamin B\textsubscript{12}
• Stress
• GIT pathologies such as Crohn’s disease

TREATMENT:
• Treat the cause. Correct nutritional status, improve immunity, probiotics!
Cold Sores

- A viral infection that lays dormant & activates when immunity is low.

- The virus remains dormant in sensory ganglion (nerves) – often the trigeminal nerve.

- When immunity is low, the virus migrates along the nerve to the skin or mucosa around the mouth – causing tingling/burning sensation

CAUSES:

- Herpes simplex virus

- Triggers include stress, steroid use, trauma, local infections, sunlight exposure
Cold Sores

SIGNS & SYMPTOMS:
• Tingling, itching, burning sensation around the mouth

• Small fluid-filled sores then appear most commonly on the lower lip.

ALLOPATHIC TREATMENT:
• Antiviral creams (acyclovir)

ALTERNATIVE TREATMENT:
• Usually clear up themselves within 7 to 10 days. Antivirals: Lemon balm, Black elderberry, silver, propolis, L-lysine, immune support: vitamin C, zinc, Echinacea. Homeopathy & herbs.
Abscess

• A localised pocket of pus surrounded by inflammation (can occur anywhere in the body)

• A defensive reaction of the tissue to prevent spread of infection elsewhere

SIGN & SYMPTOMS:
• Pain, redness, swelling in the affected area
• Fever, malaise

ALLOPATHIC TREATMENT:
• Antibiotics (side effects!) & drainage of abscess

ALTERNATIVE TREATMENT:
• Depends on the location: gargles in the mouth, herbs: liquorice, golden seal, nutrients: zinc, vitamin C, immune support with herbs, homeopathy. Silver.

A bacterial infection Commonly affecting the oral cavity and intestines
Gingivitis & Periodontal Disease

• Gingivitis is a bacterial infection of the gums.

• If left untreated may progress to periodontal disease (pathology of the bone around teeth)

SYMPTOMS:
• Bleeding gums, receding gums

CAUSES:
• Plaque build up, poor dental hygiene, dental amalgams
• Long term steroid medication use
• Diabetes
• Smokers
• Poor nutrition

gingiva = gums
-itis = inflamed
peri- = outside
dental = teeth
Angular chielitis

- Fissuring and dry scaling of the surface of the lips and angles of the mouth.
- Commonly seen in elderly where it is predisposed in changes to facial muscles (sagging)
- Also seen in immuno-compromised individuals.

CAUSES:
- **Vitamin B deficiencies**: Riboflavin ($B_2$) & folic acid ($B_9$)
- **Iron deficiency**
- Candida albicans and staphylococcus

TREATMENT:
- Treat cause: correct nutritional status, improve immunity.
Xerostomia

• Dry mouth due to reduced or absent flow of saliva.
• A common complaint in the elderly (20%).

SIGNS & SYMPTOMS:
• Dry mouth, burning sensation and halitosis (bad breath)
• Speech & swallowing interference, difficulty wearing dentures
• Oral candidiasis

CAUSES:
• Drugs (antidepressants), radiotherapy, sjogren’s syndrome (autoimmune attack on exocrine glands), stress, anxiety, dehydration, renal failure, menopause, alcohol, smoking

Why might xerostomia cause oral candida infection?
# Cleft lip/palate

<table>
<thead>
<tr>
<th>Cleft lip</th>
<th>Cleft palate</th>
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<tbody>
<tr>
<td>Malformation of the lip in embryonic development.</td>
<td>Malformation of the hard palate in embryonic development</td>
</tr>
<tr>
<td>Can be unilateral or bilateral, complete or incomplete.</td>
<td>Caused difficulty in <strong>speech, feeding and hearing</strong>.</td>
</tr>
<tr>
<td><strong>Causes:</strong> Genetic defects, environmental (maternal disease, dietary factors). Teratogens (chemotherapy, radiation, alcohol, excess vitamin A, anticonvulsant medications, smoking, substance abuse).</td>
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**Teratogen =** Something causing embryo malformation
Oral cancer

- Carcinoma of the oral mucosa, lip or tongue
- Accounts for 1 in 50 of all cancer cases.

CAUSES:
- Smoking (including pipes, chewing tobacco)
- Alcohol, HPV infection.

SIGNS & SYMPTOMS:
- Red or white patches on oral mucosa or tongue
- Difficulty eating and breathing

ALLOPATHIC TREATMENT:
- Surgery, chemotherapy, radiotherapy (*side effects!*)

SUPPORT: Herbs, nutritional supplements – diet is essential (plant based & antioxidants), alkalising the body. Homeopathy.
Salivary calculi

- Metabolic imbalance affecting mineral concentration resulting in stone formation in one of the salivary glands

- Calculi can abrade the gland wall causing inflammation and fibrosis

- Can cause a blockage of salivary duct

CAUSES:
- **Dehydration.** Abnormalities in calcium metabolism.
- **Sjogren’s syndrome, chronic salivary duct infections**

SIGNS & SYMPTOMS:
- **Intermittent pain and swelling of the affected gland** particularly when salivary flow is stimulated “mealtime syndrome”.
- May be a palpable mass.
Mumps

- Infection & swelling of the parotid glands

**SIGNS & SYMPTOMS:**
- **Fever (low grade),** myalgia, malaise, headaches, joint pains may develop a few days before swelling
- **Uni/bilateral swellings at the side of the face** under the ears, giving a "hamster cheeks"
- Pain on swallowing and swollen lymph nodes

**TREATMENT:**
- Bed rest, keep hydrated, antiviral, immune herbs, nutritional supplements (Melissa, St John’s Wort, lysine, vit. C, zinc).

Mumps can cause sterility, viral meningitis, encephalitis, and deafness
Tonsillitis

• Inflammation of the tonsils.
• Common in children, although can affect adults.

SIGNS & SYMPTOMS:
• Red, sore & painful tonsils, pus, fever over 38°C, coughing, headache.

COMPLICATIONS:
• Most cases resolve within a week, but can cause middle ear infections (otitis media) and an abscess.

TREATMENT:
• Rest & hydration, antibiotics (side effects!)
• Tonsillectomy if repeated infections.
• Alternative: Herbs (antimicrobial), gargles, homeopathy, nutritional, acupuncture. Colloidal silver.

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Gastro-oesophageal reflux disease

- The lower oesophageal sphincter relaxes and acid refluxes from the stomach into the oesophagus

SIGNS & SYMPTOMS:
- Retrosternal pain “heartburn” – aggravated by bending, laying down
- Belching

CAUSES:
- Lower oesophageal sphincter dysfunction
- Obesity
- Hiatus hernia (stomach pushed into thoracic cavity)
- Pregnancy (high intra abdominal pressure)
- Trigger foods - spicy, fatty foods, alcohol, caffeine, carbonated beverages, onions, chocolate.
- Stress: (swallowing air)
Gastro-oesophageal reflux disease

COMPLICATIONS:
• Damage to oesophageal mucosa increasing the risk of ulcers, Barrett’s oesophagus and cancer.

DIFFERENTIAL DIAGNOSIS:
• Angina, Myocardial infarction, H.Pylori.

ALLOPATHIC TREATMENT:
• Antacids (some contain aluminium – a toxic metal). Side effects: Diarrhoea, constipation, nausea, anaemia, low immunity.

ALTERNATIVE TREATMENT:
• Treat the cause. Baking soda (no aluminium) – one teaspoon in glass of water per day.
• Eating smaller but more frequent meals.
• Diet: Avoid spicy & fatty foods, coffee (caffeine), dairy products, sweets/chocolate, starchy & citrus foods. Better foods include steamed vegetables, salads, herbal teas, water.
• Aloe vera, slippery elm after meals. Homeopathy and herbs. Weight loss.
Hiatus Hernia

• Part of the stomach protrudes (herniates) into the thoracic cavity through an opening in the diaphragm.

• Estimated to affect 1/3 of people over 50

SIGNS & SYMPTOMS:
• Often asymptomatic or GORD

CAUSES:
• Increased abdominal pressure: Heavy lifting, hard coughing/sneezing, pregnancy, childbirth, violent vomiting, straining with constipation, obesity, heredity, smoking, drug abuse, stress.
Hiatus Hernia

COMPLICATIONS:
• Can cause gastro-oesophageal reflux disease (GORD)

TREATMENT:
• Treat the cause

• Eating smaller, more frequent meals, avoiding foods & drinks that exacerbate symptoms.

• Avoiding lying down for three hours after eating
Oesophageal Cancer

• A Common aggressive tumour, more common in men
• Poor prognosis

SIGNS & SYMPTOMS:
• Few early symptoms, later obstruction may occur
• Dysphagia (red flag)
• Anorexia

CAUSES & RISK FACTORS:
• Chronic irritation, alcohol, smoking
• GORD & Barrett’s oesophagus.
• Obesity, low fruit & veg diet, age

TREATMENT:
• Herbs, nutritional supplements – antioxidants, diet is essential (plant based diet rich in nutrients & antioxidants), alkalising the body.

Dysphagia = Difficulty swallowing

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Acute gastritis

- Acute inflammation of the stomach mucosa causing breakdown of the stomach lining.

- Insufficient mucous production (due to reduction of prostaglandin synthesis), which protects mucosa from erosion.

- Acute inflammation characterised by neutrophil infiltrate.

CAUSES:
- *H. Pylori*
- NSAIDs (lower prostaglandin levels)
- Alcohol, food poisoning, stress
Acute gastritis

SIGNS & SYMPTOMS:
• Epigastric pain usually worse with food intake
• Nausea/vomiting, loss of appetite

COMPLICATIONS:
• Bleeding and anaemia

TREATMENT:
• Treat cause.
Chronic gastritis

- Chronic stomach mucosal inflammation for more than 4-6 weeks
- Lymphocytes and macrophages in lamina propria
- Prolonged low grade inflammation resulting in fibrosis and hence loss of elasticity and peristalsis.
- May be associated with ulcers

**CAUSES:** (ABC)
1. Autoimmune
2. Bacterial (*H.pylori*)
3. Chronic irritation (eg. Long term NSAIDs)
Chronic gastritis

SIGNS & SYMPTOMS:
• Few symptoms: Epigastric discomfort, feeling full and discomfort with heavy meals
• Nausea and poor appetite

COMPLICATIONS:
• Anaemia: Megaloblastic, iron, pernicious
• Gastric carcinoma

TREATMENT:
• Treat underlying cause: support immunity, herbs such as slippery elm & aloe vera, antimicrobial herbs (if infection), avoid irritants.
Chronic gastritis:

The image illustrates significant infiltration of inflammatory cells in chronic gastritis and ulceration of the mucosa.
Peptic ulcer

• Ulcer of the GI mucosa (stomach, duodenum)

• Tissue erosion can be superficial or penetrate down to the submucosa or muscularis

• Commonly affects the proximal duodenum and lesser curvature of the stomach

SIGNS & SYMPTOMS:
• Gastric: **epigastric pain, 30-60 mins after eating**, less often at night.

• Duodenal: **epigastric pain 2-3 hours after eating** and at night

• Pain mostly when stomach is empty.

• **Burping, nausea, reaction to irritating food** (alcohol, coffee, sweet, spicy food, garlic, onions, fatty/fried food, citrus, fizzy drinks etc.)
Peptic ulcer

CAUSES:
- Chronic gastritis
- Helicobacter pylori (80%)
- NSAIDs (10%) – disrupts mucous barrier, reduces stomach bicarbonate, disrupts blood flow
- Stress (SNS dominance) can often cause ischaemia (resulting in defective tissue repair)
- Smoking.

SNS = sympathetic nervous system

TREATMENT:

H.pylori = strain of bacteria

Can cause bleeding, anaemia and perforation
Dumping syndrome

- Loss of control of gastric emptying
- Duodenum is filled with undigested food
- Water drawn out from surrounding vessels causing sudden and urgent diarrhoea
- Presence of carbohydrates → elevated serum glucose → excessive insulin release from the pancreas = reactive hypoglycemia (2-3 hrs later).

CAUSES:
- Bariatric surgery (vagus nerve damage).
  Cholecystectomy, gastric bypass, gastrectomy etc.

Insulin = a hormone that lowers blood glucose levels. Secreted by the pancreas.
Dumping syndrome

SIGNS & SYMPTOMS:
• **Early dumping** (straight after meal): nausea, vomiting, bloating, cramping, diarrhoea, dizziness and fatigue.

• **Late dumping** (1-3 hours after meal): weakness, sweating and dizziness.

TREATMENT:
• Avoid refined carbs/sugar, separate fluids from meals, smaller more frequent meals, supplement dietary fibre (blood glucose control)
Gastric cancer

• 2nd cause of cancer related death in the world (high in Asia – diet)

• 50% - pylorus & 25% - lesser curvature

CAUSES / RISK FACTORS:
• Male, smoking, age (55yrs+)
• H. pylori infection
• Diet rich in salted, pickled and smoked foods (N-nitroso compounds)
• Low fruit and vegetable diet

DIAGNOSIS:
• Blood in stool, tumour marker (M2-PK in stool), endocopy, biopsy
Gastric cancer

SIGNS & SYMPTOMS: (Can be difficult to recognise)
• Early stages: persistent indigestion, frequent burping, heartburn, feeling full quickly when eating, bloated, gastric pain

• Advanced stages: black blood in the stools, loss of appetite, weight loss, tiredness, anaemia, jaundice.

TREATMENT APPROACHES:
• Allopathic: Gastrectomy
• Natural: Herbs, nutritional supplements – antioxidants, diet is essential for all forms of cancer (plant based diet rich in nutrients & antioxidants), alkalising the body. Homeopathy & acupuncture.

COMPLICATIONS:
• Secondary cancers - lymphatic, blood, peritoneal.
Summary Quiz!

1) What is meant by acute gastritis?
2) What are common causes of hiatus hernia?
3) List causes of dumping syndrome. Explain why patient with dumping syndrome becomes hypoglycaemic.
4) What type of organism is present in oral thrush?
5) Name two organs prone to ulceration
6) What is the major red flag symptom suggestive of oesophageal cancer?
7) What are the risk factors for gastric cancer?
8) What can trigger Gastro-oesophageal reflux disease (GORD)? What is a complication of GORD?
9) What are the symptoms of a peptic ulcer?
10) State a complication of chronic gastritis.
Appendicitis

• Inflammation of the appendix.

• The appendix becomes obstructed, usually by faecal matter.

SIGNS & SYMPTOMS:
• Initially umbilical pain that may come and go

• Within hours the pain travels to the right iliac fossa, becoming constant and severe.

• Rebound tenderness at McBurney’s Point and local muscle guarding

• Pallor, sweating & fever, nausea, vomiting & diarrhea

• May have tachycardia, hypotension and septic shock

appendi- = appendix
-itis = inflamed
Appendicitis

**DIAGNOSIS:**
- CT scan. high ESR, hypotension

**TREATMENT:**
- Surgery (appendectomy) & antibiotics are usually required.
- The most common surgical emergency

**COMPLICATIONS:**
- **Rupture:** if pain subsides it usually indicates a rupture.
- **Peritonitis:** release of fecal matter can result in infection which spreads to peritoneum. Pain recurs.
Dysentery

• Dysentery is an infection of the intestines that causes diarrhoea containing blood or mucus.

• It is a **notifiable disease** (required by law to be reported to government authorities)

• More prevalent in developing countries/poor sanitation - travellers

**CAUSES:**
• **Bacterial** *(Shigella)* or **amoebic** via fecal-oral contamination
Dysentery

SIGNS & SYMPTOMS:
• Diarrhoea (watery stools) with mucus and blood
• Cramping and possible nausea/vomiting

DIAGNOSIS:
• Stool microscopy

TREATMENT:
• Anti-parasitic/anti-bacterial.
• Rehydration: fluid & mineral replacement
• Herbs: antimicrobial & immune, probiotics
• Colonic irrigation (to help rid of amoebic cysts).

COMPLICATIONS:
• Dehydration - dangerous in small children, infants, pregnancy & elderly
• Can enter the blood and cause liver and liver abscesses
Inflammatory Bowel Disease

• A term mainly used to describe two chronic inflammatory bowel diseases: ulcerative colitis & Crohn's disease.

Ulcerative colitis:
• Restricted to the colon.
• Small ulcers develop on the colon lining which can become inflamed & infected producing blood & pus

Crohn's disease:
• Affects the entire GIT from the mouth to the anus.
• Most common in the terminal ileum
• Transmural inflammation

Transmural = through entire wall of organ
Inflammatory Bowel Disease

SIGNS & SYMPTOMS:
• Symptoms of Ulcerative Colitis and Crohn’s disease are similar characterised by sporadic flare-ups that may vary in intensity:

• Rectal bleeding
• Abdominal pain / cramps
• Diarrhoea (with blood, mucus)
• Fever and fatigue
• Anaemia
• Nausea / vomiting
• Delayed puberty or growth failure
• Weight loss / inability to maintain weight
• Indigestion, feel “blocked”
**Inflammatory Bowel Disease**

**CAUSES:**
- Suspected **autoimmune**, **dietary** and **genetic** link.
- Environmental triggers (eg. Antibiotics, infection) with defective immune suppression.

[Diagram: Pathogenesis of IBD]

- Normal Gut
- Environmental trigger (Infection, NSAID, other)
- Tolerance-controlled inflammation
- Acute inflammation
  - Immunoregulation, failure of repair or bacterial clearance
  - Chronic Inflammation
- Complete Healing
- Tolerance


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Inflammatory Bowel Disease

DIAGNOSIS:
• Blood tests (inflammatory markers) & stool sample
• X-ray
• Colonoscopy (& biopsy), sigmoidoscopy

ALLOPATHIC TREATMENT:
• Anti-inflammatories (steroids – often for long periods so significant side effects)
• Surgery (ie. Resection)

ALTERNATIVE TREATMENT:
• Allergy elimination diet, high fibre diet, herbs (anti-inflammatory, immunomodulation), highly nutritious and anti-inflammatory diet, probiotics, vitamins A, D, E, C, zinc. Homeopathy & acupuncture
Inflammatory Bowel Disease

COMPLICATIONS:

• **Malnutrition** (failure to thrive, growth, osteoporosis etc)

• **Strictures** (obstruction)

• **Fistulas / fissures**

• **Abcesses** (pus)

• **Toxic megacolon** (non obstructive colon dilation with systemic toxicity)

• **Malignancy** (↑ risk colon cancer)
# Crohn’s vs. Ulcerative Colitis

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<tr>
<th></th>
<th>Crohn’s disease</th>
<th>Ulcerative colitis</th>
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<tbody>
<tr>
<td><strong>Region affected</strong></td>
<td>Any part of the GIT but mostly the terminal ileum</td>
<td>Colon and rectum</td>
</tr>
<tr>
<td><strong>Pattern of progression</strong></td>
<td>Skip lesions</td>
<td>Proximally continuous</td>
</tr>
<tr>
<td><strong>Layers affected</strong></td>
<td>All layers (transmural)</td>
<td>Mucosa only (‘ulcers’)</td>
</tr>
<tr>
<td><strong>Key symptoms</strong></td>
<td>Crampy abdominal pain (right) Loose semi solid stools</td>
<td>Abdominal pain (left) Bloody diarrhoea</td>
</tr>
<tr>
<td><strong>Complications</strong></td>
<td>Fistulas, abscess, obstruction, malabsorption</td>
<td>Haemorrhage</td>
</tr>
<tr>
<td><strong>Granulomas</strong></td>
<td>Common</td>
<td>Absent</td>
</tr>
<tr>
<td><strong>Bowel wall appearance</strong></td>
<td>Cobblestone appearance</td>
<td>Thin wall</td>
</tr>
</tbody>
</table>

Video: Crohn’s disease colonoscopy: [www.youtube.com/watch?v=l94f-6b8IZ4](www.youtube.com/watch?v=l94f-6b8IZ4)
Irritable Bowel Syndrome

- A functional GI disorder characterised by lower abdominal pain or discomfort and altered bowel habits
- Absence of organic pathology: inflammation or specific tissue damage
- Diagnosed according to ROME criteria: 3 months history of symptoms

SIGNS & SYMPTOMS:
- Abdominal pain & cramping relieved by passing a stool
- Diarrhoea, constipation or alternative between both
- Bloating, painful flatulence, post-prandial urgency
- Incomplete emptying of bowels and mucus in the stools

Weight loss, anorexia, fever, rectal bleeding are not associated with IBS
Irritable Bowel Syndrome

CAUSES & TRIGGERS:
• **Stress/emotional factors**: central nervous system (CNS) alterations in GI secretions, motility and pain sensitivity
• Increased sensitivity of the gut and problems digesting food
• **GIT infection** (post-infection symptoms remain)
• Food allergy or intolerance
• **Altered microbiome**, excessive antibiotic use

TREATMENT:
• Antispasmodics. **Diet**: FODMAPs, non-refined foods, avoid dairy & aggravating foods, probiotics, fibre, peppermint, manage stress, slippery elm

http://www.empowher.com/condition/irritable-bowel-syndrome/symptoms
Coeliac disease

- A common autoimmune condition where the body's immune system attacks its own mucosa tissue in the small intestine in response to ingestion of gluten.

- It affects 1 in 100 people affected in the UK, all ethnic groups. However only 10-20% are diagnosed.

- It effects those genetic susceptible: HLA-DQ2 and DQ8

- Gluten is a protein found in wheat, rye, spelt, barley, oats.

- Gluten is made up of two types of protein molecules: Gliadins & Glutenins
Coeliac disease

PATHOPHYSIOLOGY:

• Gliadin is modified by tissue transglutaminase (tTG), an enzyme found in the mucosa of the small intestine.

• *This modification is suggested to allow the protein to be more efficiently presented to the immune system.*

• In Coeliac’s the immune system mistakenly identifies parts of gliadin & glutenin as foreign.

• Immune system produces antibodies and an inflammatory / immune reaction which strips the microvilli & villi, causing atrophy.

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Coeliac disease

These images demonstrate the atrophy of villi that occurs in coeliac disease.
Coeliac disease

Coeliac has a spectrum of symptoms ranging from mild to severe:

**Classic GI Signs & Symptoms:**
- Chronic diarrhoea (or constipation)
- Bulky, pale, foul smelling stools
- Steatorrhoea (fatty stools)
- Bloating
- Flatulence
- Abdominal pain,
- Loss of appetite
- Weight loss
- Lactose intolerance (loss of brush border enzymes)

**Atypical extra-intestinal symptoms:**
- Lethargy, fatigue (iron deficiency anaemia) and irritability
- Children not growing at the expected rate
- Mouth ulcers and dental enamel defects
- Neurological problems (anxiety, depression)
- Dermatitis herpetiformis
- Muscle/joint pain
- Osteopenia/osteoporosis
- Infertility
Coeliac disease

DIAGNOSIS:
• Blood test - **anti-transglutaminase antibodies (IgA TTG)**
• Stool test, endoscopy
• **Biopsy** of the small intestinal mucosa is required for a definite **diagnosis**

TREATMENT:
• **Gluten free diet** – avoiding wheat (including spelt & kamut), barley, rye & oats (some can tolerate oats)

COMPLICATIONS:
• **Osteoporosis, anaemia** (iron / folate / B\textsubscript{12}),
• Low-birth weight baby
• Bowel cancer.
A prospective, double-blind, placebo-controlled trial to establish a safe gluten threshold for patients with celiac disease

Carlo Catassi, Elisabetta Fabiani, Giuseppe Iacono, Cinzia D'Agate, Ruggiero Francavilla, Federico Biagi, Umberto Volta, Salvatore Accomando, Antonio Picarelli, Italo De Vitis, Giovanna Pianelli, Rosaria Gesuita, Flavia Carle, Alessandra Mandolesi, Italo Bearzi, and Alessio Fasano

ABSTRACT
Background: Treatment of celiac disease (CD) is based on the avoidance of gluten-containing food. However, it is not known whether trace amounts of gluten are harmful to treated patients.

Objective: The objective was to establish the safety threshold of prolonged exposure to trace amounts of gluten (ie, contaminating gluten).

Design: This was a multicenter, double-blind, placebo-controlled, randomized trial in 49 adults with biopsy-proven CD who were being treated with a gluten-free diet (GFD) for ≥2 y. The background daily gluten intake was maintained at <5mg. After a baseline evaluation (t0), patients were assigned to ingest daily for 90 d a capsule containing 0, 10, or 50 mg gluten. Clinical, serologic, and histologic evaluations of the small intestine were performed at t0 and after the gluten microchallenge (t1).

Results: At t0, the median villous height/crypt depth (Vh/Cd) in the small-intestinal mucosa was significantly lower and the intraepithelial lymphocyte (IEL) count (%100 enterocytes) significantly higher in the CD patients (Vh/Cd: 2.20; 95% CI: 2.11, 2.39; IEL: 27; 95% CI: 23, 34) than in 20 non-CD control subjects (Vh/Cd: 2.87; 95% CI: 2.50, 3.09; IEL: 22; 95% CI: 18, 24). One patient (challenged with 10 mg gluten) developed clinical relapse. At t1, the percentage change in Vh/Cd was 9% (95% CI: 3%, 13%) in the placebo group (n = 13), −1% (−18%, 68%) in the 10-mg group (n = 13), and −20% (−23%, −13%) in the 50-mg group (n = 13). No significant differences in the IEL count were found between the 3 groups.


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**Diverticulosis / Diverticulitis**

**Diverticulosis:**
- The presence of pea-sized pouches (diverticula), caused by herniation's of mucosa bulging out through the colon wall
- Usually due to constipation.
- Most diverticula are asymptomatic

**Diverticulitis**
- Faeces and food trapped in the pea-sized colon pouches and they become infected, inflamed (and bleed)
- More common >50 years
- 15 to 25% of people with diverticulosis develop diverticulitis
SIGNS & SYMPTOMS:
• Bloating, abdominal pain & diarrhoea, fever, chills

CAUSES:
• Low fibre diet (slow GI transit) → straining
  → high intra-abdominal pressure
• Weak connective tissue.

COMPLICATIONS:
• Diverticulosis can develop into diverticulitis
• Rupture – leaking into the peritoneum

TREATMENT APPROACHES:
• Allopathic: Antibiotics & surgery may be recommended with diverticulitis.
• Diet: high fibre, avoid small seeds, herbs: demulcent, anti-inflammatory e.g. slippery elm,
An internal part of the body pushes through a weakness in the muscle or surrounding tissue wall.

**Inguinal hernia:**
- A common type mostly affecting men
- Appears as a swelling or **lump in the groin** (inguinal canal)
- Often appear after straining – lifting, constipation, heavy coughing (↑**Intra abdominal pressure**)

**Hiatus hernia**
- Portion of the **stomach protrudes into the thoracic cavity** through an opening in the diaphragm called the hiatus.
- Rarely has any noticeable symptoms, but can cause GORD

**Incisional hernia**
- Occurs at the site of a previous incision in the abdominal wall
Hernia

SIGNS & SYMPTOMS:

- **Swelling or lump in the groin** (abdominal region)
- Pain may be noticeable with strain and **disappears when lying down**
- If strangulation occurs (loss of blood supply or bowel obstruction) there may be necrosis.

TREATMENT:

- If no strangulation occurs, they often resolve within a few years
- Surgery
Colonic Polyps

• Benign epithelial growths of colonic mucosa

SIGN & SYMPTOMS:
• Usually asymptomatic, occult blood in the stool.

DIAGNOSIS:
• Colonoscopy.

COMPLICATIONS:
• May become malignant. (<1% become malignant)

TREATMENT:
• Allopathic: Surgery.
• Alternative: Herbs & homeopathy
Colorectal Cancer

• Malignant tumour that is locally invasive

• May spread (metastasise) before growth produces symptoms (liver, lungs, brain, bone)

SIGNS & SYMPTOMS:
• Initially few symptoms.
• Later: blood, potential obstruction or metastases

CAUSES:
• Strong link with a diet high in meat, low in fibre, lack of Vitamin D.

INVESTIGATIONS:
• Carcinoembryonic antigen (CEA) & MP2K stool
Major Dietary Patterns and the Risk of Colorectal Cancer in Women

Teresa Fung, ScD; Frank B. Hu, PhD; Meir J. Stampfer, DrPH

RESULTS The prudent pattern was characterized by higher intakes of fruits, vegetables, legumes, fish, poultry, and whole grains, while the Western pattern, by higher intakes of red and processed meats, sweets and desserts, french fries, and refined grains. During 12 years of follow-up, we identified 445 cases of colon cancer and 101 cases of rectal cancer. After adjusting for potential confounders, we observed a relative risk for colon cancer of 1.46 (95% confidence interval, 0.97-2.19) when comparing the highest with the lowest quintiles of the Western pattern (P value for trend across quintiles, .02). The prudent pattern had a nonsignificant inverse association with colon cancer (relative risk for fifth quintile compared with the first, 0.71; 95% confidence interval, 0.50-1.00; P for trend across quintiles, .31). We did not observe any significant association between dietary patterns and rectal cancer.

CONCLUSION We found a significant positive association between the Western dietary pattern and the risk of colon cancer.

BACKGROUND Several foods and nutrients have been implicated in the development of colon and rectal cancers. In this study, we prospectively assessed the associations between major dietary patterns and the risks of these 2 cancers in women.

METHODS Using dietary information collected in 1984, 1986, 1990, and 1994 from 76,402 women aged 38 to 63 years without a history of cancer in 1984, we conducted factor analysis and identified 2 major dietary patterns: "prudent" and "Western." We calculated factor scores for each participant and examined prospectively the associations between dietary patterns and colon and rectal cancer risks.
Association of Dietary Patterns With Cancer Recurrence and Survival in Patients With Stage III Colon Cancer

Jeffrey A. Meyerhardt, MD, MPH; Donna Niedzwiecki, PhD; Donna Hollis, MS; Leonard B. Saltz, MD; Frank B. Hu, MD, PhD; Robert J. Mayer, MD; Heidt Nelson, MD; Bernard Whitton, MD; FRCP; Alexander Hantel, MD; James

Results During a median follow-up of 5.3 years for the overall cohort, 324 patients had cancer recurrence, 223 patients died with cancer recurrence, and 28 died without documented cancer recurrence. A higher intake of a Western dietary pattern after cancer diagnosis was associated with a significantly worse disease-free survival (colon cancer recurrences or death). Compared with patients in the lowest quintile of Western dietary pattern, those in the highest quintile experienced an adjusted hazard ratio (AHR) for disease-free survival of 3.25 (95% confidence interval [CI], 2.04-5.19; P for trend <.001). The Western dietary pattern was associated with a similar detriment in recurrence-free survival (AHR, 2.85; 95% CI, 1.75-4.63) and overall survival (AHR, 2.32; 95% CI, 1.36-3.96), comparing highest to lowest quintiles (both with P for trend <.001). The reduction in disease-free survival with a Western dietary pattern was not significantly modified by sex, age, nodal stage, body mass index, physical activity level, baseline performance status, or treatment group. In contrast, the prudent dietary pattern was not significantly associated with cancer recurrence or mortality.

Conclusions Higher intake of a Western dietary pattern may be associated with a higher risk of recurrence and mortality among patients with stage III colon cancer treated with surgery and adjuvant chemotherapy. Further studies are needed to delineate which components of such a diet show the strongest association.

Acute Pancreatitis

• Acute inflammation of the pancreas, a medical emergency

• Enzymes (proteases) are activated whilst still inside the pancreas leading to self digestion of pancreatic tissue.

SIGN & SYMPTOMS:
• Sudden extreme periumbilical pain, nausea, vomiting, diarrhoea, fever.
• Mild cases improve within a week

CAUSES:
• Alcohol abuse, gall stones, cancer, injury

DIAGNOSIS:
• Serum amylase 3 x normal level; ↑ blood glucose

peri = around
umbilical = umbilicus
Chronic Pancreatitis

- **Chronic inflammation of the pancreas**
- Leading to permanent tissue changes (fibrosis & cysts) and obstruction of the common bile duct with calcified secretions

**SIGNS & SYMPTOMS:**
- Repeated episodes of abdominal pain which can be severe
- Fatty foul-smelling stools.

**CAUSES:**
- 60% **Long-term alcohol abuse**, autoimmune pancreatitis, pancreatic duct obstruction, complication of cystic fibrosis, idiopathic

**COMPLICATIONS:**
- **Diabetes**, pancreatic cancer, weight loss and malnutrition (malabsorption)

**SUPPORT:** Dietary changes: easily digestible, anti-inflammatory & low fat, digestive enzymes, avoid smoking, avoid alcohol. Herbs, homeopathy & acupuncture.
Pancreatic Cancer

- Common in older people, uncommon in people under 40 years
- Most arise from the exocrine cells
- Less commonly from endocrine Islet cells (Pancreatic neuroendocrine tumour)
- Approx. 60% metastatic at diagnosis

CAUSES:
- Cause is unknown, but risks include: age, smoking, family history (germ line defects in 5-10%)
- Other health conditions (diabetes, chronic pancreatitis, H. pylori).
Pancreatic Cancer

SIGNS & SYMPTOMS:
• Asymptomatic (early)
• **Epigastric pain** radiating to the back of the abdomen
• Unexplained **weight loss**, anorexia and fatigue
• **Jaundice**
• Post-prandial nausea
• Glucose intolerance, hyperinsulinemia and severe hypoglycemia symptoms (with neuroendocrine tumours)

ALLOPATHIC TREATMENT:
• Surgery, chemotherapy, radiotherapy (*side effects!*)

SUPPORT:
• Herbs, nutritional supplements –diet is essential for all forms of cancer (primarily plant based diet rich in nutrients & antioxidants), alkalising the body. Herbs, homeopathy & acupuncture.
Summary Questions

1) Name two types/locations of hernia
2) Where does Crohn’s disease and Ulcerative colitis tend to cause disease in the GIT?
3) What are the symptoms and prognosis of pancreatic cancer?
4) What is the most common cause of chronic pancreatitis?
5) Are polyps benign or malignant?
6) What are the main causes of dysentery?
7) “Pea-sized pouches, caused by herniation's of mucosa bulging out through the colon wall” is describing what condition?
8) What are the symptoms of appendicitis?
Liver Cirrhosis

- Irreversible scarring of liver tissue due to long-term damage

- Conversion of normal hepatocytes with fibrotic non-functional tissue.

- Scar tissue disrupts hepatic blood and bile flow. Can lead to portal hypertension

- “Liver failure” = 80-90% destruction of functional liver tissue

CAUSES:
- Alcoholic liver disease, long-term exposure to toxins, hepatitis B/C, bile obstruction, autoimmune liver disease
Liver Cirrhosis

Impaired liver function results in:

- Reduced ability to synthesise substances (i.e. clotting factors)
- Decreased removal & conjugation of bilirubin
- Impaired nutrient absorption
- Impaired glucose metabolism
- Decreased inactivation of hormones
- Decreased removal of toxic substances

conjugation = to pair with other substances

Fatty liver nodules
Liver Cirrhosis

SIGNS & SYMPTOMS:
• Initially asymptomatic, then the following develops:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaundice</td>
<td>Impaired conjugation of bilirubin &gt; bile flow &amp; production</td>
</tr>
<tr>
<td>Fatigue, loss of appetite, nausea</td>
<td>Decreased gluconeogenesis, bile (digestion)</td>
</tr>
<tr>
<td>Itchy skin</td>
<td>Bile salts back up into blood/tissues</td>
</tr>
<tr>
<td>Anaemia</td>
<td>Iron storage</td>
</tr>
<tr>
<td>Oesophageal varices &amp; splenomegaly</td>
<td>Portal vein hypertension</td>
</tr>
<tr>
<td>Hormone imbalance/gynecomastia</td>
<td>Impaired inactivation of sex hormones</td>
</tr>
<tr>
<td>Ascites &amp; peripheral oedema</td>
<td>Portal hypertension causing shift of fluid, lymph obstruction</td>
</tr>
<tr>
<td>Vomiting blood, dark tarry stools</td>
<td>Oesophageal varices, occult blood</td>
</tr>
</tbody>
</table>

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Liver Cirrhosis

INVESTIGATIONS:
• Blood tests (liver enzymes: GPT, GOT, GGT)
• Ultrasound, biopsy.

ALLOPATHIC TREATMENT:
• Liver transplant.

SUPPORT:
• Diet: highly nutritious (malnutrition is common) alkalising, primarily plant based diet rich in nutrients & antioxidants, low salt (reduce oedema), avoid toxins (including alcohol & caffeine), lose weight, exercise, good hygiene. Homeopathy, herbs and acupuncture.
Liver Cancer

- Uncommon but a serious type of cancer.
- **Primary or secondary** (*spread from another tissue*)
- Usually present with cirrhosis

**SIGNS & SYMPTOMS:**
- In the advanced stages: Jaundice, ascites, hepatomegaly
- Weight loss, vomiting, loss of appetite, feeling very full after eating, feeling sick, pain or swelling in the abdomen, itchy skin, fatigue & weakness.

hepato- = liver
-megaly = enlargement
Ascites = fluid in peritoneum
Liver Cancer

CAUSES:
- Associated with liver cirrhosis: alcohol, toxins → Necrosis > chronic inflammation and cell proliferation (turnover)
- Hepatitis B/C → viral integration into host genome (Host DNA deletions; oncogenes activated)

ALLOPATHIC TREATMENT:
- Surgery - transplant

SUPPORT:
Gallstones / Cholelithiasis

- One or more calculi (stones) in the gallbladder
- Usually made of cholesterol (80%)
- In developed countries at least 10–20% of adults and over 20% of people over 65 years old have gallstones.

SIGNS & SYMPTOMS:
- 70% asymptomatic at diagnosis
- Biliary colic (pain radiating under right shoulder, especially at 1-2 am)
- Abdominal pain/shoulder pain, jaundice, fever, bloating, nausea
Gallstones / Cholelithiasis

CAUSES/RISK FACTORS:
- 5F’s (fat, female, forty, fair, fertile)
- Increasing age, pregnancy, obesity, diabetes, hereditary link, women, taking oestrogen or OCP, liver cirrhosis, age, rapid weight loss.

TREATMENT / PREVENTION:
- **Diet**: increase fibre, avoid allergens, vegetarian diet, reduce dietary fats (triglycerides), fish oil, lecithin, peppermint
- **Allopathic**: Surgery.

COMPLICATIONS:
- Acute cholecystitis, jaundice, acute cholangitis, acute pancreatitis, gallbladder cancer

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Enterobiasis (pinworm)

- A Parasitic Helminth infection with a lifespan of approximately 2 months

- Eggs are ingested (faeco-oral) and hatch in the duodenum within 6 hours

- Worms mature in 2 weeks and commonly inhabit the terminal ileum and large intestine.

- Female worms migrates to the rectum and if not expelled, migrate to the anus at night and deposits eggs

- Very common amongst children under age 10 & institutionalised adults, but can affect all people.
Enterobiasis (pinworm)

SIGNS & SYMPTOMS:
• Can be asymptomatic, intense itching around the anus or vagina particularly at night (when female worms are laying eggs)
• Loss of appetite, weight loss, Insomnia, bedwetting.
• Skin infection around the anus

CAUSES:
• Faeco-oral contamination (toys, furniture, food etc.)

TREATMENT:
• Allopathic: Anti-parasitic: 2 doses, 2 weeks apart, as they don’t kill eggs. Whole family may be treated.
• Alternative: Anti-worm herbs, garlic oil, strict hygiene, cleaning the household (toys, furniture etc), wearing cotton gloves while sleeping to prevent scratching.
Cryptosporidium & Giardia

- Waterborne microscopic parasite that live in the intestinal tract of the infected individual.

- **Organisms**: Cryptosporidium & Giardia lamblia: protozoa

- Cause diarrhoeal diseases: cryptosporidiosis & giardiasis.

- Both are protected by an outer shell allowing them to survive outside the body and are very **tolerant to chlorine disinfection**

**CAUSES / RISKS:**
- **Waterborne disease** which can be spread by ingesting contaminated water (faecal matter) in swimming pools, ponds etc.

- Cyst is ingested, attaches the to the intestinal mucosa and multiplies
Cryptosporidium & Giardia

SIGNS & SYMPTOMS:
• Watery diarrhoea, abdominal cramps & pain, fever

• Dehydration, nausea, vomiting, weight loss.

ALLOPATHIC TREATMENT:
• Cryptosporidium is a self-limiting disease, meds - if pregnant or immune-compromised

• Giardia is treated with anti-parasitic drugs

ALTERNATIVE TREATMENT / PREVENTION:
• Herbs: anti-parasitic, garlic, strict hygiene, hydration, electrolytes.
Toxoplasmosis

• **Intracellular protozoan parasite**

• Main host = **cats**. (Can only reproduce in the gut of a cat)

• 10-20% of UK population estimated to carry the parasite as **cysts**

• Many **carriers are asymptomatic** (immune system contains the illness).

• Significant health risks during pregnancy; infection of the foetus

• A self-limiting disease that only requires treatment if pregnant or immunocompromised
Toxoplasmosis

CAUSES/RISKS:
- Eating under cooked meats, poor food hygiene
- Handling cat litter trays
- (Rarely) blood transfusion, organ transplant
- Immunocompromised

SIGNS & SYMPTOMS: (Often asymptomatic)
- Mild flu-like symptoms (weeks – months): tender lymph nodes, fever, muscle aches, lethargy.
- Miscarriage, stillborn child
- Can cause encephalitis. Also linked with schizophrenia.

ALTERNATIVE TREATMENT/PREVENTION:
- Herbs: anti-parasitic, garlic, strict hygiene, hydration, electrolytes.

Encephalitis = inflammation of brain tissue
Case Study: Crohn’s Disease

- Male, Civil Engineer, 33 years old. **Diagnosed** with Crohn’s Disease, aged 24.

- **Medical Interventions:** Partial ileostomy aged 31. Infliximab previous 12 months. Methotrexate for 3 months for 3 months recently. Discontinued.

- **Presenting Symptoms:** No blood in stools for almost a year, but symptoms returned over last 3 months. Methotrexate seemed to help initially but unbearable nausea and loss of appetite resulted in 10kg weight loss in 3 months. Blood absent but still poorly formed bowel movements, (up to 8x day). Difficulty going out without pre-planning toilets.

- **Initial Laboratory testing and findings:** Full Blood Count with urine testing = Folate deficiency anaemia, borderline low B12; Severe Vitamin D deficiency; Stool Testing – Elevated Calprotectin (Inflammation), mucus in stool.
Case Study: Presenting Food Habits

• 4 glasses milk/day. Frequent cheese consumption.

• High white bread and white rice

• Low Fibre diet and therefore minimal vegetables or fruits

• Processed red meat (sliced ham in sandwiches)

• Skipping meals frequently, small portion recently

• 6 cups coffee per day with sugar.

What are your thoughts about this diet?
Case Study: Nutrition Protocol

Dietary changes:
• Low FODMAPS diet (Low in specific carbohydrates, from grains and gluten, dairy, many nuts, seeds and most pulses), very well cooked low FODMAP soft vegetables, low red meat. Skinless Oily Fish 3x per week.

Therapeutic Foods:
• Ginger Water (2 inch Grated ginger steeped in 1 litre hot water over night) to reduce inflammation and 2 cups green tea per day to support gut tight junctions.

• 20g Turmeric, 1 tsp (5g) Black pepper, 20g Ginger Powder in cooking or hot drinks per day (or strained), to help support inflammation.

• Green juices and strained cabbage broths in cooking. When symptoms stable, add miso. To support tight junctions and maintain folate levels.
## Case Study: Supplement Regime

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Dosage</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High EPA Fish Oil</strong></td>
<td>1500mg EPA (2500mg total omega 3)</td>
<td>Support Inflammation</td>
</tr>
<tr>
<td><strong>Quercetin</strong></td>
<td>1800mg per day</td>
<td>Support gut integrity/repair and inflammation</td>
</tr>
<tr>
<td><strong>Vitamin D</strong></td>
<td>4,000 IU after initial therapeutic dose</td>
<td>Support Inflammation, immune health and bone health (due to repeated methotrexate)</td>
</tr>
<tr>
<td><strong>High Potency Probiotic</strong></td>
<td>900 billion per day</td>
<td>Maintain remission</td>
</tr>
<tr>
<td>(Requested doctor prescribe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– VSL#3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Folate and Methyl B12</strong></td>
<td>1200mcg Folate 4000mcg B12</td>
<td>Megaloblastic anaemia and previous Methotrexate</td>
</tr>
</tbody>
</table>
Case Study: **Outcome Measures**

<table>
<thead>
<tr>
<th></th>
<th>Abdominal Cramping (0-6, 6 = worst)</th>
<th>Urgency (0-6, 6 = worst)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial MYMOP Rating</strong></td>
<td>6/6</td>
<td>5/6</td>
</tr>
<tr>
<td><strong>5 month MYMOP Rating</strong></td>
<td>1/6</td>
<td>0/6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial stool type</strong></td>
<td>Semi-formed to slightly loose with high flatulence</td>
</tr>
<tr>
<td><strong>5 month stool type</strong></td>
<td>Well formed, smooth with minimal flatulence.</td>
</tr>
</tbody>
</table>

- **No Anaemia, vitamin D levels stable, Calprotectin normal.**