Drugs and Nutrition
How drug side effects can influence nutritional intake

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Factors Influencing Nutritional Intake

- Food availability
- Physical capability
- Appetite
- Presence of gastrointestinal symptoms
- Perception of food
Overview

Drugs can affect...

- Appetite
  - Food avoidance
  - Appetite

- Gastrointestinal symptoms

- Perception of food
  - Texture
  - Taste
  - Smell
Food avoidance

To comply with dosing guidance:

• Take on an empty stomach or half an hour before food
  – Some penicillins, anti-TB therapy

• Not to be taken with milk
  – Quinolones, Tetracyclines

• Take with a full glass of water, half an hour before food
  – Bisphosphonates
Anorexia and weight loss

- Commonly reported side effect of drug therapy
- Rarely clinically significant
• Amantadine
• Digoxin
• Fluoxetine
• Levodopa
• Lithium
• Metformin
• Penicillamine
Increased appetite and weight gain

- MAOIs
- Tricyclic antidepressants
- Vaproate
- Beta-blockers
- Oral contraceptives
- Antipsychotics; Chlorpromazine, olanzapine, clozapine, mirtazapine
- Steroids
- Anabolic steroids
Gastrointestinal side-effects
"And these blue ones are for the stomach cramps these red ones are going to give you."
Nausea and Vomiting

- Direct effect on chemoreceptors
- Direct effect on serotonin and dopamine receptors in CTZ
Common Drugs

• Chemoreceptors in GI tract
  - Cytotoxics
  - Potassium
  - Iron Preparations
  - Antibiotics

• Chemoreceptor trigger zone
  - Cytotoxics
  - Anaesthetics
  - Opiates
  - Nicotine
  - Levodopa
  - SSRI s
Decreased GI motility

Associated with bloating, fullness and constipation

• Anticholinergic
  – Tricyclic antidepressants
  – Oxybutynin
  – Propantheline

• Opiates
  – Morphine
  – Codeine

• Ondansetron
Diarrhoea

- Increase in GI motility
- Alteration of gut flora
- Disturbance of mucosal surface
- Erythromycin
- Metoclopramide & domperidone
- Broad spectrum antibiotics
- Auranofin (affects 50%)
- Misoprostil (affects 8%)
- PPIs (affects 1-3%)
- Antivirals; adefovir, tenofovir, lamivudine
- Magnesium salts
- Iron
- Lithium (sign of toxicity)
- Digoxin (sign of toxicity)
- Acarbose
- Sevelamer
- Metformin
- Colchicine (sign of toxicity)
Perception of Food

- Image
- Texture
- Smell
- Taste
Visual Impact
Visual Impact & Texture
Dry Mouth

Functions of saliva

- Enhance taste
- Facilitate speech
- Facilitate swallowing
- Irrigate, lubricate and protect mucous membranes in upper GI tract
Salivary Stimulus

- **Parasympathetic**
  - Increases volume

- **Sympathetic**
  - Decreases volume
  - Increases viscosity

- Saliva production decreased by:
  - Sympathetic stimulation
    - Alpha-agonists
  - Parasympathetic blockade
    - Anticholinergics
    - Antimuscarinics
Drugs and Dry Mouth

![Bar graph showing the prevalence of dry mouth based on drug intake per patient per day.](image-url)
Incidence >10%

- Anticholinergic drugs
  - Atropine, Oxybutynin, hyoscine, benztropine
- Antidepressant and antipsychotic drugs
  - SSRI s – citalopram, fluoxetine, paroxetine, sertraline, venlafaxine
  - Tricyclic – amitriptyline, imipramine
  - Atypicals – Phenelzine, olanzipine
• Diuretics
  – Furosemide, chlorothiazide
• Antihypertensives
  – ACEI – captopril, enalapril, lisinopril
  – Clonidine
  – Methyldopa
• Sedatives
  – Diazepam, temazepam
• Muscle relaxants
  – Orphenadrine
• Analgesics
  – Codeine, methadone, tramadol
  – Ibuprofen, naproxen

• Antihistamines
  – Astemizole, chlorphenamine, loratidine

• Others
  – Carbamazepine, tolterodine, carbidopa/levodopa, ipratropium
Management

• Remove offending drug
• Reduce dose or split dose
• Try modified release preparation
• Try alternative drug within same class
• Alter dose timing to minimise effect on oral intake
• Use salivary stimulants or artificial saliva products
Taste

• Sweet
• Salt
• Bitter
• Sour
• Umami
Drug induced taste disturbance

• Ageusia
  – Complete loss of one of the taste sensations

• Hypogeusia
  – Increase in taste threshold

• Dysgeusia
  – Altered perception of taste

• Parageusia
  – Bad taste in the mouth
Ageusia/Hypogeusia

ACEI, amphetamines, amiloride, amphoteracin, ampicilllin, aspirin, azathioprine, baclofen, benzodiazepines, candesartan, carbamazepine, cephalosporins, chlorhexidine, clarithromycin, cimetidine, clopidogrel, colchicine, corticosteroids, didanosine, diltiazem, furosemide, glycopyrrolate, gold salts, hydralazine, hydrochlorothiazide, hydroxychloroquine, levodopa, losartan, metformin, methimazole, methotrexate, methyldopa, metoclopramide, metronidazole, nifedipine, penicillamine, phenytoin, propranolol, spironolactone, sucralfate, terbinafine, triamterine, tricyclic antidepressants, venlafaxine, vincristine
Dysgeusia - Bitter

- Acetazolamide
- Aspirin
- Carbamazepine
- Clarithromycin
- 5-Fluorouracil
- Isosorbide mononitrate
- Lamotrigine
- Levodopa
- Metolazone
- Risperidone
Dysgeusia - Metallic

- Allopurinol
- Captopril
- Ethambutol
- Gold salts
- Lithium
- Metformin
- Methyldopa
- Metronidazole (12%)
- Nifedipine (6%)
- Pentamidine (32-72%)
- Sartans
- Sulphasalazine
Management

- Exclude other causes
- Remove offending drug
- Manage oral dryness if implicated
- Masking techniques
- Zinc supplementation
Smell
Drug induced olfactory disturbance

ACEI, amiodarone, amoxicillin, amphetamines, beta-blockers, calcium channel blockers, chlorhexidine, cimetidine, cocaine, corticosteroids, decongestants, doxycycline, flubiprofen, gemfibrozil, gentamicin, inhaled corticosteroids, isotretinoin, levodopa, methotrexate, pentamidine, quinolones, statins, streptomycin, sumatriptan, terbinafine, tobacco
Identifying patients at risk

- Polypharmacy
- Elderly
- Impaired organ function
- Pre-existing nutritional status
- Early recognition and corrective action
• Ackerman et al (1997) Disturbances of taste and smell induced by drugs. Pharmacother 17:482-96


• www.drymouth.info