Resource view

Resource name	Dental Pharmacology- NEW
Resource description	these are notes on pharmacology
Resource content	

Pharmacology

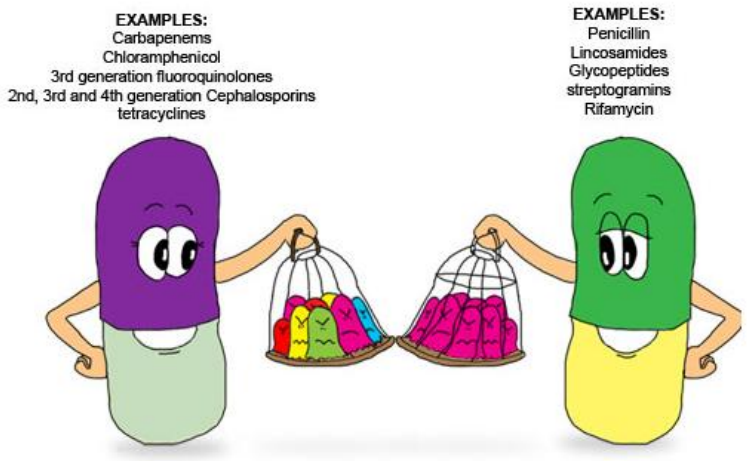
Contents:

1. Antibiotics
2. Antifungal Drugs
3. Anti Viral Drugs
4. Pain Management
5. Drug Interaction
6. Mode of action of all drugs listed above
7. Side effects of commonly asked medication

Antibiotics

CLASSIFICATION ACCORDING TO SPECTRUM OF ACTIVITY.

Depending on the range of bacterial species susceptible to these agents, antibacterials are classified as **broad-spectrum, or narrow- spectrum**. Note that the spectra of activity may change with acquisition of resistance genes.



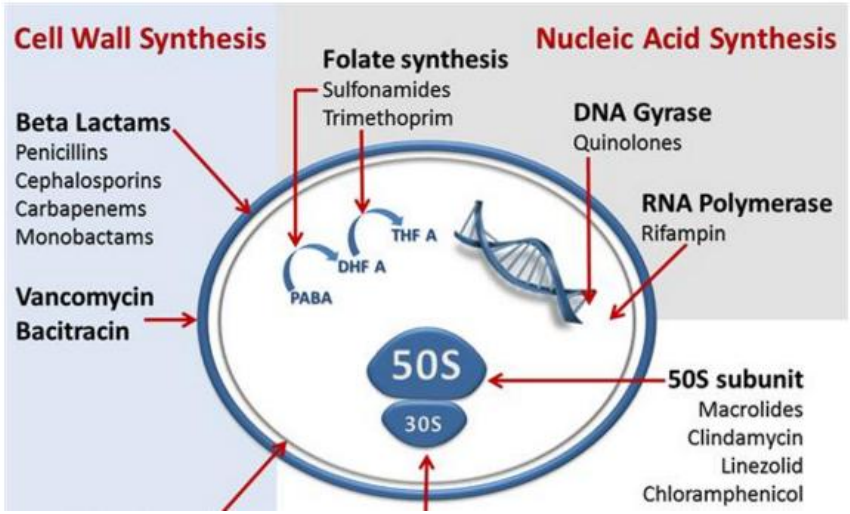
Broad spectrum Narrow spectrum

1. **Broad spectrum antibacterials** are active against both Gram-positive and Gram-negative organisms. Examples include: **tetracyclines, phenicols, fluoroquinolones, &#65533;third-generation&#65533; and &#65533;fourth-generation&#65533; cephalosporins.**

2. **Narrow spectrum antibacterials** have limited activity and are primarily only useful against particular species of microorganisms. For example, **glycopeptides are only effective against Gram-positive bacteria, Aminoglycosides and sulfonamides are only effective against aerobic organisms.**

Bacteriostatic Antibiotics

- Lincosamides- Clindamycin, Lincomycin
- Macrolides &#65533; Azithromycin, Claritromycin, Erythromycin
- Oxazolidinones &#65533; Linezolid
- Sulfonamides &#65533; Sulfadiazine, Trimethroprim- Sulfamethoxazole (Cotrimoxazole)
- Tetracyclines &#65533; Doxycycline, Minocycline





Antibiotic Grouping By Mechanism	
Cell Wall Synthesis	Penicillins Cephalosporins Vancomycin Beta-lactamase Inhibitors Aztreonam Polymycin Bacitracin
Protein Synthesis Inhibitors	**Inhibit 30s Subunit** Aminoglycosides (gentamicin) Tetracyclines **Inhibit 50s Subunit** Macrolides Chloramphenicol Clindamycin Linezolid Streptogramins
DNA Synthesis Inhibitors	Fluoroquinolones Metronidazole
RNA synthesis Inhibitors	Rifampin
Mycolic Acid synthesis inhibitors	Isoniazid
Folic Acid synthesis inhibitors	Sulfonamides Trimethoprim

PENICILLINS

- Mechanism
  - interfere with bacterial cell wall synthesis
- Examples: ampicillin, penicillin,
- Clinical use: Amoxicillin is commonly used in dental practice.
- Toxicity: hypersensitivity reaction e.g anaphylaxis
- Resistance: Penicillinase in bacteria (a type of B-lactamase) cleaves B-ring, which leads to resistance to penicillin treatment. In such a case you need to use a B-lactamase inhibitor like clavulanic acid , tazobactam, sulbactam. These Beta lactamase inhibitors are often added to penicillin antibiotics to protect the antibiotics from destruction by beta-lactamase (penicillinase).

- An example is co-amoxiclav which contain amoxicillin and clavulanic acid.

Benzyl Penicillin

- Inactive orally
- Only IM / IV ◆ dose
  - Children = 25 mg/kg ◆ every 6 hours
  - Adult = 600 ◆ 1200 mg ◆ QDS
- Drug of choice in streptococcal infection
- Acts on bacterial aspect
-
- Good tissue penetration ◆ except CSF
- Side effects:
- Hypersensitivity ◆ rash, anaphylaxis

Amoxicillin

- Similar to ampicillin
- Broad spectrum
- Dose
  - Adult = **500 mg◆ TDS ◆** PO
  - Children = 40mg/ kg daily in 3 divided doses
- Both Amoxicillin & Ampicillin cause a **maculo-papular rash** in patients with **glandular fever**, lymphatic leukaemia or HIV infection
- May interfere with the action of oral contraception
- All penicillins decrease excretion of methotrexate, and increases the risk of toxicity.

Flucloxacillin

- Active against Penicillinase ◆ producing bacteria
- Dose
  - Adults 500mg-1g ◆QDS (Four times a day) PO/IV ◆ 30 Minutes before food
  - Children ◆ 125 mg- 250mg QDS ◆ 30 Minutes before the food

Co ◆ Amoxiclav

- Amoxicillin and Clavulanic acid- (**destroys B-lactamase)**

- Dose ◆ Usually ◆ 600-1200 mg ◆TDS IV
- Adult- 250/125 mg ◆ every 8 hrs
- Child ◆ 1-6 yrs: 5ml of 125/31 every 8 hrs

CEPHALOSPORINS (Generations I, II, III, IV)

-
  - These are beta-lactam drugs that inhibit cell wall synthesis (bactericidal)
- Mechanism
  - same mechanism of action as beta-lactam antibiotics (such as penicillins)
- Examples: cefotaxime, ceftriaxone, e.t.c

Cefuroxime

- Parental broad spectrum cephalosporin
- Used in surgical prophylaxis in contaminated head and neck procedures along with metronidazole
- Dose
  - Adult ◆ 750-1500 mg ◆ TDS IV (500 mg BD PO)
  - Child (>3 months age) ◆ 125 mg ◆ twice daily

FLUOROQUINOLONES

- Mechanism
  - blocks DNA replication via inhibition of DNA gyrase
- Side effects
  - inhibits early fracture healing through toxic effects on chondrocytes

- increased rates of tendinitis, with special predilection for the Achilles tendon.
  - tenocytes in the Achilles tendon have exhibited degenerative changes when viewed microscopically after fluoroquinolone administration.
  - recent clinical studies have shown an increased relative risk of Achilles tendon rupture of 3.7.
- Contraindicated in pregnancy, breastfeeding mothers, and children under 18 years due to possible damage to their cartilage
- examples
  - ciprofloxacin (Cipro)
  - levofloxacin (Levaquin)

AMINOGLYCOSIDES

- **Mechanism**
  - bactericidal
  - inhibition of bacterial protein synthesis
  - work by binding to the 30s ribosome subunit, leading to the misreading of mRNA.
- **Examples**
  - gentamicin, neomycin, amikacin, streptomycin
- **Toxicity:** Nephrotoxicity, Ototoxicity, Neuromuscular blockage
- **Gentamycin**
- A bacterial aminoglycoside
- Active against Gram ve organisms
- Topical usage in ear infections
- Side effects: dose related ototoxicity + nephrotoxicity hence levels should be monitored
- Dose = 3-5mg/kg divided in 3 doses every 8 hours

VANCOMYCIN

- **Coverage**
  - gram-positive bacteria
- **Mechanism**
  - bactericidal
  - an inhibitor of cell wall synthesis
  - indications for vancomycin
    - serious allergies to penicillins or beta-lactam antimicrobials
    - serious infections caused by susceptible organisms resistant to penicillins (MRSA, MRSE)
    - Also used in pseudomembraneous colitis caused by Clostridium difficile
    - Side effects: nephrotoxicity, ototoxicity
    - Used in antibiotic induced colitis **&#65533;** 125 mg QDS **&#65533;** 10 days PO
    - Used in prophylaxis of patients at high risk from infective endocarditits
    - Side effects: **Ototoxicity , Nephrotoxicity , Phlebitis &#65533; at the site of infusion, Red man&#65533;s syndrome**

CLINDAMYCIN:

- Is bacteriostatic, it inhibits 50S ribosomal subunit
- Clinical use: Anaerobe infections e.g oral infections
- Side effects: it commonly associated with pseudomembranous colitis (Clostridium difficile, fever, diarrhoea)
- Used in **staphylococcal osteomyelitis** in conjunction with metronidazole (inhibits clostridium difficile)
- Dose **&#65533;**
  - Adult **&#65533; 150 mg &#65533; 500mg** every 6 hrs
  - Child - 3-6 mg/ kg every 6 hours
- Replaced erythromycin for single dose prophylaxis of infective endocarditis.

TETRACYCLINES:

- Mechanism: bacteriostatic, inhibits protein synthesis
- Example: doxycycline, tetracycline
- Causes GI upset
- Broad spectrum antibiotic **&#65533;** may be used in periodontal disease
- Used topically for the treatment of apthae
- Results in **opportunistic infection with *Candida albicans***
- Deposits in bone & teeth **&#65533;** causing staining and **hypoplasia** (discolouration of the teeth and inhibition of bone growth in children and photosensitivity.
  - **Avoid in children <12 years and pregnancy**
- Dose **&#65533; 250 mg &#65533; 500 mg QDS** PO

- Decreased absorption with milk, therefore to be taken well before food

MACROLIDES

- Mechanism: inhibits protein synthesis by binding to 50S ribosomes subunit
- Bacteriostatic
- Clinical use: Atypical pneumoniae, used in streptococcal infections if is patient allergic to penicillin
- Side effect: nausea, vomiting, abdominal discomfort and diarrhoea are common. Rash, QT prolongation, cholestatic jaundice are less frequent.
- Examples: Azythromycin, Clarithromycin, Erythromycin

- **Erythromycin**
- Similar spectrum to a penicillin dose = **250 mg-500mg/4 times a day**
- **Active against penicillinase producing organisms**
- Major problem nausea, hepatic and renal impairment, ototoxicity
- It is a good alternative in patient who are allergic to penicillin that cannot swallow pills

METRONIDAZOLE

- Bactericidal antibiotic, antiprotozoal
- Anaerobicidal drug against acute dental and oral infections

- It forms toxic metabolites in the cell of the bacteria which damage the DNA
- Clinical use: used in anaerobic infections (e.g anaerobic dental infections) and also in clostridium difficile)
- Side effects: it causes an unwanted reaction if taken with alcohol i.e severe flashing, headache, hypotension, tachycardia) - **DISULFIRAM** like reaction
- Dose for **NUG** (NUG = Necrotising Ulcerating Gingivitis) **200 mg TDS PO 3 days**
- Dose in Anaerobic infection
  - Adult **400mg** every 8 hours
  - Children 7.5mg/kg every 8 hours
- Should be avoided in lactating women.

Chloramphenicol

- Used in bacterial conjunctivitis (0.5% eye drops, 1 % eye-ointments apply 3 hourly)
- Systemic use is limited due to toxicity
- Ointment is excellent wound dressing
- Side effects- **Neonatal grey baby syndrome** - occurs in newborn infants because they have not yet fully developed the functional liver enzymes (UDP-glucuronyl transferase)

ANTIMYCOBACTERIAL DRUGS

Common combination: Rimfampicin, Isoniazid, Pyrazinamide, Ethambutol (RIPE)

Clinical use: Treatment of Mycobacterial tuberculosis

RIFAMYCINS:

Examples: **Rifampicin**

Mechanism: Inhibits RNA polymerase

Induces Microsomal P-450

Clinical use: Treatment of TB (Mycobacterium Tuberculosis)

ANTIFUNGAL

- Examples: Nystatin, Amphotericin, Azoles (Fluconazole, Ketoconazole, Clotrimazole, Itraconazole, Voriconazole)
- Clinical use: Oral thrush, vaginal thrush, systemic fungal infection
- Mechanism: Inhibits antifungal sterol synthesis, by inhibiting the P-450 enzyme
- Side effects: Testosterone synthesis inhibition (gynaecomastia, liver dysfunction due to inhibition of P450 enzyme.)

ANTIVIRAL (Acyclovir, famciclovir, valacyclovir)

Mechanism: Inhibits viral DNA polymerase

Clincal use: Herpes simplex virus and Herpes Zoster Virus (Varicella Zoster Virus (VZV))

Heparin

- Anti-coagulant

  helps in preventing deep vein thrombosis and pulmonary emboli in patients at risk
- It activates Anti-thrombin III which in turn inactivates thrombin.

Side-effects:

- Heparin induced thrombocytopenia (HIT)
- Increased aminotransferase levels and hyperkalemia
- Alopecia, osteoporosis
- Overdose leads to severe bleeding
- Antidote for heparin overdose = protamine sulfate

Warfarin

- indirectly inhibiting vitamin K
- Takes 2-3 days to exert its full effect and takes about the same time to wear off
- Drugs like **metronidazole** and **macrolides** should be avoided with warfarin, as they increase its toxicity, by reducing the metabolism via inhibiting **CYT P450**
- Antidote for warfarin toxicity is **Vitamin K**

Warfarin Interactions. CYT P450

Cyt P450 Inducers =Drug is eliminated quickly from the blood

- **C**arbamazapine
- **R**ifampin
- barbiturates
- **P**henytoin

CYT P450 Inhibitors = Drug stays for a longer time than normal in the blood

- **S**odium Valproate
- **C**iprofloxacin
- **S**ulphonamides
- **C**imetidine/ Omeprazole
- **A**ntifungals, Amiadarone
- **I**soniazid
- **E**rythromycin
- **G**rapefruit Juice

- # INR

- International Normalized Ratio, a laboratory test measure of blood coagulation, based on prothrombin time.
- INR is typically used to monitor patients on warfarin or related oral anticoagulant therapy.
- The normal range for a healthy person not using warfarin is **0.8- 1.2.**
- For patients on warfarin therapy, on INR of **2.0 - 3.0 i**s usually targeted; although the target INR may be higher in particular situations, such as for those with a mechanical heart valve.
- If INR is decreased ----> increased risk of developing a clot
- If INR is increased ---> increased risk of bleeding

Recommended therapeutic range for oral anticoagulant therapy*

Indication	INR
Treatment of venous thrombosis	2.0-3.0
Treatment of pulmonary embolism	2.-3.0
Prophylaxis of venous thrombosis (high-risk surgery)	2.-3.0
Prevention of systemic embolism	2.-3.0
Tissue heart valves	2.-3.0
AMI (to prevent systemic embolism)	2.0-3.0
Valvular heart disease	2.0-3.0
Atrial fibrillation	2.0-3.0
Bileaflet mechanical valve in aortic position	2.0-3.0
Mechanical prosthetic valves (high risk)	2.5-3.5
Systemic recurrent emboli	2.5-3.5

If oral anticoagulant therapy is elected to prevent recurrent myocardial infarction, an INR of 2.5 to 3.5 is recommended.

ANTIBIOTIC GUIDELINES FOR COMMON INFECTION IN DENTISTRY

1. Osteomyelitis:

Flucloxacillin first choice of antibiotic.

If Penicillin allergy **Clindamycin** is the treatment of choice.

Suggested duration of treatment 6 weeks for acute infections.

If methicillin resistant Staphyloccocus aureus suspected, **vancomycin** is treatment of choice.

2. Pericoronitis

Antibacterial required only in presence of systemic feature of infection or trismus or persistant swelling despite of local treatment.

METRONIDAZOLE

alternative: AMOXICILLIN for 3 DAYS

3. GINGIVITIS: ACUTE NECTROTISING ULCERATIVE

Antibacterial required only in presence of systemic feature of infection

METRONIDAZOLE 200MG*3DAYS

OR

AMOXILLICIN 250MG*3DAYS

4. PERIODONTITIS

Antibacterial used as an adjunct to debridement in severe disease or disease unresponsive to local treatment

METRONIDAZOLE OR DOXYCYCLINE

5. PERIAPICAL OR PERIODONTAL ABSCESS

Antibacterial required only in severe disease with cellulitis or if systemic feature of infection.

AMOXICILLIN 500MG 3 times a day for 5 days

OR

METRONIDAZOLE 400MG 3 times a day for 5 days

6. SINUSITIS

Antibacterial should usually be used only for persistent symptoms and purulent discharge lasting at 7 days or if severe symptoms.Also consider antibacterial for those at high risk of serious complications(eg in immunocompromised, cyctic fibrosis)

First choice is AMOXICILLIN OR CLARITHROMYCIN*7DAYS

Second choice CLARITHROMYCIN*7DAYS

Consider oral co-amoxiclav if no improvement after 48 hours.

7. CELLULITIS

Flucloxacillin first choice of antibiotic.

If Penicillin allergy **Clindamycin** treatment of choice.

Suggested duration of treatment 6 weeks for acute infections.

If methicillin resistant Staphyloccocus aureus suspected, **vancomycin** treatment of choice.

PAIN MANAGEMENT:

Acute and post-op pain:

- Usually controlled by LA
- For systemic analgesics **paracetamol** = 1g /PR/IV 4 hourly
- **Ibuprofen** = 400- 600mg 8 hourly
- Paracetamol and codeine could be combined e.g **co-codamol**
- **Diclofenac** = 50mg PO 3 times a day (8 hourly)
- **Opioid analgesics** - short term analgesic
  a) **Morphine**- 10mg every 3-4 hours
  +
  b) **Metoclopramide** (anti-emetics) 10mg IM/IV

Pain following maxillofacial trauma:

- Check for any head injury (which is a contraindication for opioid use)
- Codeine phosphate 60mg IM
  +
  NSAID (Diclofenac)

Patient controlled analgesia (PCA)

- The optimal technique for severe post-operative pain
- It involves a small delivice a bolus (1-2mg Morphine) when the patient presses a button.

NSAIDs

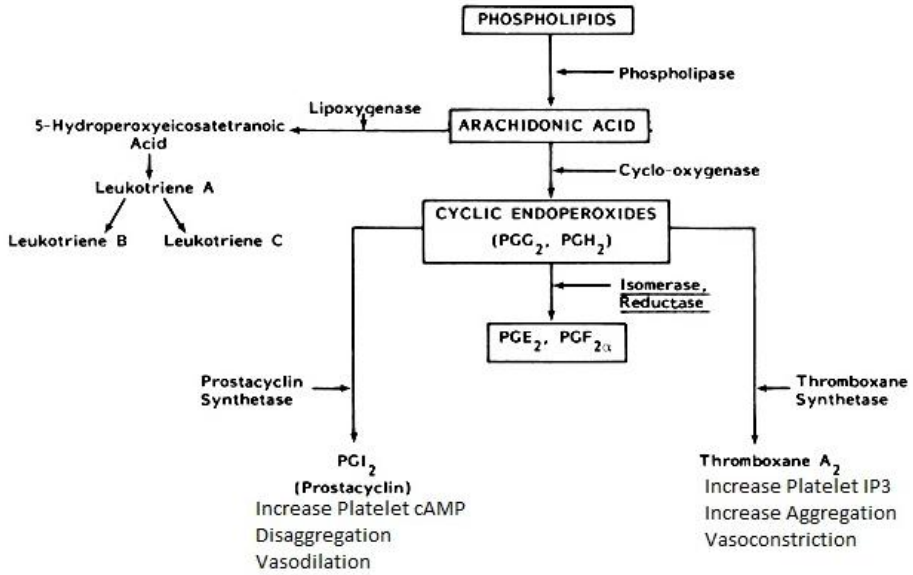
When there is an injury/cut, prostaglandins are formed via cyclooxygenase (COX) pathway, which results in pain and inflammatory response.

NSAIDs block Cycloxegenase, **COX**, No prostaglandins formed, No pain and inflammation

Provide effects of :

- Analgesia
- Antipyretic
- Anti-inflammatroy (at high doses)

Mechanism:



Eg:

Diclofenac Sodium

- Available in tablet, IM, suppository and in one daily slow release form.
- A mild potency NSAID
- An alternate to high-dose-lower potency NSAID or an opioid which has no anti-inflammatory effect
- Dose: For tablets = 50mg TDS after food
- IM = 75MG BD - for no more than 2 days (painful injection)
- Suppositories = 100mg PR OD

Contraindications for NSAIDS

- Age > 75 years

- Hypersensitivity to Aspirin / any other NSAID
- Pregnancy /breast feeding
- History of Gastroentestinal bleed

Common side effects of NSAIDS

- Ringing in the ears after overdose ⇒ Aspirin
- Liver damage after overdose ⇒ Paracetamol
- Constipation ⇒ Codeine

- Bronchospasm in asthmatics ⇒ Ibuprofen
- Peptic ulcer disease
- Chronic kidney disease

Aspirin:

- The only NSAID able to irreversibly inhibit COX-1
- Also indicated for inhibition of platelet aggregation.
- This is useful in the management of arterial thrombosis and prevention of adverse cardiovascular events.
- Aspirin inhibits platelet aggregation by inhibiting the action of thromboxane A2.

Side Effects:

- Gastric bleeding
- Reye's syndrome in children

Analgesics in hospital practice

Opioids

Act centrally to alter the perception of pain, but have no anti-inflammatory properties.

- Used for severe pain of visceral origin, post-op (acting partly by sedation), in terminal care.

Side effects

- Depresses respiratory function
- Interferes with pupillary response
- Cough suppression
- Urinary retention
- Nausea, constipation (decreased gut mobility)
- Tolerance, dependence.
- Contraindicated in head injury

E.g.

Codeine Phosphate

- A moderate opioid for short-term analgesia

  Dose = 30- 60mg, 4 hourly IM/PO

Morphine

- Drug of choice in the management of terminal pain

- Available in oral form (tablet, elixir or slow-release tablet MST)
- Always prescribe a laxative

  Dose - depends on previous analgesia

  a) 10 mg 4 hourly or 30mg MST BD

  b) IM / Post - op pain 10-20mg 2 -4 hourly + anti-emetic or IV

- Reversed by Naloxone.

Tramadol

- Acts by two central methods
- Lower side effects
- Dose = 50 -100mg PO 4 hourly
- Slow IV = 50 -100mg 4-6 hourly

STEROID DRUGS

- May be either analgesics/co-analgesics

Topical Steroids

Hydrocortisone lozenges

- 2.5mg dissolved in mouth QDS

Betamethasone phosphate tablets

- 0.5mg soluble tablet made into a 1mg in 10ml mouthwash rinsed QDS
- Betamethasone inhaler for use in asthma can be used as spray (1 spray = 100 μg)
- Repeatable to a max of 800 μg

Hydrocortisone 1% and Oxytetracycline 3%

- Ointment/ spray
- (Hydrocortisone = 50mg; Oxytetracycline = 150mg per aerosol unit) QDS

Systemic Steroids

- Main indication Adrenocorticol suppression and also treatment of systemic diseases like SLE , Rheumatoid arthritis and Giant cell arthritis

i) Hydrocortisone

ii) Prednisolone

iii) MethylPrednisolone

iv) Dexamethasone

Drugs causing Xerostomia

- Atropine, atropinics and hyoscine
- Antidepressants (tricyclic antidepressants, selective serotonin reuptake inhibitors, lithium)
- Antihypertensives (e.g. terazosin, prazosin, clonidine, atenolol,propranolol)
- Phenothiazines
- Antihistamines
- Anti reflux drugs (proton pump inhibitors, e.g. omeprazole)

- Opioids
- Cannabinoids
- Diuretics

SEDATIVES:

Benzodiazepines:

Examples: Temazepam, Midazolom, Lorazepam, Clonazepam

Mechanism of action: Inhibit the neurotransmitter GABA via GABA receptors

Indications:

- Insomnia/ Sedation
- Anxiety
- Alcohol withdrawl
- Treament of Seizure

S.E:

- Respiratory depression
- CNS depression
- Dependance

Opiates:

Mechanism of Action: Acts on Central opiate receptors

Divided into:

Weak opiates:

Examples: Codiene, Oxycodeine, Dehydrocodiene, Tramadol

Strong opiates:

Examples: Morphine, Diamorphine, Fentanyl, Oxycodone

Indications: Mainly used as an Analgesic

S.E:

- constipation
- dry mouth
- nausea and vomiting
- CNS depression
- drowsiness
- respiratory depression

Toxicity:

Pinpoint pupils

Respiratory depression

DRUGS USED IN ANGINA:

1. GTN:

Reduces preload (amount of blood coming to the heart) by Vasodilatation.

Also causes coronary artery dilatation which increases oxygen supply to the brain.

2. ASPIRIN:

Is an NSAIDs as well as an anti-Platelet.

3. Calcium Channel Blocker:

e.g: Nefidipine, Amlodipine

They may cause gum hypertrophy.

4. B-Adrenoceptors Antagonists:

e.g: Atenolol, Metoprolol.

- used as anti-angina

- used in prophylaxis of angina

DRUGS USED IN ASTHMA:

1. B-Adrenoceptors Agonists:

Salbutamol:

- Short acting Beta- agonists.

- It dilates bronchi.
- It acts on B-2 receptors

Salmeterol:

- long acting B-2 agonist.

2. Steroids:

- These can be inhaled steroids or oral steroids.
- Inhaled: Beclomethasone, usually used in a brown inhaler.
- Oral: Prednisolone.

DRUGS USED AS IMMUNOSUPPRESSANTS:

E.G: STEROIDS, METHOTREXATE, CYCLOPHOSPHAMIDE, AZATHIOPRINE, CYCLOSPORINE

Indications:

- Autoimmune diseases: SLE, Rheumatoid Arthritis
- Hypersensitivity: Asthma
- Transplant

Side effects: Opportunistic infections as Oral Candidiasis.

Drugs Causing Gingival hyperplasia:

Phenytoin

Cyclosporin

Calcium channel blockers (especially nifedipine) Other causes of gingival hyperplasia

SIDE EFFECTS OF COMMONLY ASKED MEDICATIONS

1. Ibuprofen, Aspirin and steroid cause peptic ulceration.

2. Ibuprofen and Aspirin are contraindicated in Asthma

3. NSAID enhances effects of anticoagulant like warfarin

4. Fluconazole, erthromycin, metronidazole increase INR

4. Vitamin K and Oral contraception pills decrease INR

5. Aspirin is contraindicated in children less than 16 years. It causes Reyes syndrome.

6. Gingival hyperplasia is caused by calcium channel blockers (nifedipine, amlodipine, diltiazem), cyclopsorine and phenytoin.

7. Vancomycin causes red man syndrome, it is used to treat MRSA infections

8. Carbamazepine causes erytherma multiforme

9. Tetracycline causes teeth staining and contraindicated in pregnancy.

10. Steroids (beclomethasone, prednisolone) causes high glucose

11. Side effects of long term steroid are: weight gain, osteoporosis, Hypertension, Cataract, diabetes

12. Rimfampicin is used for the treatment of tuberculosis, causes red urine.

13. Omeprazole non carious tooth surface lose.

14. Diazepam interacts with fluconazole.

15. Clindamycin causes pseudomembranous colitis

16. In pregnancy the following medication can be given: amoxicillin, paracetamol, erythromycin, clindamycin

17. Metformin the drug of choice in obese patient with diabetes type 2.

Metformin does not cause hypoglycaemia. It causes lactic acidosis

18. Glibenclamide is preferred in patient with renal failure than metformin.

19. Inhaled steroid like beclomethasone can cause oral candidiasis

Resource start date	2014-10-04 11:17
Resource end date	2024-10-04 11:17

Back

PayPal WorldPay VISA AMEX DELTA Maestro MasterCard PayPal Accredited cpd Course Copyright © 2013 SamsonPLAB:All Rights Reserved Web Design Company Flick Media Ltd