Medicaments
Administering Injections

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Forms of medicine

- Solid medicines
- Semi-solid medicines
- Liquid medicaments
- Pharmaceutical preparation made by extraction
- Other pharmaceutical forms

Main principles, main concepts and the main areas of pharmacology – **not within this lecture**
Solid medicines

- **Teas** – whole, chopped, filters
- **Powders, body powders** – internal-external use
- **Pills, tablets** – the most frequently applied medications
- **Capsules** – must not be opened
Semi-solid medicines

- **Ointment** - for treatment of the skin and mycoderm
- **Creams** – soft ointments with large water content
- **Paste** – with a high powder content
- **Rectal and vaginal medicines** - Solid at room temperature
- **Pellets** - out-of-date
Liquid medicaments

- **Solutions** – For internal or external use
- **Liquid medicines for external use** – eyedrops, ear drops, nosedrops
- **Ingested liquid medicine forms** - syrup
- **Other liquid forms of medicine**
- **Emulsion** – have to be shaken before use
- **Solutions for parenteral use** – sterile, rapid effect, no absorption
Pharmaceutical preparation made by extraction

- **Decoction** - from loose-structure parts of plants

- **Extract** - extraction with appropriate solvent

- **Tincture** - from phytogenic drugs with alcohol or ether
Other pharmaceutical forms

- **Aerosol** - 0,001-100 µm particles

- Transdermal Therapeutic System (TTS) - avoiding first pass effect
Guidelines in medication

- right patient
- right drug
- right time
- right dose
- right route

- right form
- right action
- right response
- right documentation
Medicine storage in healthcare institutions

- separated room, in locker, 15 - 25°C
- fridge only for medicaments (3-7 °C)
- infusion solutions, disinfection solutions, bandages, flammable and explosive materials – separated room
- physician and nurse responsible for the medicaments
Medicine storage in healthcare institutions

• storage of narcotics, opiates:
  – in a strong-box within a locker
  – strict registration – uncorrectable

• storage of medicaments in ABC order

• storage within the original wrapping

• prohibited to wrap back the medicaments if it was delivered to the patient
Oral (Per os ) administration of medicine

- cooperation, swallowing properly
- appropriate amount of liquid
- appropriate body position
- sublingual
- buccal
Otological treatment

- external auditory passage
- ear drops, aerosol sprays, ear powder, ear rinse liquids
- only body temperature products
- positioning the patient
- external auditory passage can be straightened
Vaginal treatment

- vaginal suppository
- vaginal pill
- vaginal capsule
- vaginal solution
- vaginal emulsion
- vaginal suspension
- vaginal foam
- tablets for vaginal solutions or suspensions
- semi-solid vaginal preparation
- medicated vaginal tampon

Aquatus system is a Hungarian invention
Use of the applicator
Vaginal suppository
Positioning the patient
Nasal administration

- high permeability of the nasal membrane
- large surface for absorption
- local or systemic effect
- first pass fails to come
- free airways are needed
- disadvantage: condition of the nasal membrane, diseases (rhinitis) can alter the absorption; elimination is fast
- oily solutions should be avoided
- pneumonia
- drops and sprays
- powders, ointments, gels
- positioning the patient
Ophtalmologic treatment

- sterile preparations exclusively
- liquid solutions, solid or semi-solid preparations
- positioning the patient
- drop in the temporal canthus
- ointment- from nasal to temporal canthus
Rectal treatment

- local and systemic effect
- for therapeutic and diagnostic purposes
- first pass fails to come
- unreliable dosage (dosages with 20-30% more)
- positioning the patient
Transdermal patches

Consistent drug level-continuous absorption

No first pass

Comfortable, simple

Local side effects

Water, local warmth

**nitro-glycerine**
- Introducing nitrate free periods in order to avoid tolerance
- Applying the patches

**contraceptive patches**
- Three patches in a period
- Placement

**opioids**
- 48-72 hours
- Varied plasma level
Aerosol therapy

part of the Oxygen therapy lecture
Administering injections
Injection

- it is a parenteral administration of medicine
- invasive technique

- with or without syringes
- choosing the site for injection
  - General characteristics of the patient
  - State of skin and tissues
  - State of circulation (chimino shunt)
Syringes

disposable - re-usable

centric - Eccentric cone

Luer-Slip and Luer-Lock types
two-part - three-part
Low-dose syringes, high capacity syringes
Calibration scale (0.25-450ml)
Tools for administering injection

Syringes

- Hypodermic syringe
- Oral syringe
- Vaginal, rectal syringes

Safety Systems – *Infusion therapy lecture*

- safety needles
- safety syringes
Prefilled syringes
For intravenous catheters:
  Generally physiological saline
  Needle is needless
Anticoagulants
Needle

- risk of needlestick injuries
- place the plastic covering on the needle after the intervention???

- needle inner diameter measured by Gauge (G)
- length of the needle measured by inch (1 inch = 2.54 cm)
Short and long bevels
Cone tips and blunt tips
<table>
<thead>
<tr>
<th>Way of administering injections</th>
<th>Lumen of needle</th>
<th>Length of needle (inch (mm))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intracutaneous/intradermic</td>
<td>25 G - 27 G</td>
<td>$\frac{1}{4}$inch/6mm - $\frac{5}{6}$inch/21mm</td>
</tr>
<tr>
<td>subcutaneous</td>
<td>25 G - 26 G</td>
<td>$\frac{1}{2}$inch/13mm - 1inch/25mm</td>
</tr>
<tr>
<td>Intramuscular</td>
<td>21 G - 23 G</td>
<td>$\frac{5}{8}$ inch/16mm - 2inch/50mm</td>
</tr>
<tr>
<td>Intravenous/venipuncture</td>
<td>21 G - 23 G</td>
<td>$\frac{3}{4}$inch/19mm - 1$\frac{1}{2}$inch/38mm</td>
</tr>
</tbody>
</table>
Choosing the suitable needle:

- Fat tissue
- Gender
- Site of administration
PEN

- for insulin administration – but not exclusively
- comfortable, simple, discreet
re-usable - disposable

choosing the suitable device

- dosage
- right-left handedness
- patients with poor eye-sight
- possibilities of correction

new needle for each administration

storing the cartridges
cartridge house

setting button

shooter

cartridge

double tipped needle
Administering injections without needles

- not so common
- in case of needle phobia
- simple, comfortable
- high pressure liquid jet (spring power)
- intramuscular use is possible
- opening with lumen 200 µ at the end of ampoule
- infectious previously
Tools for drawing up medicine

- filter needle
- wheel/syringe filter
- filter connector
- filter aspiration
Tools for drawing up and mixing medicine

- Transfer cup
- Passing spyke
- Syringe connectors
- Spyke
Tools for drawing up and mixing medicine

- Syringe closing cap
- Closing cone
- Syringe cone
- Aspiration straw
Drawing up medicine

• from an ampoule
Drawing up medicine

- from an injection bottle
Drawing up medicine

- from an ampoule with powder
Mixing different medicines in an injection

1. LÉPÉS
- Inject air

2. LÉPÉS
- Draw up „A” medicine
- Draw up „B” medicine

3. LÉPÉS
- Never inject back med. „A” into „B”
- Always turn ahead ampoule
Intracutaneous/Intradermic (ID) Injection

- into the layers of skin
- slow absorption
- generally diagnostic interventions (goal: triggering local reaction)
- small amount of agent
Intracutaneous/Intradermic (ID) Injection
Subcutaneous Injection (under the skin, sub-q, SC, SQ)

- Slowly, consistently and continuously
- Absorption
- 1-2 ml pharmaceutical is delivered
- Rotating the sites of administration
- Retraction?
insulin, vitamins, heparin, vaccins, interferon, narcotics
Intramuscular Injection (IM)

max. 5 ml
absorption is faster
Intramuscular Injection (IM)

- Obese patients (Site of injection? Length of needle?)
- Site of injection: advantages-disadvantages
- Adult or child?
- Appropriate body position
- Dorsogluteal -> more complications
- Ventrogluteal -> less complications
Intramuscular Injection (IM)

index finger on the spina iliaca anterior superior

lower parts of the palm is on the greater trochanter

ventrogluteal area should be the most preferred for the professional

Hungarian practice:
  • Kós-Votin-method

opposite hand and hip
Intramuscular Injection (IM)

dorsogluteal area
on this area we can expect the thickest fat tissue

- spina iliaca posterior
- point of the puncture
- greater trochanter

Hungarian practice:
spina iliaca anterior and posterior
Intramuscular Injection (IM)

vastus lateralis
broad muscle

rectus femoris
in case of infants, small children and self injection

one palm transverse below the greater trochanter

point of the puncter is the upper part of the intermediate area

one palm transverse above the knee
Intramuscular Injection (IM)

**deltoid muscle**
Comfortable for the patient and the professional too

Max. amount – 2 ml

With two transverse finger below the acromion
Intramuscular Injection (IM)

- Traditional method
- Air lock/ air bubble technique
- Z-track technique

- Retraction
- Recommended velocity of administration is 1ml/10 sec
- Do not massage the site of injection
Injection complications

- pain
- redness of the skin
- swelling
- itching
- infection
- nerve injury
- bleeding
- change of colour of the tissues
- abscess resulting from injection
- injection site fibrosis
- allergic reaction
- breaking of the needle between the tissues
- Nicolau syndrome
Reducing pain

- Communication
- Applying manual pressure on the site of injection
- Appropriate body position
- Appropriate tools (needle, injection without needle)
- Amount of fluid to be administered
- Angle of administration
Intravenous Injection (I.v.)

• through secured venous access or without it
• the drug is delivered directly to the blood circulation
• we cannot talk about absorption
• immediate effect
• risk of overdosing
• medicine must be injected slowly
Intravenous Injection (I.v.)