Parasite Causing Skin Disorders

Saleha Sungkar
Department of Parasitology FMUI
Parasites

- Arthropod: *Sarcoptes scabiei*, *Pediculus humanus capitis*, *Phthirus pubis*, fly, butterfly, house dust mite
- Helminths: hookworm, pinworm, *Schistosoma*, *Taenia solium*
- Protozoa: *Entamoeba histolytica*
Scabies

- **Etiology:** *Sarcoptes scabiei*

- **Distribution:**
  - cosmopolitan
  - poor urban populations
  - crowded community
  - minimal facilities for bathing and washing

→ scabies is common in slum area, jail, orphanage, dormitory.
Life cycle

- Metamorphosis: egg-larva-nymph-adult
- The female enters the skin and burrows itself 2-3 mm during the course of 24 hours, especially at night.
- Warmth increases its activity
- The mite, burrows very superficially in stratum corneum
Life cycle

Predilection:
Thin and wrinkled skin such as the skin between fingers, on the wrist, feet, extensor surface of the elbows, in the axillae, under the breasts, on the penis and scrotum.

In adults, the presence of burrows on the face or neck is unusual.

In children whose skin is thin, infection may occur anywhere including the face and neck.
Pathology

- The preferential sites are between the fingers and toes, the flexor surfaces of forearm, shoulder, inguinal and genitalia.
- The lesions appear as slightly reddish elevated tracts on the skin.
- Minute, translucent, vesicular swellings, possibly produced by the irritating fecal deposits or excretions.
Pathology

The intense itching → causes scratching → spreads the parasite, irritates the lesions → papular, vesicular, pustular

Unless treated, a chronic condition may ensue → severe infestations
Diagnosis

- Finding the tunnel by burrow ink test (but this method can not be used for finding the mites)
- Confirmed diagnosis is based on finding the mite by needle, skin scraping, or superficial biopsy
Scabies control

- To treat scabies patients the following medications may be used:
  - 5% permethrin topical cream
  - 1% gamma benzene hexachloride
  - 3-10% sulfur ointment

- Prevention: sterilization of garment and bedding, and personal hygiene.
Myiasis

- Myiasis is the term applied to invasion of dipterous larvae (the larvae of flies) into living tissues of man and other mammals
- Metamorphosis of fly: egg-larvae-pupae-adult
Classification according to the regions of the body affected

1. **cutaneous**, when the larvae live in or under the skin
2. **intestinal**, when the larvae are present in the stomach or intestine
3. **atrial**, when the larvae invade the oral, nasal, aural, ocular, vaginal, urethral cavities
4. **wound**, when they enter artificial lesions
5. **external**, when they are bloodsuckers.
Cutaneus Myiasis

- The egg: deposited on the wound
- The larvae are able to burrow through necrotic or healthy tissues with their chitinious mandibular hooks
- Tissues destruction.
- Their progress is facilitated by secondary bacterial infection and by their proteolytic secretions.
Cutaneous myiasis
Larva *Chrysomyia megacephala*
Identification of larvae
Identification of pupae and adult fly
Diagnosis

1. From morphology of the larvae particularly characteristic of the posterior spiracle.
2. Identification of adult flies
   - take the larvae from the lesion
   - culture in a breeding medium until adult stage
   - identify the species of the adult flies
Treatment

1. Paralyzed the larvae with chloroform and then extract by forceps.
2. Anthelmintic drug may be used for intestinal form.

Control of flies by:

1. Reduction of breeding places (eg. destruction of garbage disposal)
2. Fly trap (ultraviolet, glue)
3. Insecticides
Pediculosis

- associated with people living crowded together with limited facilities for regular bathing and laundering

- the condition is most common during stressful time such as war and in concentration camps, evacuation centers, schools and institutions.

- Three lice that infest humans: *Pediculus humanus capitis*, *P. h. corporis*, *Phthirus pubis*
Pathology

- The lesions are produced by the bites of both young and adult lice
- The lesions due to the **head louse** occur most frequently on the back of the head and neck, although they may be present anywhere on the scalp
- The lesions due to **body louse** is present on the parts of the body in close contact with clothing
Pedicululosis
Phthirus pubis/
Crab lice

- small grayish-white insects
- short abdomen: hairy lateral tufts
- large second and third pairs of legs which give a crab-like appearance.
- most commonly found on pubic hairs
- may be found on hairy areas of the chest, armpits, eyebrows, eyelashes.
Pathology

- The lesion due to the **crab louse** is in the pubic region but may appear on the hairy parts of the abdomen, thorax, axilla and the beard.

- The irritating saliva, injected during feeding produces a rosette elevated papule accompanied by severe itching. Individuals vary in sensitivity. In chronic infestations, the reaction may be slight.
Scratching increases the inflammation and may lead to secondary bacterial infection with the sequelae of pustules, crusts, supurative processes, matted hair.

Severe infestations may lead to scarring, induration and pigmentation of the skin and even ulceration.

Infestation of the eyelashes through secondary infection leads to conjunctivitis and keratitis. The symptoms are those of cutaneous irritation, loss of sleep and psychological depression.
Phthiriasis
Phthiriasis
Control of body lice

- Ordinary laundering with hot water will destroy all stages of lice on infested clothing and bedding.
- Pressing cloth at home is also satisfactory, but special attention must be given to the seams.
- Dry cleaning may be used to destroy lice on wool garments.
- Insecticide: 1% lindane or 1% malathion,
Control of head lice

- For school boys, men, or prisoners of war, a very close hair cut or even shaving the head to remove the eggs and lice is a simple, inexpensive method of controlling head lice.

- A simple treatment for crab louse control is shaving or cutting the infested hair to remove the lice and eggs.

- The best materials are 1% permethrin or 1% lindane.
Allergy Caused by Insects

The condition of being specifically hypersensitive to certain insect proteins is a fairly common and widespread phenomenon among persons working habitually with bees or collections of dead insect, or exposed for longer periods of time to pulverized insect parts, scales of butterflies, moths, and caddisflies.
**Dermatophagoides pteronyssinus**

- House dust mite
- Size 0.2 – 1.2 mm
- Adult & nymph: 4 pairs of legs
- Larvae: 3 pairs of legs
- The legs are equal in length and structure
Life cycle

- Habitat: House dust in carpets, mattresses, pillows, furniture, animals, floor etc
- Metamorphosis: egg-larva-nymph-adult
- The egg: 6 days
- The nymphal stage: 8-15 days
- Adult live:
  - males 60-80 days
  - females 100-150 days
Pathology

Mite $\rightarrow$ produces allergen $\rightarrow$ the allergen contaminate environment $\rightarrow$ dust particles $\rightarrow$ dust particles contaminated with the allergen $\rightarrow$ are inhaled by the persons $\rightarrow$ persons get sensitized $\rightarrow$ dermatitis, asthma
Factor influence the growth
- Food: human scales
- Relative humidity: 80-90%
- Temperature: 24-26 C

Control
- Expose mattresses, carpets etc to sunlight (6 hours)
- Clean the house
- Insecticide:
  - 1% lindane or
  - benzyl benzoate
Cutaneous larva migrans
(creeping eruption)

- a dermatitis characterized by serpiginous, intracutaneous lesions caused by migration of nematode larvae that normally do not infect the human host
- The hookworm of cats and dogs, *Ancylostoma braziliense*, is most commonly incriminated
- *A. caninum*, are in rare cases the etiologic agents
- The Infective larvae of other nonhuman helminthic parasites can enter the human skin, or even be ingested, and fail to complete their development → produce skin eruptions by allergic sensitization
Pathology and Symptomatology

- At the points of larval invasion, indurated, reddish, itchy papules develop.
- In 2 to 3 days narrow, linear, slightly elevated, erythematous, serpiginous, intracutaneous tunnels, 1-2 mm in diameter, are produced by the migratory larvae.
- They move from a fraction of an inch to more than an inch per day but rarely pass beyond a few inches from the original site of entry.
Vesicles form along the course of the tunnels, and the surface becomes dry and crusty.

Local eosinophilia and round-cell infiltration may be present.

The itching is intense, especially at night when one has nothing else to distract one’s attention, and the resultant scratching may lead to secondary infection.

The feet, legs and hands are most commonly involved, but inflection of any portion of the body exposed to infested soil may occur.
Treatment

- Mebendazole or albendazole 2-3% is applied topically to the lesions.

- Light infections with only several larvae may be managed by freezing an area in the active portion of the lesion with ethyl chloride or carbon dioxide snow.

- If secondary bacterial infection is present, it should be treated with antibiotics.
Prevention

- avoiding skin contact with soil that has been contaminated with dog or cat feces
- keeping dogs and cats off beaches and away from the space under houses
- children’s sandboxes should be covered when not in use.
- anthelmintic treatment of dogs and cats will prevent contamination of the soil
Enterobius vermicularis
(Oxyuris vermicularis/pinworm)

Host: human
Diseases: oxyuriasis, enterobiasis
Distribution:
- Cosmopolitan
- Prevalence in Indonesia is high especially in children
Pathology

Eggs:
- expelled at the perianal region
- the gravid female: 11000 – 15000 epg
  - pruritus ani
  - ectopic infection
  - enter into the vulva, vagina, fallopian tubes, appendix
  - other symptoms
Enterobius vermicularis

Diagnosis:
- to find eggs in the perianal region (anal swab)

Treatment:
  mebendazole, pyrantel pamoate, albendazole, piperazine
Schistosoma

Eggs: released in blood stream

Trapped in tissue

Some eggs leave the tissue

Stool/urine

Hatch in water
Miracidium

Fresh water snail

Mother sporocysts

Daughter sporocyst

Cercaria

Release from the snail to the water
Cercariae → penetration through the skin → definitive host → schistosomul → blood circulation → adult worms in vein
Skin rash

- cercariae: dermatitis
- shistosomulae/adult worms/protein of the death worm:
  - urticaria
  - angioneurotic edema
  - fever
- treatment:
  - praziquantel 30 mg/kg bw, 2x/days
  - health education
**T. solium**

- scolex with rostellum: 2 rows of hooklets, alternating large and small, 4 cup-shaped suckers
- neck, stout
- strobila less than 1000 segments
- length → usually less than 3 m
T. solium: life cycle

- definitive host: man → adult worm attached to wall proximal portion of small intestine
- intermediate host: pig, man, dog → cyst in muscles/subcutaneous tissue, brain, heart, eye, etc.
T. solium: life cycle

- Route of infection (man):
  consuming raw, medium, rare cooked pork containing cysts or consuming by accident eggs from human excreta

- Route of infection (pig/dog):
  contaminated food with eggs of T. solium from human stool
Signs / symptoms

- Taeniasis: gastro-intestinal complaints
- Cysticercosis: depend on infected organs:
  - brain → seizures/epileptic, headache, changes in behavior
  - subcutaneous nodules, eye, heart disorders etc.
Diagnosis

- Enzyme-linked immunotransfer blot (EITB)
- Examine stools for ova and parasites (3 consecutive days)
- Enzyme-linked immunosorbent assay (ELISA)
- Magnetic resonance imaging
Treatment

- Cysticercosis
  - Albendazole 15 mg/kg, oral once daily during 8 days
  - Praziquantel
    - To prevent side effects: prednisone 5 mg 3 x/day during 8 days
Evaluation of treatment

Positive result of treatment if in:

- **Taeniasis**
  - Scolex found together with segments 24 hours collected stool after treatment
  - After 3 months neg. findings of eggs and or segments in stool; also by anamnesis

- **Cysticercosis**: 3 months after treatment decreasing number /no nodules found

- **Neurocysticercosis**: frequency of seizures decreased and after 2 years no seizures any more
Entamoeba histolytica

- Host: man
- Mode of infection: ingestion of mature cyst
- Morphology:
  - trophozoite form: histolytica form and minuta form
  - cyst form
Complication
- perianal and perineal amoebiasis
- perforation
- peritonitis
- ulcers in skin and vagina

Diagnosis
- histolytica forms in feces, abscess, ulcer
- immunological reactions

Therapy
- metronidazole (trophozoite and cyst form)
- chloroquin (trophozoite form)
- paromomycin (trophozoite form)
Thank you very much

For your attention