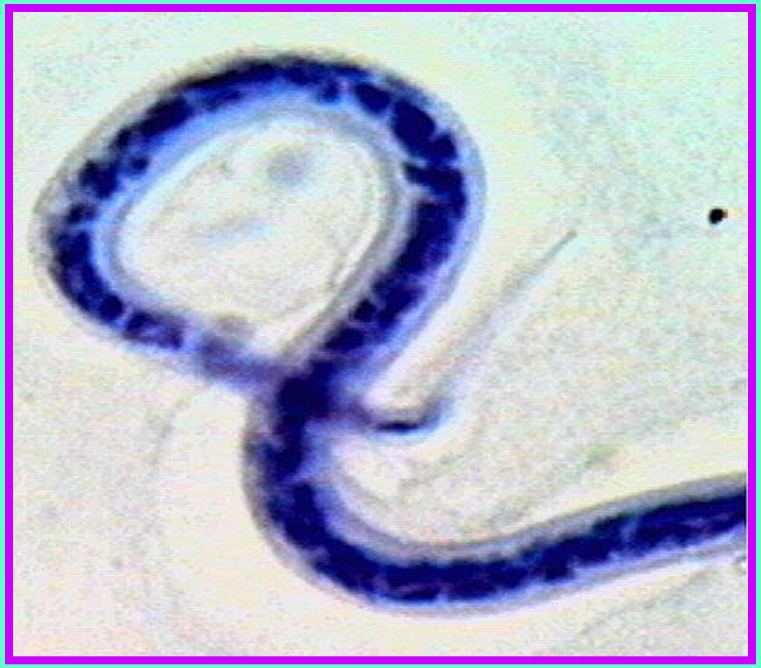
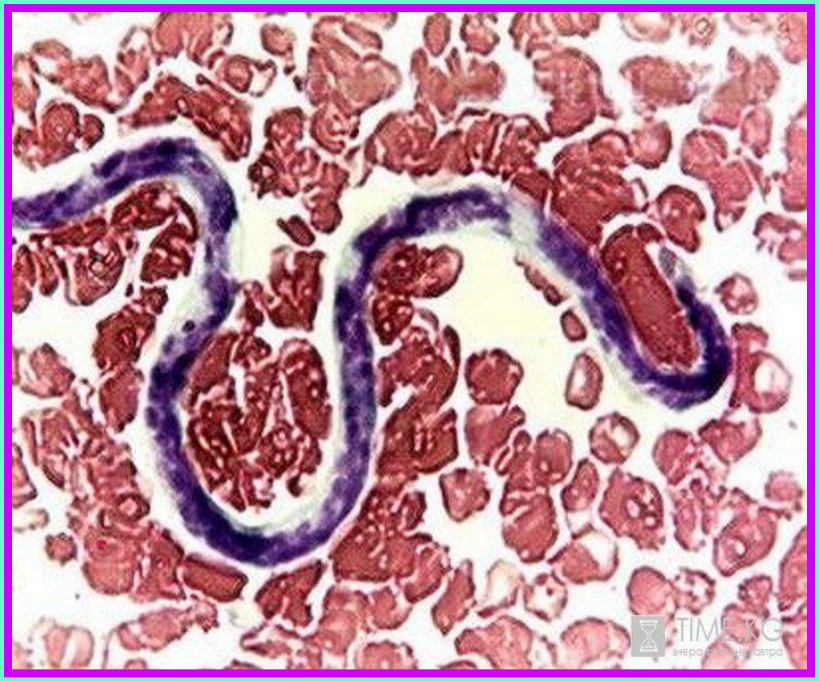
FILARIASIS





Filariasis - is tropical transmissible biohelminthiasis caused by nematodes (roundworms) that inhabit the lymphatic and subcutaneous tissues.

Eight main species infect humans:

***Wuchereria bancrofti* and *Brugia malayi* cause lymphatic filariasis**

***Onchocerca volvulus* causes onchocercosis (river blindness).**

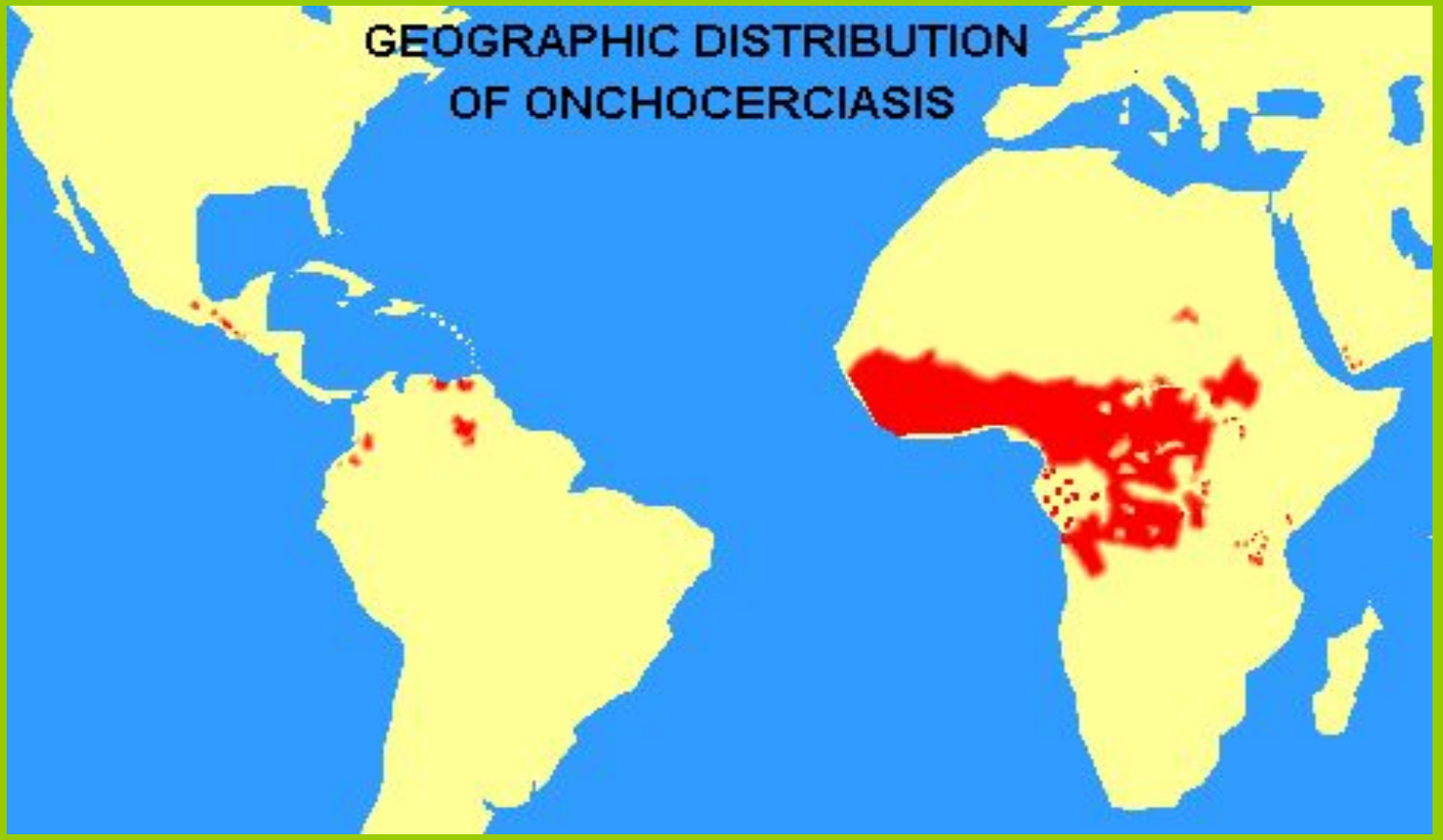
The other five species are *Loa loa*, *Mansonella perstans*, *M. streptocerca*, *M. ozzardi*, *Brugia timori*. (The last species also causes lymphatic filariasis.

Lymphatic filariasis - Wuchereriasis and Brugiasis common in 76 countries, where the risk of infection are susceptible to 905 million, of which 90 million are sick.

2\3 of affected live in China, India, Indonesia, many countries of Africa and Pacific region;

Onchocercosis - is distributed in 34 countries, mainly in tropical Africa, the Volta river basin, Mexico, Columbia, Guatemala.

The number of patients 17.6 million, of which 26000 are blind.



Loa-loa disease (loaosis) - is found only in the forest zone of West and Central Africa;

General properties of filariasis:

1. They are – all biohelminths , developing with the change of owners.
2. The final host – is human, intermediate hosts of – arthropods (mosquitoes, midges, mokrets).

3. All filarias divide on male and female.
4. The adults (macrofilaria)dwell in various human tissues where they can live for several years (subcutaneous tissue – onchocercosis, loaosis, streptocercosis, lymph vessels – wuchereriasis and brugiasis connective tissue etc).

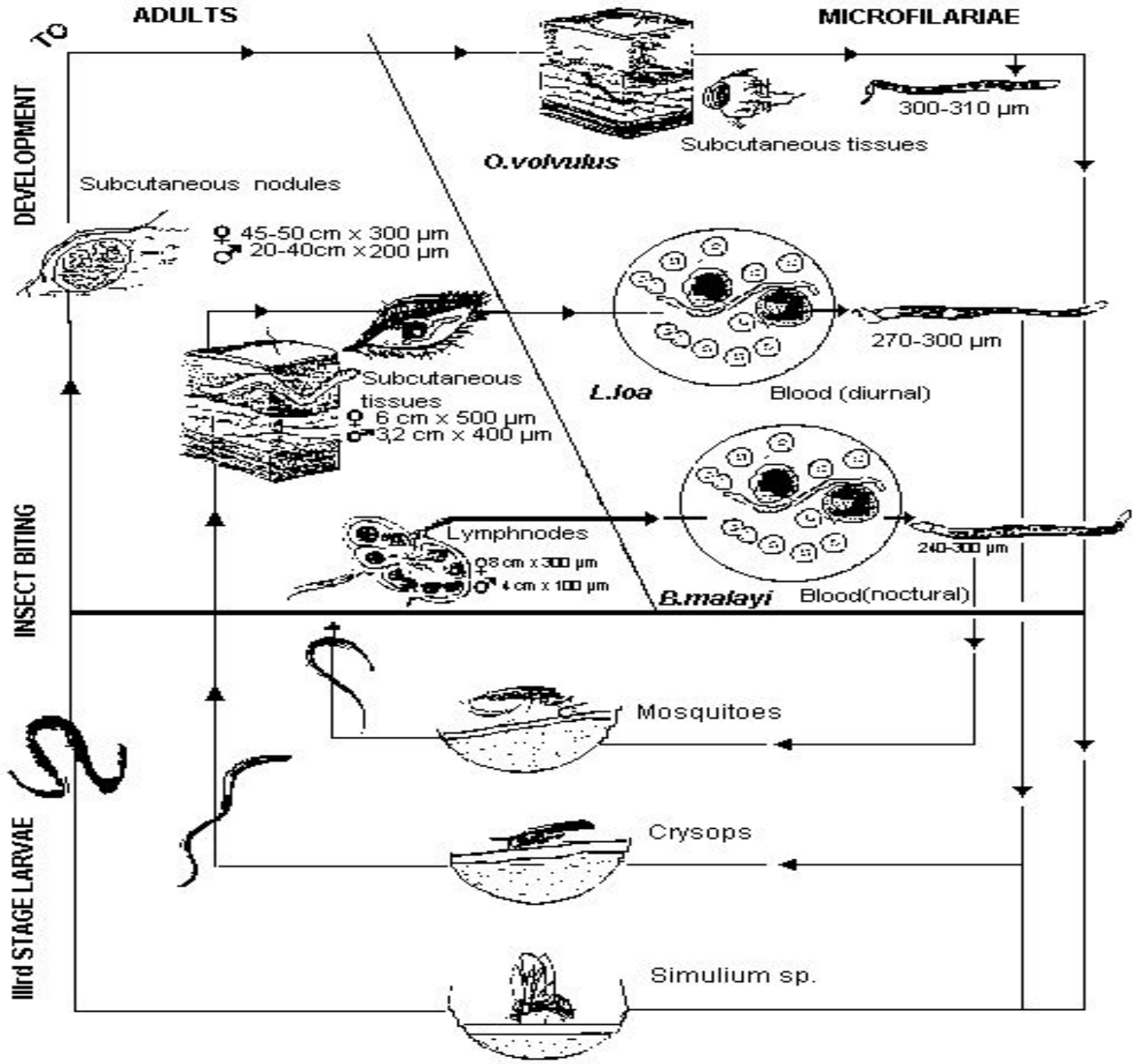
5. Females produce a larvae (microfilaria) which penetrate into blood stream or superficial skin layers (onchocercosis), they do not grow and change morphologically.
6. Length of adult males up to 50 mm, females - up to 100 mm, microfilaria - 0,3 mm.

6. The cycle of development the same for all filarias:
   human infection is only transmissible.
   Infective larvae are transmitted by infected biting arthropods during a blood meal. The larvae migrate to the appropriate site of the host's body, where they develop into microfilariae-producing adults.
7. Vectors swallow larvae at blood-suction and become infected in 2-3 weeks.

8. All filariasis have proloned incubation period - 2-18 months, when helminths reach sexual maturity.

9. Disease develops slowly.

10. Duration of the disease more than 10 years (the period of life of macrofilaria), microfilaria lives about 70 days.



LIFE CYCLE of *ONCOCHERCA VOLVULUS, LOA LOA and BRUGIA MALAYI*

11. There are three groups of filariasis depending on the concentration of larvae in the peripheral blood:

- periodical –peak of the highest concentration of larvae in peripheral blood is observed in a day or at night, in other times filarias are absent ,
- subperiodical - larvae is constantly present in the peripheral blood, but the highest concentration may be seen only in the same time of the day.
- non-recurrent – microfilarias are allways present in the blood in constant concentration.

Frequency coincides with the period of maximal activity of the vector.

Wuchereriasis and Brugiasis

(Filariasis Bancrofti, F. Malayi)

- helminthiasis affecting the lymphatic system.

ETIOLOGY: causative agent of

wuchereriasis – Wuchereria bancrofti

(Wucherer and Bancroft - scientists, who have described the helminth),

brugiasis - Brugia malayi (Brug – scientist)

Macrofilarias parasites in the lymph nodes and vessels,

microfilarias - in the blood.

EPIDEMIOLOGY: source of infection

in W.(anthroponosis) – man,

in B. (zoonosis) – human, cats, dogs, monkeys.

Vectors

of W.- mosquitoes of the Culex (in city), Anopheles, Aedes (in village);

of B. - Aedes mosquito, Anopheles (in city), Mansoni (in the wild nature).

Periodical forms of W. and B. – have night peak of filaria concentration.

Subperiodical - with daily peak in W. and night peak – in B. (natural-focal zoonosis, source - animals, a vector – Mansoni mosquito).

PATHOGENESIS:

1. Sensitization of human organism by helminthic antigens.

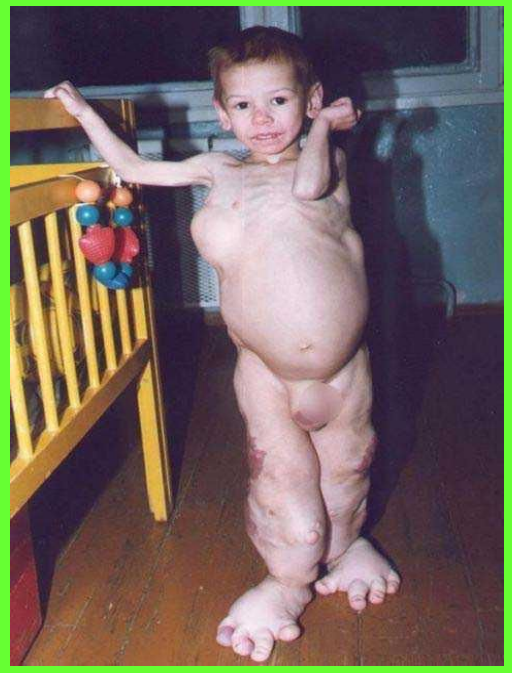
2. Mechanical damage of the lymph vessels with subsequent slowing or stopping the lymph flow.

3. Inflammatory infiltration of the walls of the lymph vessels with necrosis, subsequent fibrosis and obliteration.

4. Lymphostasis leads to the lymphadenopathy, varicose dilatation of vessels, rupture of them and lymphorrea in organs and abdominal cavity.

5. Long lymphostasis leads to elephantiasis of different parts of the body.

6. Activation of secondary infection with the development of abscesses.



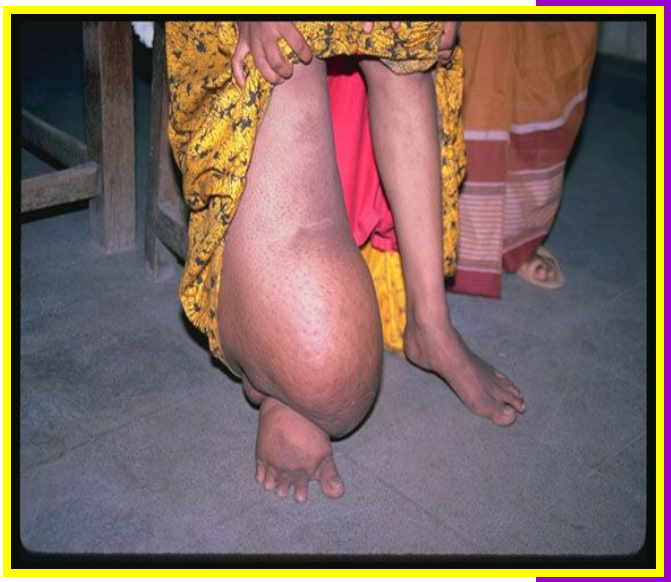
Early stage (migration) - 2-7 years

- allergic manifestations (ekssoudative erythema, swelling of the skin, fever, itching, conjunctivitis),

- episodes of lymphadenopathy or lymphangitis with temperature and malaise
(in W. - attack lasts 3-15 d
in B. - 3 weeks - 3 months)

- compactions in the testes, subcutaneous tissue due to formation of granulematose tissue around macrofilaria

Elephantiasis, Kandy, Sri Lanka, December, 2003



- funikulit, epididymitis, orchitis (in W.)

- abscesses in the upper parts of the thighs, under the fascia of abdominal muscles. They are sterile, appear and disappear slowly (in W.)

- often the crotch lymphadenitis and lymphangitis in inguinal area and axillar region (seldom) – in B.

- eosinophilic pulmonary infiltrates, hepatosplenomegaly, eosinophilia in CBC,

-

- often inflammation of lymph nodes and abscesses (Indonesia, Malaysia, Thailand), rarely - in India.

Stage of varicose dilatation of vessels:

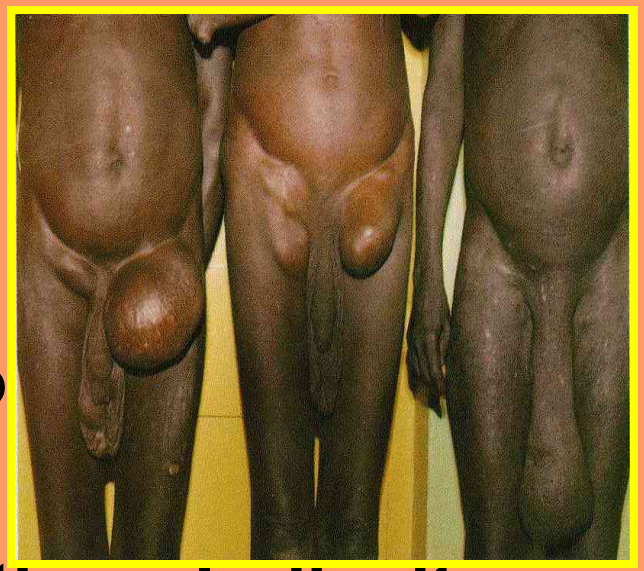
- expressed painfull lymphadenopathy due to obturation of lymp hvessele with parasites
- varicose dilatation of superficial and deep lymphatic vessels with lymphostasis

- rupture of lymph nodes in the kidney, bladder, intestine, mesenterium

-formation of aseptic abscess around the adults helminthes in the tissue, muscles, genitals, cavities, joints

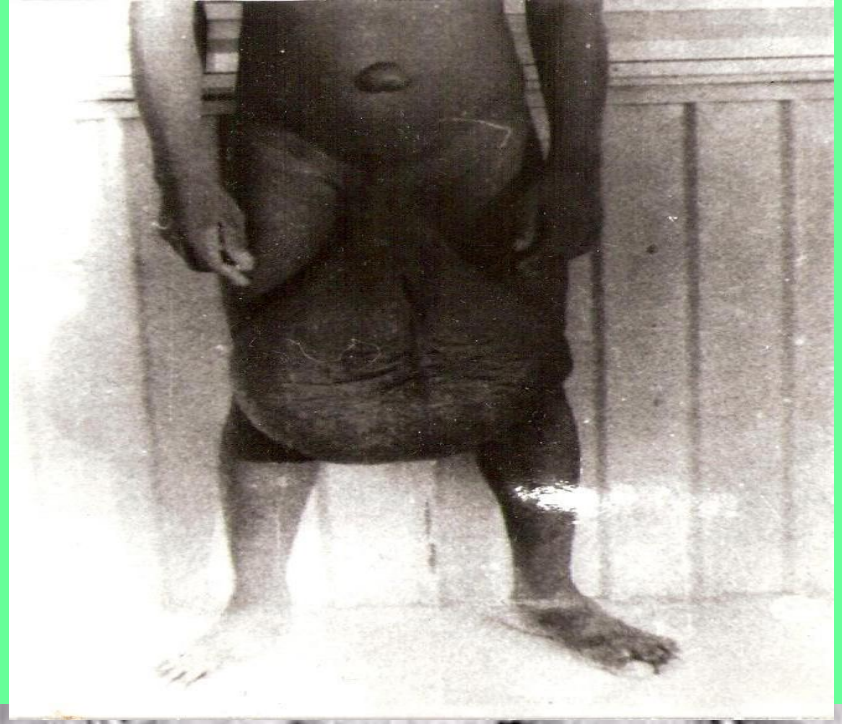
-Especially dangerous in the chest and abdomen, due to secondary infection and development of peritonitis, empiema.

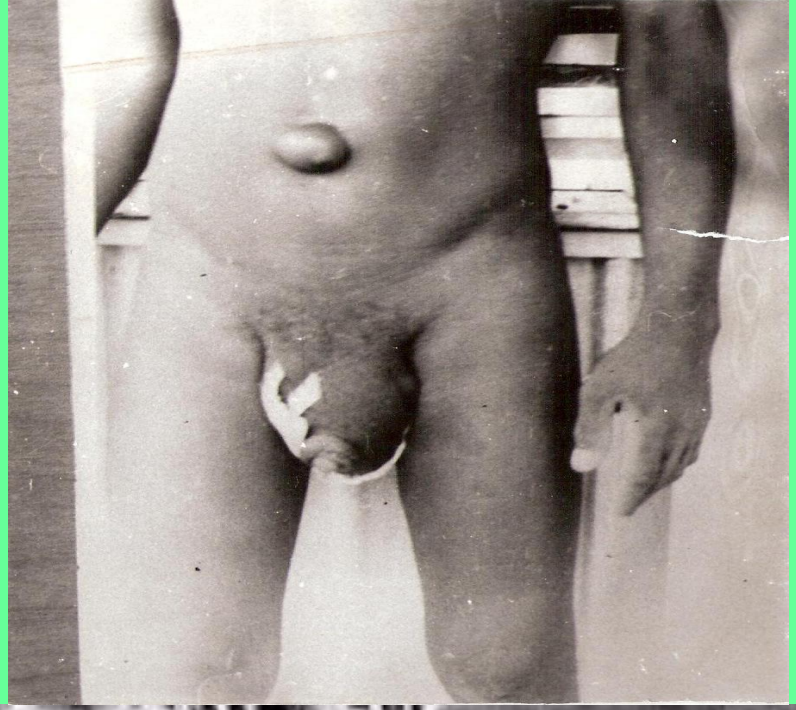
Obstruction stage (develops in 10-15 years):

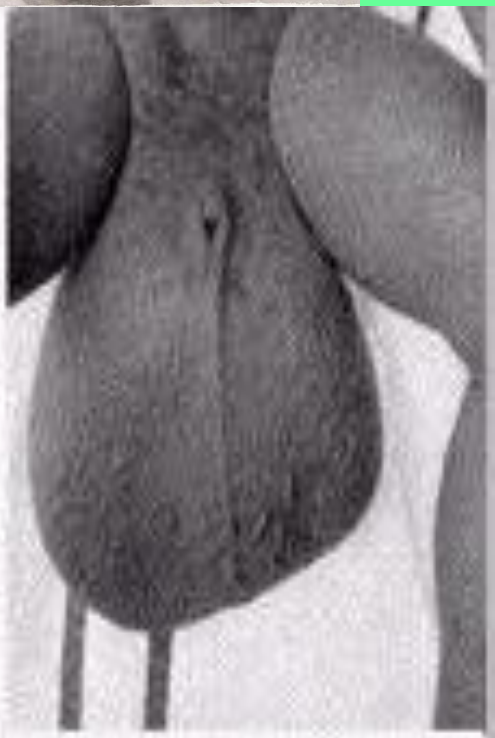


- hydrocele - is the most commo manifestation of Wuchereriasis in Africa, Egypt, Indonesia, Northern India, it should be preceded by funikulit or orchitis, may be bleeding and abscess, not typical,

- elephantiasis fever – develops due to activation of secondary microflora. It is more aggressive with the rapid course.



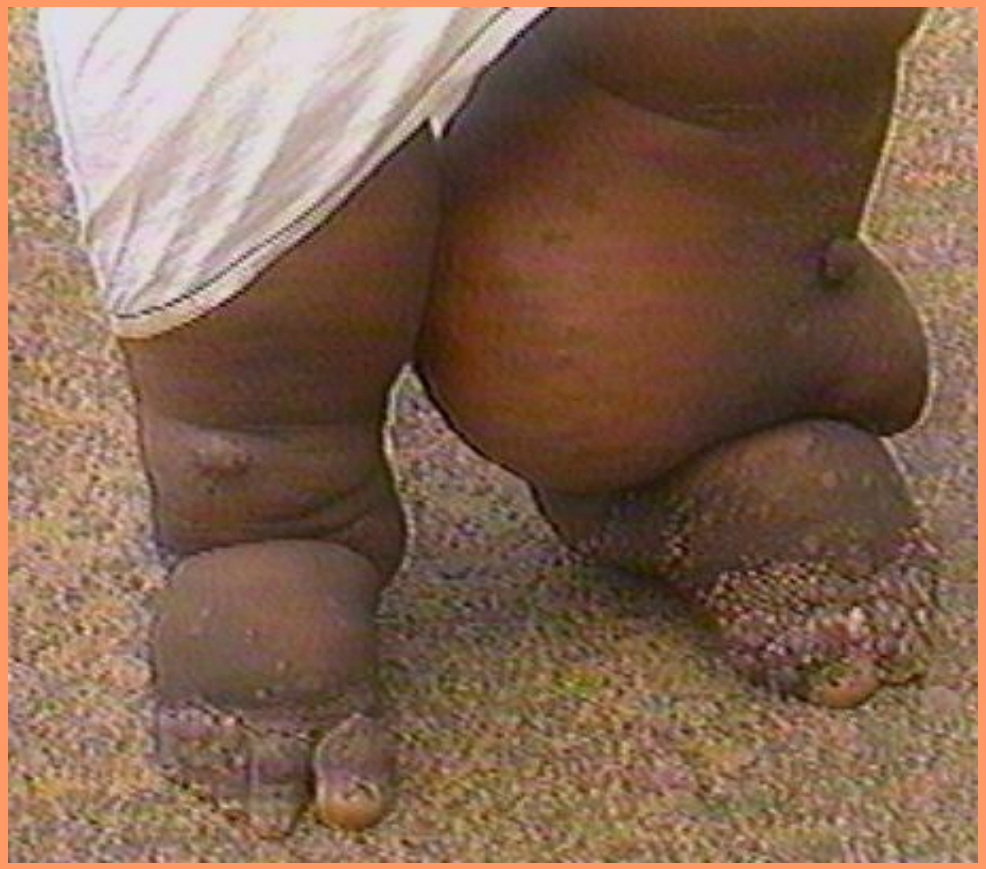




-Swelling spreads - the foot, ankle, thigh

-extremity increases in 3 times

- on the skin -
expressed folds,
papillomas,
trophic ulcers,
eczema.



IMMUNITY

- low reactivity antigens of filaria

- development of immunosuppression (serum-factors, T-lymphocytes, monocytes),

- high ratio of suppressors to helper T-cells,

-titles of IgE are high, but signs of allergic reactivity are not observed.

ONCHOCERCOSIS

River blindness

- Helminthiasis, characterised by lesions of the skin, disorder of vision, formation of connective tissue nodes in the subcutaneous layer.

ETIOLOGY

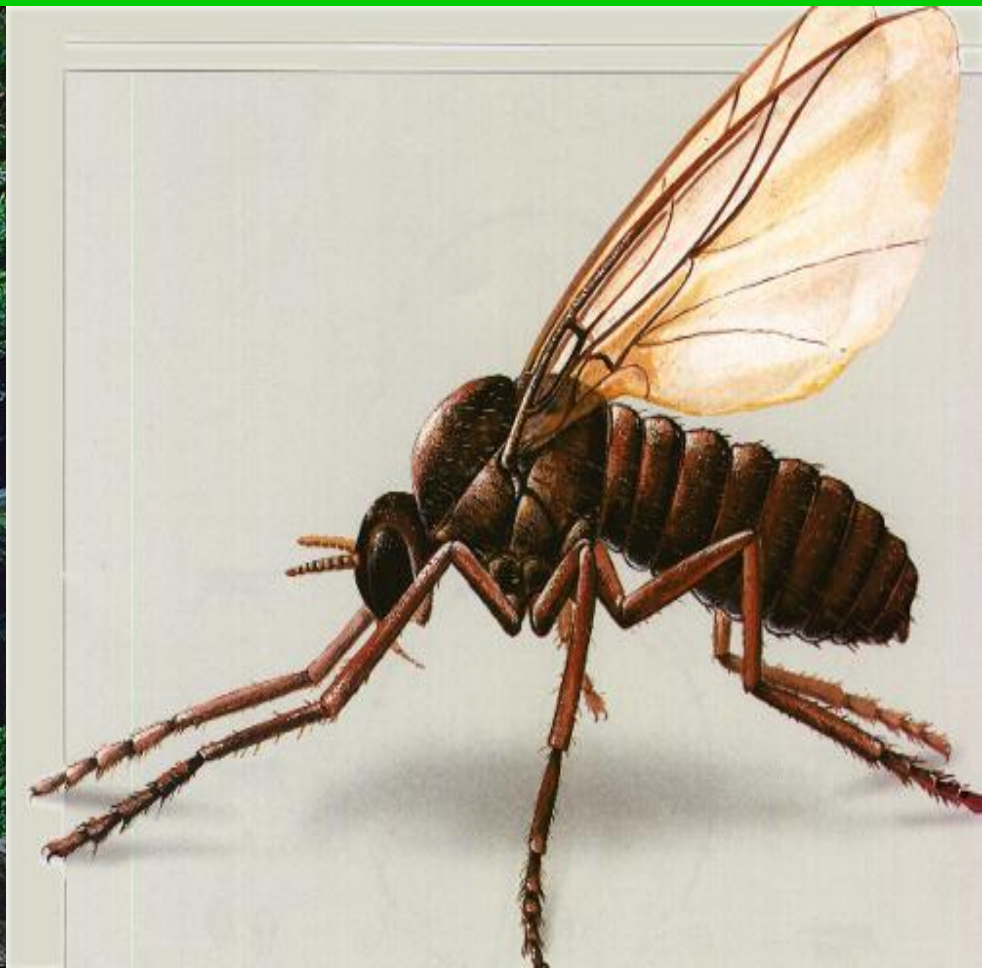
- the causative agent is Onchocerca volvulus Macrofilaria parasites in the subcutaneous layer usually in the pelvis, joints or head.

Female hatches aboute 2 million microfilaria per year, which live in the skin epidermis, environments of eye-ball and lymph nodes.

EPIDEMIOLOGY

The source of infection and the final host- only human

Vectors - gnats Simulium that lives near rapid rivers.
In Africa there are two strain - **Savannah zone** (more virulent, affects often the organ of vision that leads to blindness) and **forest zone**.
In South America affect the vision organ is rarely



PATHOGENESIS

1. Mechanical effluence of adult parasites, around which onchocercoma is formed (connective tissue node)
2. Toxic-allergic effects of mature parasites and it's larvae (especially dead worm)

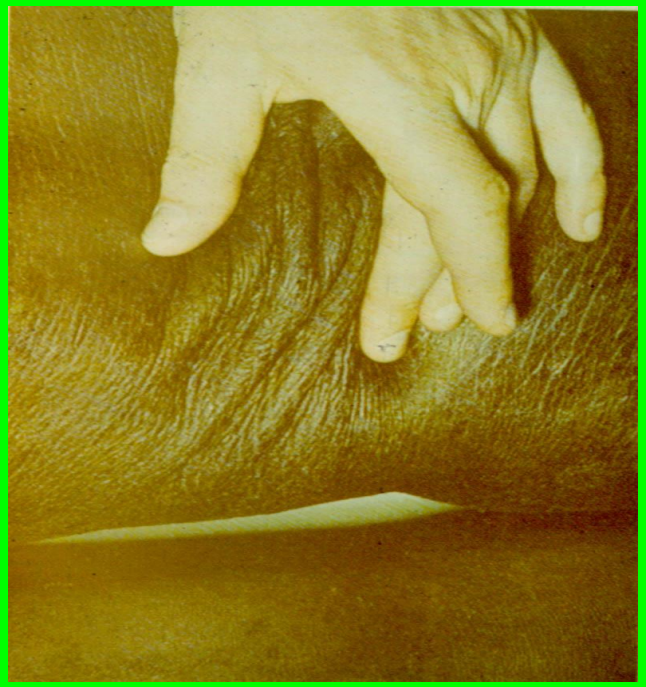
3. Penetration of the larvae in the eyeball is manifested as iritis or iridocyclitis («anterior uveitis») and/or chorioiditis or chorioretinitis («posterior uveitis»), as keratitis, conjunctivitis with subsequent development of gradual sclerosis of the eyes, optic nerve atrophy and blindness

4. Parasitizing microfilaria causes dermatitis with lymph swelling of the skin of genitals, lower extremities, and elephantiasis
5. In the final stages depigmentation, atrophy, ulceration is developed

CLINIC.

Incubation period - is about a year.

- **Itching, local swelling at the site of the bite**
- **urticar rash,**
- **subfebral fever,**
- **increased lymph nodes,**
- **spleenomegaly,**
- **eosinophilia**



Dermatitis:

In the first – expressed itching and swelling of skin, scratching,

- activation of bacterial flora («filariatous scabies»)

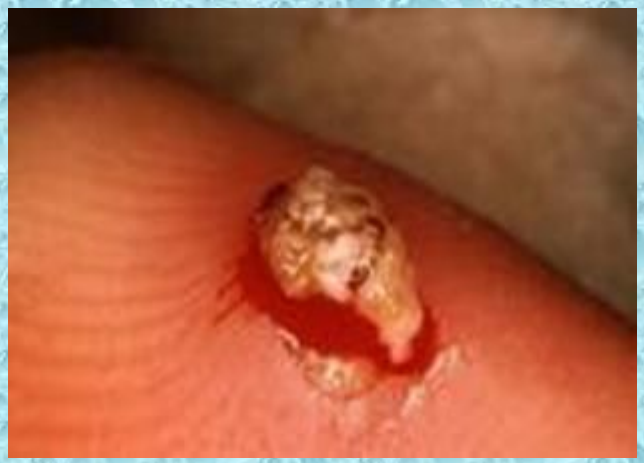
- cseroderma - dryness, peeling (skin-lizards»)

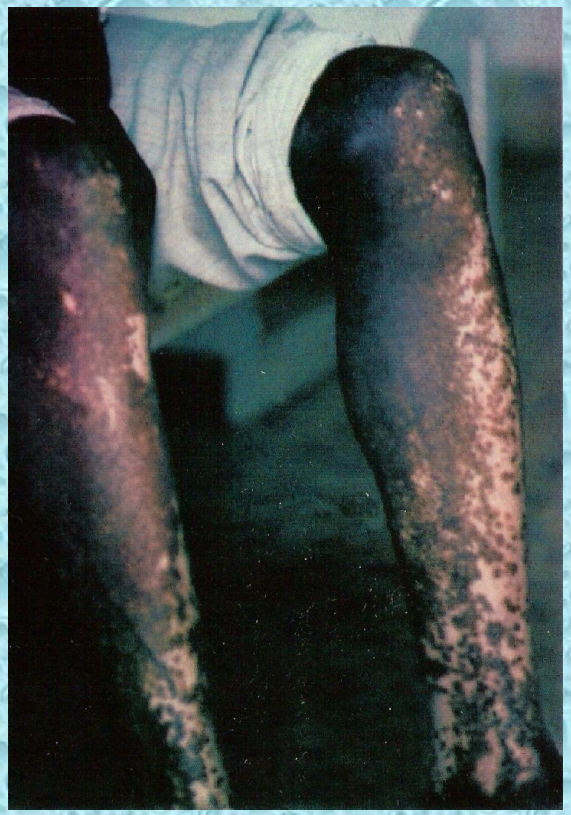
- depigmentation of the skin («leopard skin»),

- resistant atrophy, loss of skin turgor («senile dermatitis», «lion face»)

- pseudoadanitis – skin bags with subcutaneous tissues and lymph nodes - «gotentog apron», «hanging groin», «hanging armpit», hernia,

- dermatitis may occur as erysipelas with oedema, conjunctivitis and fever



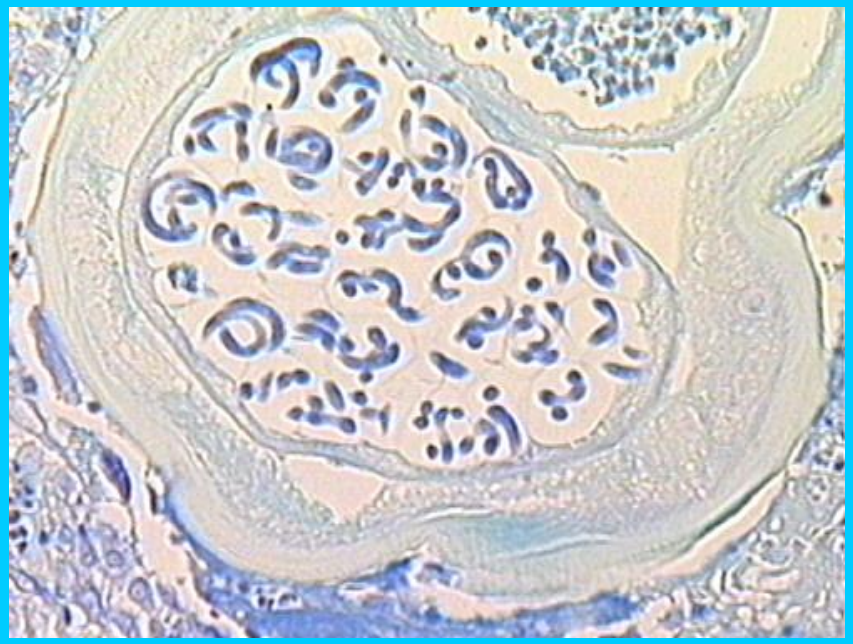


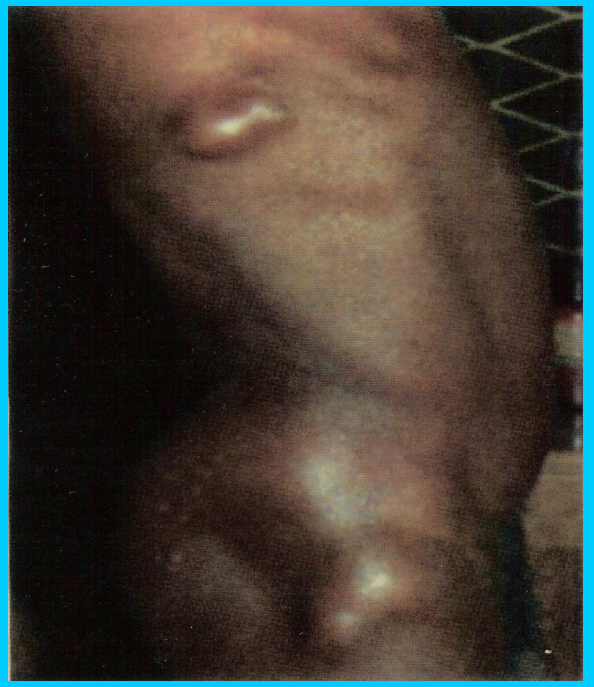
-Formation of onchocercoma - dense, mobile, painless nodes with dead or live microfilaria.

-They have different sizes (from a pea to chicken eggs), single or connected together in a thick capsule.

- In africans onchocercoma is localized below the belt (scallops iliac bone, knee joints, side of the chest).

- In americans – upper part of the body (head, neck, shoulders).



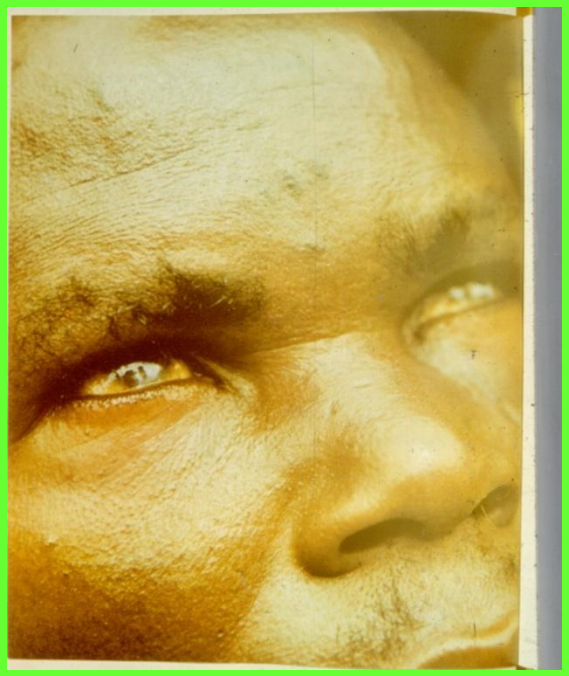


-affection of lymphatic system -
lymphadenitis (groin and armpit), lymph oedema,orchitis, hydrocele, elephantiasis of the lower limbs and genitals

- microfilaria is detected in urine, sputum, vaginal discharge, lymphatic and blood circulation system, saliva, cerebrospinal fluid, liver, kidneys, lungs, spleen

Onchocercosis is a systemic disease

Affection of eyes



-corneal-conjunctivitis syndrome:

- pruritus, tearing, photophobia,

-blepharospasm.

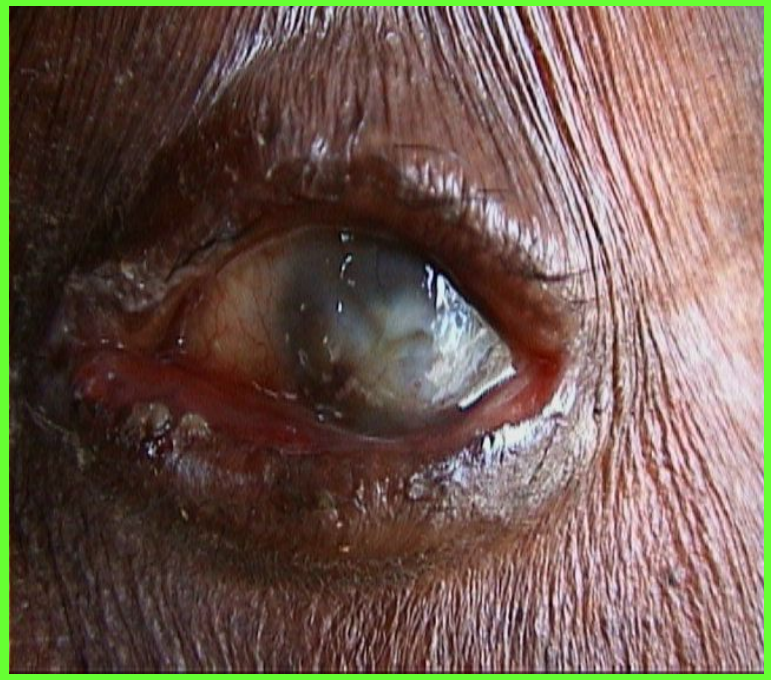
-pointed keratitis, sclerosis, degeneration and corneal ulcer.

-reduced visual function:

Iritis, iridotsyklitis, chorioretinitis.

Transparency of the conjunctiva is lost,

the lens is cloudy, overgrown pupil.



-neuritis and optic nerve atrophy and blindness.

LOAOSIS
(Calabar swelling disease)

Helminthiasis, characterised by the swelling of soft tissues, affection of eyes and genital organs.

ETIOLOGY

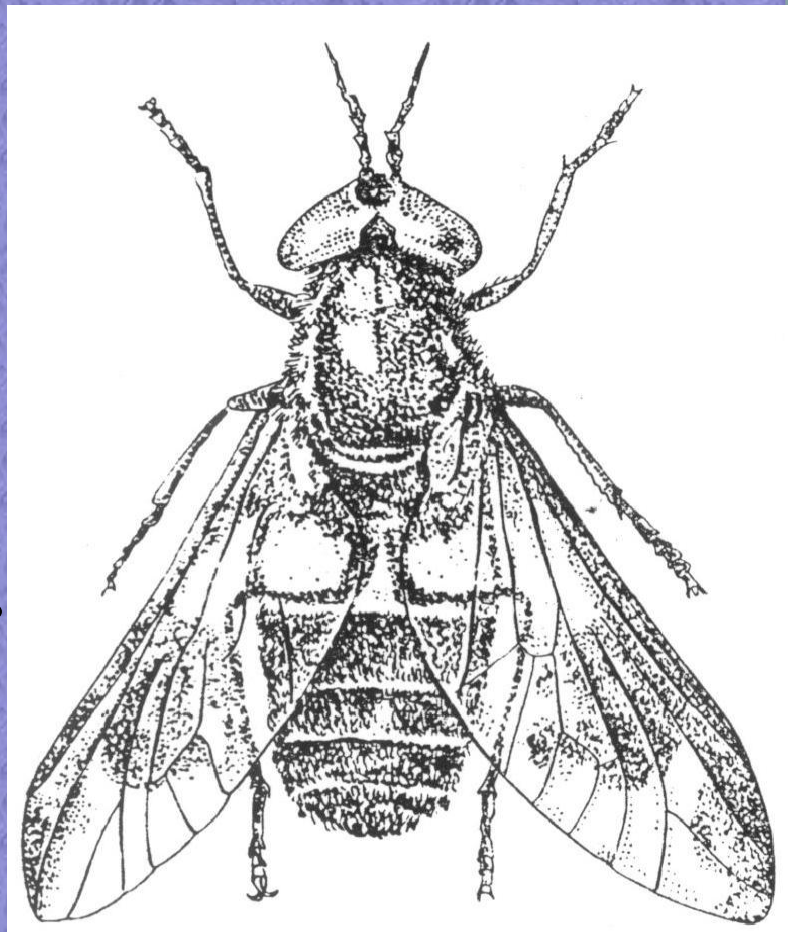
Pathogen - Loa loa, adult worm parasites under the conjunctiva of the eye and pericardium, microfilaria – in the blood in afternoon.

EPIDEMIOLOGY

Source of invasion - man (sometimes monkeys)

Vectors - horse-flies of the genus Chrysops that lives in small water reservoirs.

Adult flies live in trees and attack in the afternoon, prefer people with dark skin.



PATHOGENESIS – the same to other filariasis

CLINIC

Incubation period - 4 months, more than a year.

1. Skin itching, rash, neuropathic pain, subfibrale fever, hypereosinophilia.

2. Calabarien swelling on limited areas of the body (often on the extremities), disappears slowly, painless, skin is pale, hot, fossa is not remain.

3. Swelling, hyperemia of the conjunctiva, pain, lacrimation. Helminth is visible by eyes.

4. Symptoms are correspond to the place of helminth migration (dysuria, meningoencephalitis, neuritis, nephrotic syndrome, hydrocele).

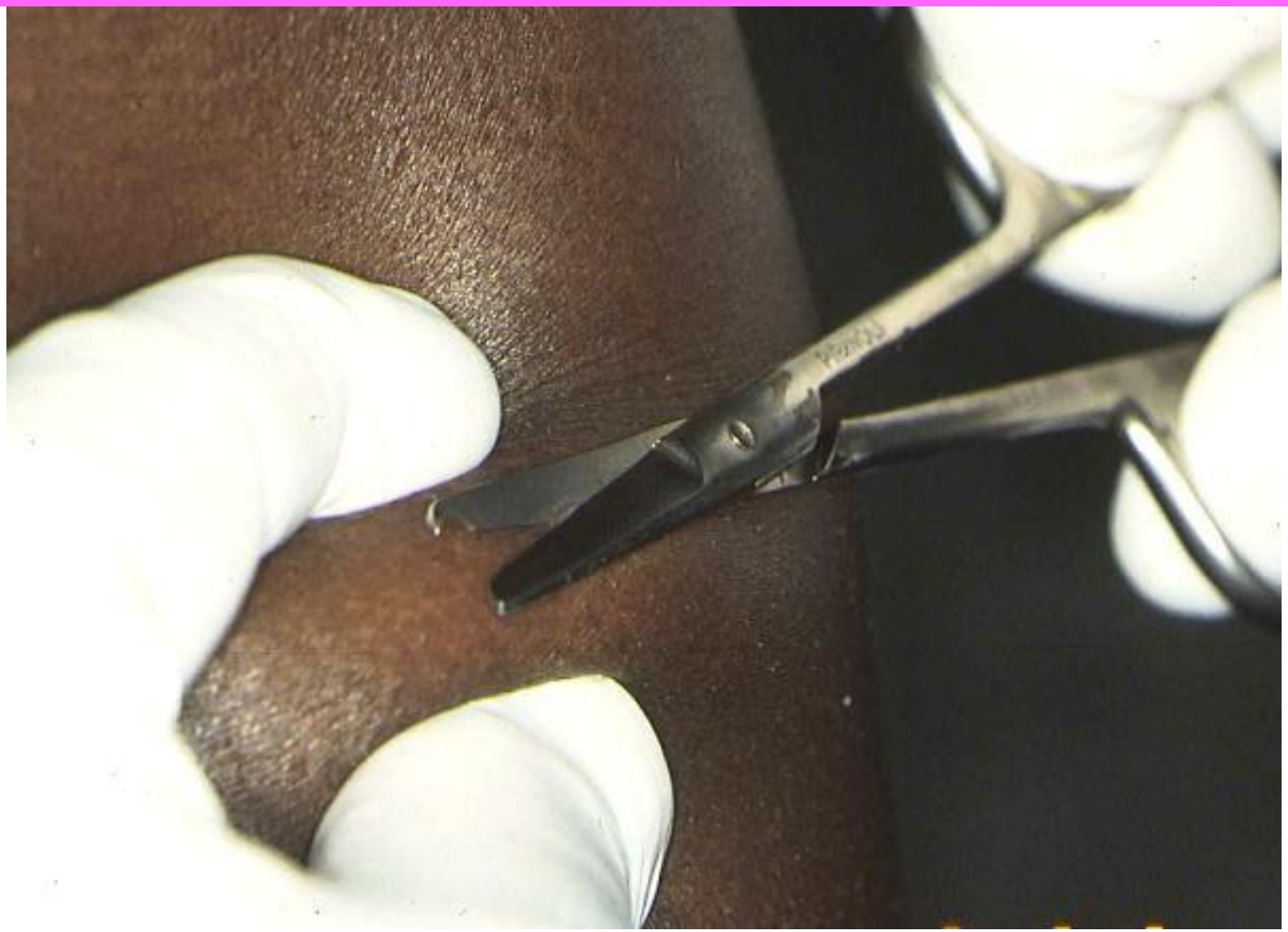
5. Abscesses around the dead worms.

6. Sometimes parasites visible under the skin and come out through the skin.

LABORATORY DIAGNOSTICS

1. Detection of microfilaria in the blood smear and thick drops in the painted and unpainted preparations with a quantitative assessment of microfilariemia.

2. Detection of microfilaria in the skin sections received with sclera –corneal perforator (onchocercosis).



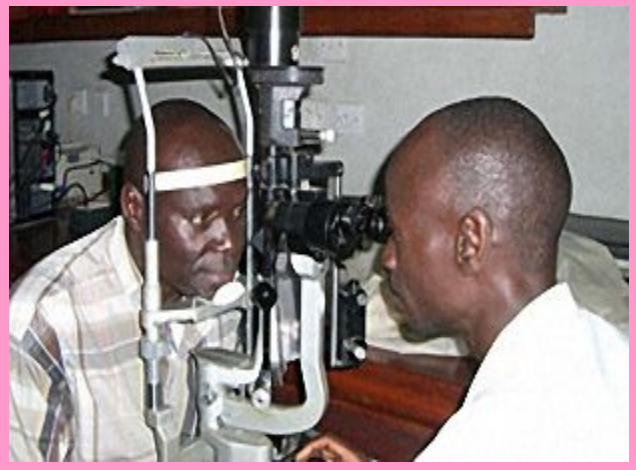
3. Detection of microfilaria in urine (W. and B.).

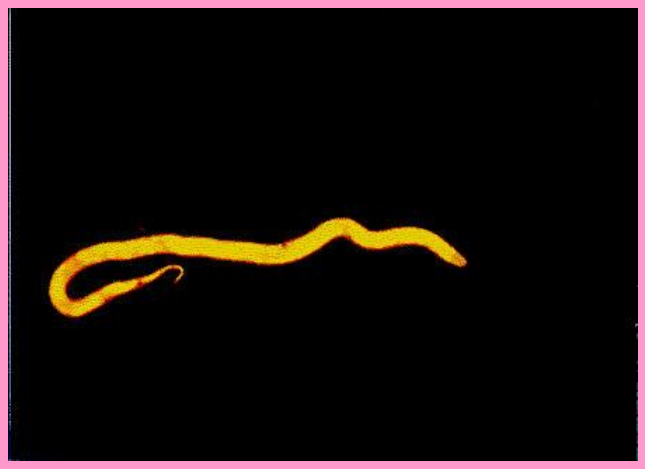
4. Ophtalmoscopic detection of microfilaria in the front eye cavity (onchocercosis).

5. Detection of helminth under the conjunctiva directly (loaosis).

6. Mazotti-test with ditrasune (except for loaosis).

7. Immunological methods (CBR, RIHA).





TREATMENT

Dietylcarbamasepine - is effective in acute and chronic stage, in latent filariasis

6 mg /kg /day (after meal) - 12 days (from 3 to 6 mg / kg / day).

In loaosis - on the first day - 1\2 of doses, gradually increasing to 0.1 (3-4 times) - 2-3 weeks.

Onchocercosis:

Dietylcarbamasepine (initial dose reduced) -12 days

Antripol (suramin)- 10% - 5ml - 1st day

10% - 10 ml - 2nd day

10% - 10 ml -1 times in 7 days -

5-7 weeks

Ivermectine (mektisane) 150 mg\kg 1 time in 6 months.

PREVENTION

1. Straggle with the intermediate hosts

2. Improvement of the source of the invasion: therapy of sick people

3. Sanitary-hygienic measures on improvement of settlements (water, sewerage, shower and other).

4. Individual prevention - protective clothing at risk groups.

5. Health education of the population (not pollute the water with feces, not to swim and others).

6. Sanitary supervision over natural reservoirs


Thank you for attention!
Stay healthy!