**ONCHOCERCIASIS (RIVER BLINDNESS)**

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| Onchocerciasis is the result of infection by the filarial *Onchocerca volvulus*. **MODE OF TRANSMISSIOM**The infection is conveyed by flies of the genus *Simulium* which inflict a painful bite. The flies breed in rapidly flowing, well-aerated water The larvae being attached to submerged vegetation, rocks or crabs. Adult flies bite during the day both inside and outside houses. **Humans are the only known definitive hosts.****EPIDEMIOLOGY** |

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| Onchocerciasis is endemic in sub-Saharan Africa, Yemen, and a few foci in Central and South America. It is currently estimated that 17.7 million people are infected, with 500 000 being visually impaired and 270 000 blind.   |

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| **PATHOLOGY** **Infective larvae** of O. volvulus are introduced into the skin by the bite of an infected **Simulium fly.**The worms mature in 2-4 months and live for up to 17 years in subcutaneous and connective tissues. At sites of trauma, over bony prominences and around joints, fibrosis may form nodules around adult worms which otherwise cause no direct damage. Innumerable microfilariae, discharged by the female O. volvulus, move actively in these nodules and in the adjacent tissues, are widely distributed in the skin, and may invade the eye. Live microfilariae elicit little tissue reaction, but dead ones may cause severe allergic inflammation leading to hyaline necrosis and loss of collagen and elastin. Death of microfilariae in the eye causes1. **conjunctivitis**,
2. **sclerosing keratitis** with pannus formation,
3. **uveitis** which may lead to **glaucoma and cataract and**
4. less commonly, **choroidoretinitis and optic neuritis**.

**CLINICAL FEATURES** * The infection may remain symptomless for months or years. The first symptom is usually
* Itching, -localised to one quadrant of the body and later becoming generalised and involving the eyes.
* Evanescent oedema of part or all of a limb is an early sign, followed by
* Papular urticaria spreading gradually from the site of infection. This is difficult to see on dark skins, in which the most common signs are
* Papules excoriated by scratching,
* Spotty hyperpigmentation from resolving inflammation, and more chronic changes of a rough, thickened or inelastic, wrinkled skin.
* Superficial lymph nodes enlarge and may hang down in folds of loose skin at the groins.
* Hydrocele,
* Femoral hernias and scrotal elephantiasis occur.
* Firm subcutaneous nodules (onchocercomas) occur in chronic infection, and are palpable and 1 cm or more in diameter.

**Eye disease***is most common in highly endemic areas and is associated with chronic heavy infections and nodules on the head. Early manifestations include itching, lacrimation, conjunctival injection and evidence of the features listed under 'Pathology'. Classically, 'snowflake' deposits are seen in the edges of the cornea.***INVESTIGATIONS**1. ***N/B*** *The finding of nodules or characteristic lesions of the skin or eyes in a patient from an endemic area, associated with eosinophilia, is suggestive.*
2. **Skin snips or shavings,** taken with a corneoscleral punch or scalpel blade from calf, buttock and shoulder, are placed in saline under a cover slip on a microscope slide and examined after 4 hours. Microfilariae are seen wriggling free in all but the lightest infections.
3. **Slit-lamp examination** may reveal microfilariae moving in the anterior chamber of the eye or trapped in the cornea. **Incision of a node-** A nodule may be removed and incised, showing the coiled, thread-like adult worm.
4. **Filarial antibodies** may be detected in up to 95% of patients, but antibody positivity can be much lower in lightly infected expatriates.
5. *If the test is negative, a test dose of DEC is given to see whether it aggravates the rash.*

**MANAGEMENT** 1. **Ivermectin**, in a single dose of 100-200 μg/kg, kills microfilariae and prevents their return for 9 months.
2. **Prednisolone** 20-30 mg may be given daily for 2 or 3 days. In the rare event of a severe reaction causing oedema or postural hypotension,
3. Retreatment with **ivermectin** may be necessary.

**PREVENTION** 1. Mass treatment with ivermectin is in use. It reduces morbidity in the community and prevents eye disease from getting worse.
2. Simulium can be destroyed in its larval stage by the application of insecticide to streams.
3. Long trousers, skirts and sleeves discourage the fly from biting.

**DRACUNCULIASIS (GUINEA WORM)** Another tissue-dwelling nematode is the Guinea worm (*Dracunculus medinensis).* Infestation manifests when the female worm, over a metre long, emerges from the skin.MOT Humans are infected by ingesting a small crustacean, Cyclops, which inhabits wells and ponds and contains the infective larval stage of the worm. The worm was widely distributed across Africa and the Middle East but after a successful eradication programme is now seen only in sub-Saharan Africa. **MANAGEMENT** Traditionally, the protruding worm is extracted by winding it out gently over several days on a matchstick. The worm must never be broken. Antibiotics for secondary infection and prophylaxis of tetanus are also required. **PREVENTION** The global elimination campaign is based on the ---*provision of clean drinking water and eradication of water fleas from drinking water. The latter is being achieved by simple filtration of water through a plastic mesh filter and chemical treatment of water supplies.* **TREMATODES (FLUKES)** These **leaf-shaped** worms are parasitic to humans and animals. Their complex life cycles may involve one or more intermediate hosts, often freshwater molluscs. **SCHISTOSOMIASIS (bilharziasis)**Is a trematode infection caused by parasite of the genus SchistosomaSchistosomiasis (bilharziasis) is one of the most important causes of morbidity in the tropics . There are three species of the genus Schistosoma which commonly cause disease in humans: namely 1. S. haematobium,
2. S. mansoni and
3. S. japonicum.

The manifestation results from the host’s reaction to the foreign protein [eggs]. Recent travellers, especially those overlanding through Africa, may present with eosinophilia; residents of schistosomiasis-endemic areas are more likely to present with chronic urinary tract pathology or portal hypertension. **DISTRIBUTION****S. haematobium was discovered by Theodor Bilharz in Cairo in 1861 and the disease is sometimes called bilharziasis.** **Schistosome eggs have been found in Egyptian mummies dated 1250 BC****S. haematobium is the commonest in Kenya.They are found in Lake region, Coast , Tana River.****They tend to spread in new irrigation schemes –mainly in the Tropical region*** ***N/B***
* ***Adult worms do not replicate in human host***
* ***Severity of the disease depends on the worm load [Cercariae]***
* ***There is no immunity in Schistomiasis***
* ***Eggs areextremely antigenic leading to severe immunity response and tissue destruction***
* ***Adult worms can leave for about 20 years and more.***

**LIFE CYCLE** The ovum is passed in the urine or faeces of infected individuals and gains access into fresh water where the *ciliated miracidium* inside it is liberated;The miracidium enters its **intermediate host**, a species of **freshwater snail**, in which it multiplies . Large numbers of **fork-tailed cercariae** are then liberated into the water, where they may survive for 2-3 days.  The Cercariae can penetrate the skin or the mucous membrane of the mouth of their definitive host--MAN.  Once in man,they transform into schistosomulae then moult as they pass through the lungs and are carried by the blood stream to the  --liver and so to --the portal vein where they mature into ADULT worm.  Within 4-6 weeks of infection they migrate to the venules draining the pelvic viscera, where the females deposit ova.*N/B* * *The adult S. haematobium –swims upstream from the liver to come and localize in the urinary bladder wall and rectum.*
* *Mansoni (also japonicum) localize in rectum*

 *from where the eggs are liberated into faeces or urine then into the lungs**some eggs may re-enter the circulation—systemic veins and gain access into the right side of the heart through the lung to the left side of the heart into systemic arteries to reach the Portal CIRCULATION---these becomes trapped into the lungs and liver causing scarring**Some eggs may pass via anorectal anastomosis and reach the CNS**The eggs of S haematobium may also involve** *Rectum*
* *Seminal vesicles*
* *Vagina*
* *Cervix and*
* *Uterine tubes*

*Mansoni and Japonicum involve* * *Mainly the walls of lower bowels and*
* *the liver*
* *Haematobium likes tempoaraly water*
* *Mansoni like ponds dams etc*

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| *Adult in portal circulation* |

*HOST* *EGGS*In bladder ,/ in haemorrhoidal plexus,/ in rectumin

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| *Penetrates SKIN of man-wadding in water* |

 *Hatch in water* *[MIRACIDIA]*  *[CERCARIA]*  *INTERMEDIATE HOST*

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| *Miracidia enter Fresh water snail* |

**PATHOLOGY** The pathological changes and symptoms depend on species and stage of infection . Most of the disease is due to 1] the passage of eggs through mucosa and  2] the granulomatous reaction to eggs deposited In tissue. A] **Primary infestation** I] Penetration of the skin by cercaria may produce:* + Dermatitis—Present with papular reaction which may Become vesicular
	+ Pneumonia(Katayama syndrome)—due to migration

 immature schistosome into the lungs=us ually patchy pneumonia.*N/B KATAYAMA SYNDOME=allergic phenomenon caused by Schistosoma Mansoni and Japonicumeggs .Presents with urticaria/ eosinophilia/muscle pains/joint pains/spleenomgally/cough and sweating. PARTCHY pneiumonia may be present.* *On examination hepatomegaly, splenomegaly, lymphadenopathy and pneumonia may be present. There is eosinophilia and schistosomiasis serology may be positive***B]Reaction to eggs protein-**There is tremendous inflammatory reaction to the eggs , rectum, liver and lungd A] in the bladder.[S haematobium]=Te effects encountered are -can predispose to squamous cell carcinoma of the bladder--Scarring and abscess formation--urethral and ureteric blockage- causing obstruction and hydronephrosis and renal destruction hence R.failure.B] Rectum –S mansoni The effects seen include:* + 1. rectal scarring, abscess and fistular formation
		2. Rectal obstruction-due to scarring and fibrosis

causing stricture* + 1. Rectal prolapse

C] Liver— Effects 1] Liver cirrhosis [ S. mansoni] 2] Liver failure 3] Ascites due to portal hypertension and  hypoalbuminaemia 4] bleeding tendencies 5] Oesophageal varicesD] Lungs A] Pulmonary fibrosis-leading to  -hypoxia due to restrictive lung disease  -and pulmonary hypertensionC] CNS Focal scarring to brain leading to * + - * + epilepsy
				+ dementia
				+ secondary infections

others ;*semina vesicles , the vagina cervix and fallopian tube may be damaged***CLINICAL FEATURE / S/SX**During the early stages of infection there may be itching lasting 1-2 days at the site of cercarial penetration. After a symptom-free period of 3-5 weeks acute schistosomiasis  **A]SCHISTOSOMA HAEMATOBIUM** Humans are the only natural hosts of S. haematobium .Theya affects mainly the urinary bladder,uretus,and the geinitals Highly endemic in Egypt and East Coast of Africa,(common in Mombasa) and occurs throughout Africa and the Middle East . Infection can be acquired after a brief exposure such as swimming in freshwater lakes in Africa. Presentation1. Incubation period= app 10 weeks
2. Swimmers itch-urticaria
3. Haematuria -Painless terminal haematuria i (*usually the first and most common symptom)*.
4. fever usually during evening hours
5. General malaise
6. Abdominal discomforts
7. Pain in the iliac fossa/ suprapubic –radiating to the groin
8. Frequency of micturition –when disease is long established due to fibrosed and calcified bladder
9. **Dysuria -due** frequent urinary tract infections,
	* 1. bladder or ureteric stone formation,
		2. hydronephrosis,
		3. renal functional abnormalities and ultimately
		4. renal failure with a contracted calcified bladder.
10. Disease of the seminal vesicles may lead to **haemospermia**. \
11. Females may develop

 - schistosomal papillomas of the vulva,  - and schistosomal lesions of the cervix  which may be mistaken for cancer B] SCHISTOSOMA MANSONI * N/B
* *S. mansoni mainly attacks the Large bowel*
* *Rectum is most affected.*
* *It is endemic throughout Africa, East Africa/ Nile Delta/West Africa the Middle East, Venezuela, Brazil and the Caribbean.*
* *Baboons are also affected*

Presentation1. Incubation period =approximately 5 weeks
2. Swimmers itch-at the sight of cercariae penetration
3. Fever
4. Rectal discomfort [ tenesmus] / abdominal pains
5. Allergic manifestation- urticarial
6. Headache
7. Bloody diarrhea/mucoid stained
8. Right upper quadrantpain—associated with hepatomegaly and splenomegaly
9. Rectal polyps--in severe advanced state
10. Eggs may be deposited in the spinal,cord and cause paraplegia

 **C] SCHISTOSOMA JAPONICUM** * Usually affects the small intestine and uoper part of the large intestine
* In addition to humans the adult worm infects the dog, rat, fieldmouse, water buffalo, ox, cat, pig, horse and sheep.
* Not found in Africa but is prevalent in the Yellow River and Yangtze-Jiang basins in China, Philippines, Indonesia and Thailand.

presentation * Clinical features resemble those of severe infection with S. mansoni, with added neurological features.
* The small bowel as well as the large may be affected, and hepatic fibrosis with splenic enlargement is usual.
* Deposition of eggs or worms in the central nervous system, especially in the brain, causes symptoms in about 5% of infections, notably-
* epilepsy,

 hemiplegia, blindness and paraplegia. **Diagnosis /Investigations** **A**] From clinical history and s/sx—*when there is hx of* *residence in an endemic area with*  *characteristic symptoms will indicate the*  *need for investigation*Diagnosis depends on demonstrating eggs or serological evidence of infection. In S. haematobium infection, B] LAB INVX1. **Urine Examination**

 **I] Dipstick urine testing** =shows blood and albumin. **II] Urine for Ova of SH** = The *terminal spined eggs* can be found by microscopic  examination of the centrifuged  deposit of *terminal stream urine.***B]Ultrasound** = is useful for assessing;* + 1. the Urinary tract damages
		2. Bladder wall thickening,
		3. Hydronephrosis and
		4. Bladder calcification can be detected.

**C] Endoscopy**  **Cystoscopy** reveals 'sandy' patches, bleeding  mucosaand later distortion. **D] Radiology**  **X-rays=may** indicate Calcification of the wall of  the bladder/ it can show the presence of renal  stone **S. mansoni or S. japonicum** **Stool Examination**=the characteristic egg with its *lateral*  *spine* can usually be found in the stool. **Rectal snip or rectal biopsy** can be taken with the help of a  proctoscope and should be examined for ova **Endoscopy** Sigmoidoscopy may show inflammation or  bleeding.. There is eosinophilia.  *Proctoscope***Serological tests (ELISA)** are useful as screening tests but  remain positive after chemotherapeutic cure. **MANAGEMENT** The objective /aim/ target of specific treatment is to *kill the adult schistosomes and so stop egg-laying*.1] PRAZIQUANTEL [ BILTRICIDE]Drug of choice for all forms of schistosomiasis.Dosage=40 mgs/ kg/bwt Orally stat Or 20 mgs/kgbwt bd x one day [ within 4-6 hrs interval] orally*With Japonicam =30mgs/kgbwt x 1 day**Side-effects are uncommon but include nausea and abdominal pain,headache,drowsynes,giddiness**n/b*  -cure rate in 90-100% =SH 60-90% =S.M -egg reduction = 99%2] METRIFORNATE [ BILARCIL]Commonly for S haematobium treatmentDosage; 7 months – 5 years=10 mgs/kgbwt orally-repeat dose after 2 weeks for 3 doses*Side effects;* Abdominal pains, nausea, vomiting,Action= paralyzing the worms 3] OXAMNIQUINE [VANCIL**]**Good for both mature and immature wormsActive against =MansoniCure rate =more than 95%Dosage =15mgs/kgbwt BD X2 Days Orally.Or I/M 75mgs/kgbwt STATSide effects=may cause feverContraindicated in-epileptic patient -Renal failure -Cardiac failure**2] SURGERY** may be required to deal with residual lesions e.g* Ureteric stricture and the small fibrotic urinary bladder may require plastic procedures.
* Removal of rectal papillomas by diathermy or by other means may provide relief.
* Granulomatous masses in the brain or spinal cord may require neurosurgery .

**COMPLICATIOSNS DUE TO;** **S.haematobium**1. **Scarred bladder**
2. **Obstruction of the ureter/urethra leading to**
3. **Hydronephrosis then**
4. **Renal failure**
5. **Tendencies to Ca Bladder**
6. **Liver cirrhosis and its complications**
7. **Lung fibrosis**

**S.mansoni**1. **Rectal polyps**
2. **Rectal fistula**
3. **Papilloma formation**
4. **Thickening and stenosis of the bowels**
5. **Paraplegia**

**PREVENTION** This presents with great difficulties and so far no satisfactory single means of controlling schistosomiasis has been established. Those tried were;* + 1. Personal hygiene
		2. The provision of latrines and of a safe water supply,
		3. Mass treatment of the population helps against S. haematobium and S. mansoni but this method has so far had little success with S. japonicum.
		4. Attack on the intermediate host, the snail,
		5. For personal protection, avoid contact with infected water
		6. wash vigorously and toweling if comes into contact with contaminated water.
		7. Storage of water for 3 days usually kills the cercariae
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