WEEKLY EPIDEMIOLOGICAL REPORT

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Schistosomiasis (Bilharziasis)

Introduction

Schistosomiasis is an infection caused by parasitic blood flukes known as schistosomes. The parasite is in the phylum Platyhelminthes (flatworms), class Trematodea (flukes), and order Strigeatoidea, family Schistosomatoidae. It is also known as "bilharziasis" after Theodor Bilharz who identified the parasite first in 1852. The disease is referred to as Snail fever, Katayama fever, Swimmers itch as well. There are 5 species that cause schistosomiasis in humans. They are three major species namely *S.* ***japonicum*** , *S.* ***mansoni*** *and S.* ***haematobium*** and two minor species namely *S.* ***intercalatum*** and *S.* ***mekongi***. . Out of the major species, S. mansoni and S. japonicum can provoke intestinal and hepatic complications where as S. haematobium predominantly leads to renal and bladder sequelae, although occasionally, it results in liver disease.

Epidemiology

This disease, among tropical diseases, is second only to malaria in terms of its impact humans and the third most prevalent parasitic disease in the world. Globally, it infects 1 in 30 people and remains a major public health problem, with an estimated 200 million people infected, mostly in Africa but also in rural central China and Egypt The prevalence is found to be the greatest in teenage years with higher prevalence rates being among boys than girls.

Life cycle

Humans acquire schistosomiasis Infection from contaminated freshwater containing larval forms (cercariae) of the parasite. Cercariae is released from the freshwater snail, the intermediate host, in to the water and from there they penetrate a human host. Cercariae attach to humans by suckers and migrate through the intact skin. Over the next few days, they reach the pulmonary vessels and during this migration, the cercariae metamorphose and become highly resistant to the host immune responses. The organisms, now called schistosomula, incorporate host proteins including histocompatibility and blood group antigens, in their integuments. The worms migrate through the pulmonary capillaries to the systemic circulation and the portal veins where they mature. Within the portal vessels they mate. Together they migrate along the endothelium, against portal blood flow, to veins surrounding the intestines (*S.* ***mansoni***, *S.* ***japonicum***) or bladder (*S.* ***haematobium***), where they produce eggs. The eggs number hundreds per day in African species and thousands per day in Asian species. The eggs are highly antigenic and induce an intense granulomatous response which is the primary cause of morbidity. They migrate through the bowel or bladder wall to be shed in faeces or urine. Eggs that are not shed may remain in the tissues or be swept back to the portal or to pulmonary circulation.

In water, eggs hatch in to larvae (miracidia) which penetrate the snail host where they undergo asexual changes. After several weeks, free-swimming cercariae are released and they can survive in fresh water up to 48 hours before it finds a human host to continue its life cycle.

Clinical presentation

Infection can be acute or chronic. The physical findings vary with the stage of illness, worm burden, worm location, and organs involved.

Acute infection

The acute reaction is due to the sudden release of highly antigenic eggs. The commonest acute syndrome is Katayama fever which usually occurs in children or young adults with no past exposure to the disease. So travelers to endemic areas who contract the disease usually belong to this group. Acute reaction is most likely to occur with *S.* ***japonicum***

Most acute infections are asymptomatic. The first sign may be *swimmer's itch* in which there is an urticarial response for a few days after the parasite has penetrated the skin. They can also present with malaise, arthralgia or myalgia, cough, diarrhoea and right upper quadrant abdominal pain. On examination one might find hepatosplenomegaly, lymphadenopathy and a skin rash caused by an invasion of skin by non human species.

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Chronic infection

Chronic infection can present months to years after exposure making the diagnosis difficult. It is endemic in poor, rural areas and many patients have not had an acute syndrome. Symptoms may be few or mild. They may be nonspecific or reflect the site of egg production in the mesentery or the bladder wall, the extent of damage to liver or spleen, the degree of lung involvement, and possibly other sites including the Central Nervous System.

Patients can present with bloody diarrhea, right hypochondrial pain, cramps, haematemesis from oesphageal varices as a result of portal hypertension or frequency of micturition. One can also present with haematuria which could initially be only terminal, but as it becomes more severe, red urine throughout the stream can be detected. Pulmonary hypertension may produce fatigue, dyspnoea on exertion, cough and atypical chest pain. On examination there will be features of portal hypertension.

Complications

The most important effects of schistosomiasis are the late complications that arise from chronic infection liver fibrosis, portal hypertension and its sequale and possibly colorectal malignancy in the intestinal forms obstructive uropathy, infertility and bladder cancer. Eggs can be deposited at ectopic sites like brain, spinal cord, skin, pelvis and vulvovaginal areas.

Diagnosis

Definitive diagnosis of schistosomiasis depends on demonstration of eggs in biopsy specimens, in stool by direct smear or on a kato thick smear, or in urine by examination of a urine sediment or nuclepore filtration. Antigen detection is used in endemic areas and antibody tests elsewhere. It usually takes 4 to 8 weeks for seroconversion to occur although it can be up to 22 weeks and serology remains positive for 2 years after eradication of the parasite. Blood count shows eosinophilia and anaemia and renal function may be impaired if the urinary tract is obstructed. Imaging, Electro cardiography, US scan can be used to detect complications.

Treatment

Praziquantel is the drug of choice in most cases. It exerts its effects by paralyzing adult worms with great rapidity. However, it does not have any effect on eggs or immature worms. Follow up of the patients at 4 to 6 weeks is recommended with a repeat of treatment in 6 to 12 weeks.The drug has been shown to be very safe with low toxicity and the WHO believes that it is even safe in pregnancy, lactation and in children of less than 24 months old. Oxamniquine is the only alternative. It is used in intestinal infections in Africa and South America, where praziquantel is less effective. However the use of oxamniquine is declining mainly on grounds of its cost. Derivatives of artemisinin, the anti-malarials, are under consideration for use in combination with one or more of the above as praziquantel resistance appears.

In the acute Katanyan fever, the use of corticosteroids is very important to subdue the hypersensitivity reactions. Surgical options include biopsy of suspected tissues eg. Colonic biopsy, or cystoscopy which may be used for diagnosis. Endoscopy and sclerotherapy can be used for the treatment of oesophageal varices.

Prognosis

Acute schistosomiasis has a mortality rate up to 25% in some series. Heavy infestation increases the risk of mortality. Most people with chronic schistosomiasis have few or no symptoms but complications do occur. Despite that, mortality appears to be low among 200 million infected individuals. There are an estimated 14,000 deaths per year. Drugs cure about 60-98% of cases and reduce the egg load in the rest. Dead eggs may be shed for months, but treatment arrests egg-laying, granuloma formation and future complications. Whilst gross fibrosis may not reverse, portal and pulmonary hypertension from granulomatous changes may improve significantly after treatment, particularly in the young. Pulmonary disease is less reversible However almost all patients improve with treatment. Most patients with early disease or without severe end-organ complications recover completely. Patients with heavier worm burdens are less likely to improve and are more likely to require re-treatment. Patients with end-stage complications of portal hypertension and severe pulmonary hypertension are less likely to benefit from treatment.

Methods of control

Preventive measures

- Treat patients in the endemic areas with praziquantel to relieve suffering and prevent disease progression. Regularly treat high risk groups such as school age children, women of childbearing age or special occupational groups in endemic areas.
- Educate the public in endemic areas to seek treatment early and regularly and to protect themselves from contracting the disease.
- Dispose of feces and urine so that viable eggs will not reach bodies of fresh water containing intermediate snail host.
- Improve irrigation and agriculture practices, reduce habitats by removing vegetation, by draining and filling, or by lining canals with concrete.
- Treat snail-breading sites with molluscicides.
- Individual protection: prevent exposure to contaminated water (e.g. rubber boots). To minimize cercarial penetration after brief or accidental water exposure, vigorously and completely towel dry skin surfaces that are wet with suspected water. Apply 70% alcohol immediately to the skin surface to kill surface cercariae.
- Provide water for drinking, bathing and washing cloths from sources free of cercariae or treated to kill them. Effective measures for inactivating cercariae include water treatment with iodine or chlorine. Allowing water to stand 48-72 hours before use is also effective.
- Travelers visiting endemic areas should be advised of the risks and informed about preventive measures.
- Reporting to local health authority. But in many countries it is not a notifiable disease as in Sri Lanka.
- Investigation of contacts and source of infection
- Examine contacts for infection from a common source.
- Proper and adequate treatment of the identified sources.

Epidemic measures.

- Examining for schistosomiasis and treating all who are infected, especially those with the disease and moderate to heavy intensity of infection with particular attention to children.
- Providing clean water,
- Warning people against contact with water potentially containing cercariae
- Prohibiting contamination of water with.
- Treating areas that have high snail densities with molluscicides.

Reference

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Editor wishes to thank Dr. Upekha Seneviratne for her assistance in compiling this article.

Table 1: Vaccine-preventable Diseases & AFP

04th April - 10th April 2009 (15th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	00	00	00	00	00	00	01 RP=1	01	01	21	22	-4.54%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	00	00	00	00	01	00	00	00	00	01	03	45	40	+12.5%
Tetanus	00	00	00	00	00	00	00	00	00	00	00	08	12	-33.3%
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	20	11	+81.8%
Tuberculosis	56	06	01	07	08	07	00	12	07	104	252	2407	2679	-10.2%

Table 2: Newly Introduced Notifiable Disease

04th April - 10th April 2009 (15th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	10	01	13	82	00	14	02	00	03	125	76	4456	1794	+148.4%
Meningitis	02 GM=1 KL=1	00	04 MT=4	00	0	06 PU=2 KR=4	00	00	00	12	17	301	521	-42.2%
Mumps	00	01 KD=1	04 GL=2 MT=2	00	00	07 KR=1 PU=6	01 AP=1	00	00	13	52	535	720	-25.7%
Leishmaniasis	00	00	00	00	00	00	00	00	01	01	Not available*	349	Not available*	-

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.

DPDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

National Control Program for Tuberculosis and Chest Diseases: Tuberculosis.

Table 3: Laboratory Surveillance of Dengue Fever

04th April - 10th April 2009 (15th Week)

Samples	Number tested	Number positive	Serotypes *				
			D1	D2	D3	D4	Negative
Number for current week	03	00	00	00	00	00	00
Total number to date in 2009	30	03	00	00	03	00	00

Sources: Genetic Laboratory, Asiri Surgical Hospital

* Not all positives are subjected to serotyping.

NA= Not Available.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

04th April - 10th April 2009 (15th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	20	588	0	53	0	5	0	65	0	12	4	141	0	2	0	27	0	3	**62**
Gampaha	5	308	0	44	0	6	0	19	0	9	4	90	0	3	0	27	0	2	**86**
Kalutara	4	168	0	91	0	3	0	26	0	6	1	56	0	0	0	4	0	1	**75**
Kandy	5	558	1	111	0	1	0	12	0	52	0	68	1	40	0	15	0	0	**68**
Matale	6	203	3	30	0	0	0	14	0	5	1	151	0	2	0	2	0	2	**75**
Nuwara Eliya	2	23	0	118	0	0	0	59	0	20	0	16	3	22	0	22	0	0	**77**
Galle	0	36	0	60	0	7	0	0	0	5	1	56	0	2	0	6	0	3	**58**
Hambantota	0	43	1	27	0	6	0	2	0	5	2	19	0	29	0	7	0	0	**55**
Matara	1	178	2	104	0	2	0	4	0	4	1	62	0	54	0	5	0	0	**59**
Jaffna	0	7	0	34	0	3	0	73	0	20	0	0	0	83	00	10	0	1	**100**
Kilinochchi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**100**
Mannar	0	3	0	13	0	0	0	56	0	4	0	0	0	0	0	14	0	0	**100**
Vavuniya	0	4	0	76	0	1	2	6	0	2	0	2	0	0	0	0	0	0	**75**
Mullaitivu	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**100**
Batticaloa	0	208	0	43	0	9	0	5	0	5	0	2	0	0	0	2	0	1	**100**
Ampara	0	25	0	11	0	0	0	5	0	4	0	6	0	0	0	4	0	0	**100**
Trincomalee	0	64	0	28	0	1	0	2	0	0	0	1	0	4	0	4	0	0	**90**
Kurunegala	4	233	2	53	1	4	0	17	0	1	0	37	0	42	0	20	1	5	**47**
Puttalam	0	50	0	45	0	5	0	36	0	0	0	37	0	20	0	5	0	1	**78**
Anuradhapura	4	110	0	28	0	3	0	3	0	2	3	64	0	22	0	4	0	0	**74**
Polonnaruwa	0	22	0	12	0	2	0	10	0	6	0	36	0	0	0	4	0	0	**100**
Badulla	0	22	0	77	0	2	0	16	0	13	0	33	0	24	1	76	0	0	**87**
Monaragala	0	10	0	16	0	0	0	7	0	7	0	6	0	29	0	13	0	0	**100**
Ratnapura	0	79	3	193	0	13	2	25	0	2	0	34	0	13	0	6	0	1	**61**
Kegalle	1	295	0	39	0	4	0	13	0	1	1	36	0	9	0	54	0	1	**91**
Kalmunai	0	71	0	46	0	1	0	5	0	1	0	2	0	1	0	3	0	0	**92**
SRI LANKA	**52**	**3308**	**12**	**1354**	**01**	**78**	**04**	**481**	**0**	**186**	**18**	**955**	**4**	**401**	**01**	**334**	**01**	**21**	**76**

Source: Weekly Returns of Communicable Diseases (WRCD).
*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.
**Timely refers to returns received on or before 10th April, 2009 Total number of reporting units =311. Number of reporting units data provided for the current week: 237
A = Cases reported during the current week. B = Cumulative cases for the year.

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