SEARCH FOR HEPATITIS B VIRUS IN LIVER TISSUE IN CASES WITH HEPATIC SCHISTOSOMIASIS AND ITS CORRELATION WITH CERTAIN BIOCHEMICAL LIVER FUNCTION TESTS

THESIS

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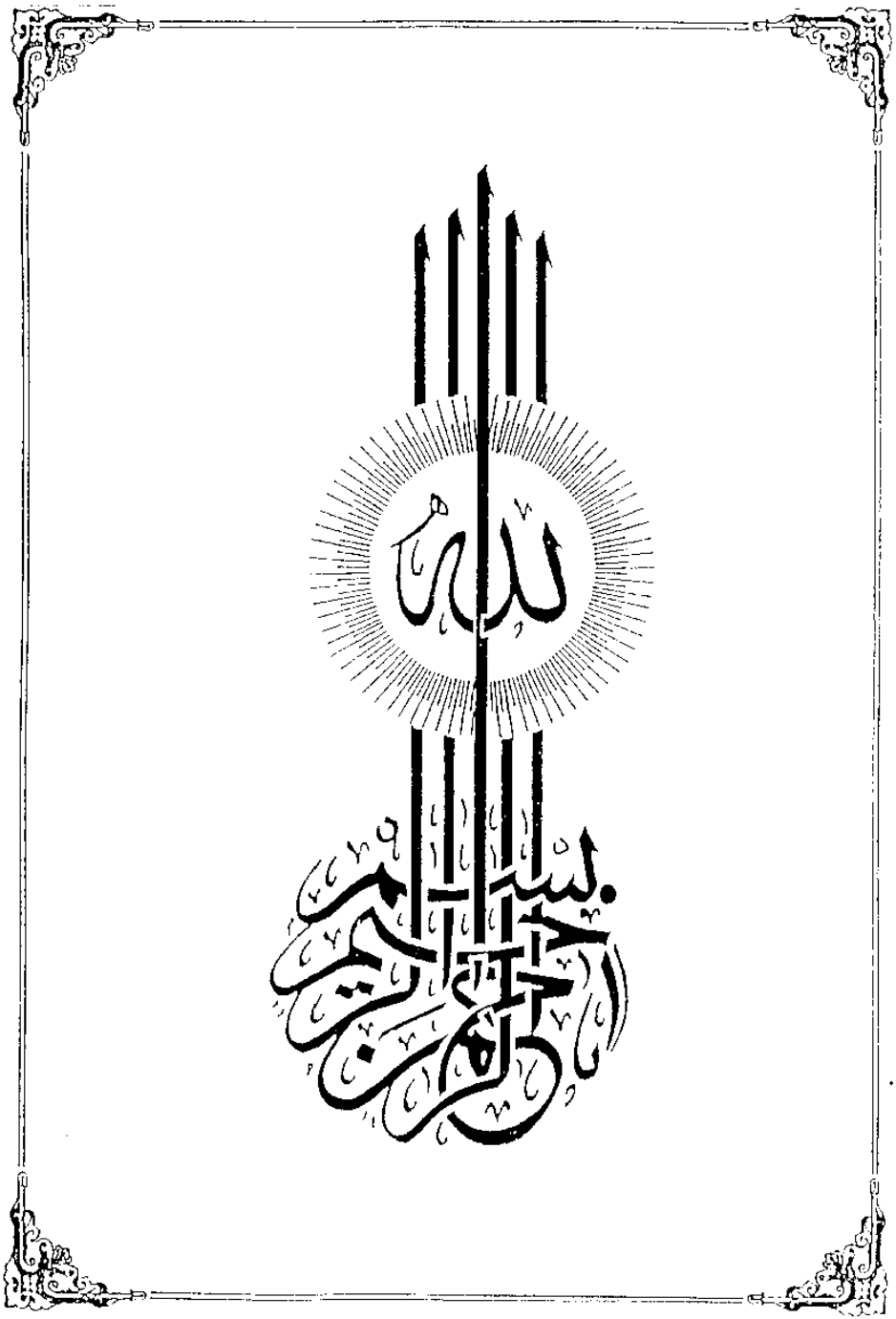

C O N T E N T S

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REVIEW OF LITERATURE

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Schistosomiasis

Definition :

Shistosomiasis is the name given to a group of diseases caused by trematodes of the genus Schistosoma, for instance in human infections, S.haematobium, S.mansoni , S.japonicum, S.matheei , S. intercalatum and S. bovis . Man and other animals are definitive hosts and snails of various genera are the intermediate hosts, certain related genera of trematodes, parasites of animals cause skin lesions but do not mature in man .(Wilcocks, 1972).

Historical review :

Bilharziasis was known to the ancient Egyptians the occurence of the disease in Egypt in ancient times has been found in the early Egyptian records and in the bodies of mumies of the twentieth Dynasty (1250-1000 B.C.).

Symptoms of the disease were frequent among the french troops during the Napoleonic invasion of Egypt (1799 - 1801) .

It was not until 1851, however, that the cause was recognized . In that year Dr.Bilharz, the Assistant Proffessor at Kasr-El-Aini School of Medicine, Cairo, discovered the two worms and later establishing their relation with haematuria and dysentery resulting from the corresponding lesions in the bladder and the intestines.

Bilharz was not aware of the presence of two species of this worm and he described and figured two forms of eggs one with the terminal spine and the other with the lateral spine . In 1893 Manson suggested, on grounds of dissimilar geographic distribution that the vesical and the intestinal forms of the disease were of separate origin . Adopting this suggestion Sambon in 1907 created a new species, S.mansoni for the species

with a lateral spined egg . Its validity was bittarly criticized by Looss who considered that the lateral spined ova were immature, non fertilized ones of S. haematobium .

In 1915 restudied the problem in Egypt and by a series of experiments proved that two types of snails were involved in the egyptian infection, Leiper also showed that the adult worms of these two types were morphologically different, thus confirming Manson's and Samben's hypothesis and demonstrated that these worms producing lateral spined eggs were the cause of the intestinal Schistosomiasis .

Aetiology, Epidemiology and Epizootiology of Schistosomiasis:

S.haematobium normally lives and mates in the veins of the urinary bladder of man (the only important definitive host) producing eggs with a terminal spine which pass into the bladder wall and thence into the urine . Eggs are also found in the mucosa of the lower bowel . S.haematobium has been regarded as a group of strains, it is transmitted by snails of the Bulinus truncatus and Bulinus forskali groups.

S.mansoni normally lives and mates in the veins of the mesentery of man and more rarely of some rodents and baboons, producing eggs with a lateral spine which pass into the wall of the large intestine and lower ileum, and thence into the faeces, strains from Africa and from Puerto Rico differ in morphology, infectivity for snails and animals and pathogenicity . S.mansoni is transmitted by snails of the genus Biomphalaria . S.japonicum normally lives and mates in the veins of the small intestine in man , cattle , water buffalo, horses, donkeys, dogs, cats, rodents and monkeys, producing eggs with a small lateral knob-like rudimentary protrusion, which pass into the bowel wall and thence into the faeces . It produces eggs more prolifically than S.haematobium and S.mansoni .

There are several races of S.japonicum. The Taiwan race does not develop to maturity in man, but the Japanese ,

chineese, and philippine races do, though they are not uniformaly virulent .

There are morphological differences between the eggs of strains fownd in Cambodia and the classical strains. S.japonicum is transmitted by snails of the genus Oncomelania, except in Cambodia and Laos, where other snails are involved (Barbier, 1969) .

S.matheei is essentially a parasite of sheep, goat, horses cattle, baboons and wild gun of South and East Africa. It lives in the mesenteric veins and produces eggs with a terminal spine . Human infection has been reported in 1% of persons with Schistosoniasis in Rhodesia, and to the extent of 35 - 40 % in cattle-owning people in parts of the Transvaal, always co-existing with S.haematobium or S.mansoni.

Pitchford (1961) has produced evidence of possible hyberidization between S.matheei and S.haematobium in man . But Taylor (1969) have shown that S.matheei can produce eggs by parthenogenesis and suggest that in man cross-specific pairing takes place between female S.matheei and male S. haematobium or S.mansoni, the males transporting the females to the bladder or bowel and the females producing eggs characteristic of S.matheei, most of which are non viable.

S.intercalatum is a parasite of the S.haematobium complex . Producing characteristic eggs with a terminal spine but found exclusively in faeces . It lives in the mesenteric portal venous system not the vesical system. S.bovis is aparasite of sheep and cattle, producing eggs with a terminal spine . It has occasianally been reported in man in Rhodesia, Uganda and other parts of Africa . Mac Mohon (1969) thinks that such infections are usually spurious, eggs appearing in the faeces of persons who have eaten the intestine of infected cattle . He has seen several subjects in whom eggs were found once but not subsequent but nevertheless, the Uganda case was undoubtedly genuine (Raper 1951) .

There are variations in the pathogenicity and infectivity of strains of Shistosoma in man . The extreme example is the Taiwan strain of S.japonicum which is prevalent in a wide range of animals but does not infect man or monkeys, less pronounced variations occur in both S.mansoni(Saoud , 1966)and S.haematobium (Wright ,1967) . These varieties determine the infectivity to both the snails and the definitive host, and may be of considerable epidemiological significance (Nelson , 1968) . Miracidia hatched in fresh water from the eggs of schistosomes usually but not always respond to light, seeking the surface of the water, where the snails hosts mostly live . Snails inhabiting the bottom

of canals have been found infected with S.haematobium and snails from the bottom of Lake Victoria at a depth of about 12 m. have been found infected with S.mansoni . Snails frequently move up and down in water . From a single miracidium a snail may produce enormous numbers of cercaria , possible as many as 100,000 .

Wilcoks 1972 considered that Schistosomiasis in all its forms is a rural disease and he explained that this concept depends on a variety of factors : -

. Contamination of fresh water with human or animal urine or faeces containing shistosoma eggs .

. The presence in the water of snails capable of infection by miracidia hatched from those eggs, and capable of producing cercaria infective to man . Water temperature, rate of flow, acidity or alkalinity, and content of organic matter conductive to snail growth are also important.

. Human contact with water containing living cercariae by bathing wading or washing in it, or bydrinking it . Infected children are important, they excrete large numbers of eggs and are attracted by water .

. The introduction of greatly increased human populations in irrigation areas add to the chance of infection, but much transmission takes place in communities which rely on ponds or water-holes for their supplies .

In S.Africa there is little transmission more than 400 m from sources of polluted water , but a dense rural population adds to the incidence of the disease . In Zanzibar the incidence of S.haematobium infection is highly focal in good areas; wells, running streams or piped water are available and the incidence rate for S.haematobium is about 30% (Forsyth and Macdonald ,1966) in bad areas, only a few virtually stagnant streams or pools are available and infection rates reach almost 100% . In these areas the infection is not only common, it is also heavy in individual patients . In Iraq it is a disease of fishermen and gardeners as well as agricultural workers but is a social rather than an occupational disease, heaviest in poor people living in poor conditions . Small dams or pools are dangerous in that they attract both bathers and snails, which may be introduced as eggs on the feet of water birds . The shores of lakes especially near inflowing streams which are likely to be contaminated with human excreta, are also dangerous . Irrigation is a major factor, and it is likely to increase as water conservation schemes and agricultural programmes are extended . In well maintained irrigation canals, however, snails do not thrive but where there is silt and vegetation,unsatisfactory water management schedules, poor drainage chanels with right storge dame and temporary pools, conditions suitable for the multiplication of snails exist . These factors have been

responsible for the observed increase of S.haematobium and S.mansoni infections in irrigation areas . In the Gezira plain of the Sudan, after the Senna dam was built, over 400,000 hectares of land were opened up for irrigation and the incidence and mortality from the disease increased steadily as the population rose . The irrigation scheme has now been extended to cover another 400,000 hectares and the disease has invaded most of the new area, 25% of the people were infected by 1969 .

In Egypt the old traditional basin system of irrigation was formerly the rule, in which fields alongside the Nile were divided into large basins by a system of dykes, and flood waters were kept in them long enough for valiable silt to settle . This type of irrigation depended upon the natural seasonal rise and fall of the river, it did not favour snails, and the incidence of Schistosomiasis was low, about 10% . In other parts of Egypt, however, the system was introduced of perennial irrigation from reservoirs artificially created to hold the Nile water . In this system the water is released from canals as it is needed, and drainage ditches carry away the seepage water, the canals are never dried, and snails find the habitat favourable . The incidence of Schistosomiasis in such areas were found to be as high as 60% of the population for both S.haematobium and S.mansoni, though in some areas were the specific snail hosts had not colonized the waters the incidence of S.mansoni was low . The Aswan dam

has converted most of egyptian irrigation to the perennial type and the snail hosts of both S.haematobium and S.mansoni have extended southwards, where as with the traditional basin irrigation only the Bulinus snails was found in the south . Perennial irrigation, with its ramifying canals, bring more land into cultivation, and production is increased because it does not depend so much on season . There is a dilemma : better irrigation means better economics and a better standard of living, but it also usually means the spread of Schistosomiasis . Restriction of irrigation is unlikely to be accepted by the economic authorities, but they must face the health hazard . In Egypt the infection rates with S.haematobium and S.mansoni differ significally between various areas, between different villages and even between different areas of the same village . The rates increase up to the age of 14 years, then decline somewhat to the age of 40 and remain at a level of about 30% . Infection with S.mansoni is acquired more slowly than with S. haematobium . Males are more commonly affected than females and farmers and fisher-men and boatmen more than others . Of the factors affecting infection, swimming is stated to be one of the most important (Farook et al., 1966) and children are enthusiastic swimmers.Main drains are important sources of infection . Though in Natal, South Africa and East Africa ,South of Lake Victoria, the incidence of S. haematobium infection in children is very high and of S. mansoni low , there are parts of the eastern Gongo and the Southern Sudan where S.mansoni is very prevalent and