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Why is Parasitosis Disregarded in Japan?

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ABSTRACT

Parasitosis is an infectious disease caused by parasites. The symptoms cause intestinal obstruction when mild, but it is fatal when symptoms become severe. Until the 1940s, nutrition and hygiene were poor in Japan, and it was common for many people to suffer from parasitosis. However, currently, the number of patients is extremely small. In recent years, rapid and large amounts of traffic from foreign countries, such as people, food, and pets, have become popular, and the number of patients with parasitosis is on the rise. However, parasitosis is not well known and the medical system is inadequate for diagnosing this disease. In this paper, we examine the reasons why parasitosis is currently disregarded, with consideration of the historical background.

INTRODUCTION

Parasitosis is a type of infectious disease caused by parasites, and may cause intestinal obstruction when the symptoms are relatively mild, but is fatal when the symptoms are severe. A parasite is an animal that parasitizes the outside or inside of a host. It is not well known that the snake-like element in the WHO insignia is derived from a parasite (medina worm)[1].In Japan, parasites were widely prevalent in the era when nutritional status and hygiene were extremely poor until immediately after World War II, and it was regarded as a national disease that occurred in many patients. At that time, more than 60% of Japanese people suffered from ascariasis (a disease in which roundworms parasitize the intestinal tract). However, currently, the number of patients is extremely small. Recently, there have been signs of a re-epidemic for several reasons, and it is considered that the number of patients is increasing. Nonetheless, not only the general public but also doctors currently tend to disregard the disease. This is thought to be reflected in the shortage of class hours at the university medical school, which is a medical doctor training course, and the proportion of parasitosis-related questions in the national examinations required to obtain a doctor's license[2]. In recent years, there are situations in which celebrities have become more aware of parasitosis by reporting their illness on television and other media outlets[3]. Also, there are currently 1 billion people infected with ascariasis worldwide, and 20,000 die each year. Malaria (a disease in which Plasmodium parasitizes mainly red blood cells) affects 800 million people and reportedly kills 1.5 million people peryear[1]. This paper presents the history and current status of parasitosis and examines why it is disregarded in Japan.

Biography of parasitosis

Until the 1940s, after World War II, Japan had poor nutritional intake and poor maintenance of a hygienic environment. Livestock animals were kept and crops were grown in the gardens of each household, and some food items were self-sufficient. It was common for people to sprinkle human and animal feces in the fields as fertilizer, to have dirt floors in their homes, and to walk barefoot on unpaved roads. Under such circumstances, many parasites were widespread. Typical examples of parasites include ascariasis, ancylostomiasis (hookworm disease, where hookworms parasitize the intestine and lungs), and trichuriasis (whipworm disease, where whipworms parasitize the cecum). To overcome this situation, parasite control measures centered on group stool tests and anthelmintic drug use were actively applied nationwide. In addition, the spread of chemical fertilizers had eliminated the need to sprinkle

human feces in the field. Water and sewage systems became widespread, and soil-borne parasites have gradually decreased due to the introduction of flush toilets and improved hygiene education, especially in urban areas. In the 1970s, the infection rate by these parasites dropped sharply from the initial 60% or higher to 0.1% or lower[4]. As a result, not only the general public but also doctors have disregarded parasitosis, and the state of being unwary of parasitosis is ongoing. Such a low infection rate was observed only in Japan. Looking overseas at other countries, there are many places where parasitosis is so prevalent that it is comparable to that in Japan's past time. The number of patients with parasitosis is increasing on a global scale due to the population explosion in developing countries[4]. Moreover, if further internationalization in Japan progresses in the future, diseases from all over the world may be brought into Japan due to the high-speed movement of many people of various nationalities. Nowadays, transportation means have been developed and food distribution has expanded, and a large amount of fresh food can be brought in from abroad within a short period. Japanese people who rely on imported foods for more than half of their food needs and prefer to eat raw foods have a particularly high risk of parasite infection (Table 1). The fact that more than half of the destinations of Japanese travelers and originating countries of foreigners visiting Japan in recent years are developing countries also increases the risk of infection. Cases of imported and opportunistic infections are increasing due to the pet boom, gourmet preferences, demand for bizarre or exotic foods, increasing prevalence of immunodeficiency diseases in an aging society, and increasing homosexuality[5].In recent years, organic farming is preferred by many people, and even human feces may be used as fertilizer without caution. The prevalence of traditional parasites, such as ascariasis, have also re-emergerd[4]. In this way, the risk of parasitosis is increasing due to the expanding food preferences and mobile behavior of the Japanese population. Consequently, it may not seem unexpected that the prevalence of parasitosis is reverting towards that in the past.

Why is parasitosis not registered?

Despite the situation described in the previous section, very few people act to avoid the risk of parasitic diseases. There are several reasons for this. First, one of the characteristics of parasitosis is that the number of patients in each case is small, even if the number of cases of parasite infection is relatively large[6]. Since the number of patients is not large, people are likely optimistic that they will not be infected.

Second, even if there is an affected person, it seems that the people in proximity can observe the relative ease at which the person is cured by treatments such as medication. In the case of a bacterial infection, the number of bacteria that invade the human body increases dramatically over time, and symptoms often worsen rapidly. On the other hand, in the case of parasitosis, there are many cases where only a single parasite invades the body. A parasite does not increase exponentially due to cell division but often goes through the process of producing eggs and larvae after growth. For this reason, the symptoms progress slowly and often do not require prompt treatment. In some cases, even if diarrhea or gastrointestinal pain is temporarily severe, the symptoms may heal spontaneously due to aging or the death of the parasite. Alternatively, some foods and medicines taken orally have an anthelmintic effect, so people may be cured without needing to go to the hospital. This is related to what will be described further below; it is also a factor that makes it challenging for medical personnel to make a definitive diagnosis of parasitosis because it is difficult to confirm the worm body during development. However, it should be noted that parasitosis can sometimes become severe and even fatal.

Third, doctors may not be able to make a proper diagnosis. Parasitosis may be misdiagnosed as another disease[2)]. Most parasites parasitize the digestive tract, and if the parasite itself or the egg that parasitizes in the body can be identified, it can be a differential diagnosis. Unfortunately, it has become commonplace for many doctors to use tests that utilize the increase or decrease in the concentration (numerical value) of components in the blood or the like for diagnosis. Training to observe parasites using a microscope or visually has not been sufficiently conducted apart from in medical school. The reality is that many clinical technicians have never seen an actual worm in the clinical setting. Some diagnostic methods include testing for antibodies using serum, but this has only been established for limited parasitoses and is inadequate (Table 2).

Current status of parasitosis in Japan

The current response to parasitosis in Japan will be described in this section. The Infectious Diseases Law (formally, the Prevention of Infectious Diseases and Medical Care for Infectious Patients Act) currently lists many parasites as Class 4 or Class 5 infectious diseases (Table 3). This may be because the number of affected cases continues to occur and these pathogens have not been eradicated in Japan. As mentioned earlier, there are situations in which the diagnosis and treatment of parasitosis are neglected in medical education because

few patients require treatment for parasitosis. Furthermore, there are cases in which gastric anisakiasis is misdiagnosed as gastric ulcer[7]. Due to the revision of the Food Sanitation Act in 2012, parasitic diseases such as anisakiasis were added to the contents of notifications to the public health center[6]. This may provide some basis for considering parasitosis, at least when doctors have a medical interview. However, there is an ongoing problem of insufficient medical technicians who can properly inspect such parasites (confirm the worm body). Among the parasites, zoonotic diseases are not a field that attracts the attention of medical personnel due to the small number of patients, and it is said that medical professionals have insufficient awareness and knowledge of zoonotic diseases[8].In Japan, there may be many infectious diseases in humans that are caused by livestock or pets. However, the actual number of cases cannot be determined owing to the insufficient inspection system.

CONCLUSION

The three major factors for the onset of infectious diseases are the source of infection (infected person, animal, etc.), the route of infection (animal, insect, equipment, food, drink, air, etc.), and the sensitivity of the host (nutrition status, immune function)[1]. However, it is difficult for the Japanese to control the third factor. This is a major difference from the treatment and prevention of other diseases (especially infectious diseases derived from bacteria and viruses), and may hurt disease treatment[3]. The people of Japan already have good nutritional statuses, and no further improvements can be expected. Measures such as improving immune function may be temporarily possible as part of treatment, but it is difficult to continuously increase immune function for prevention. Therefore, it is important to prevent the other two factors (source and route of infection). This can be addressed by improving hygiene. Such preventative measures include easy and difficult components to implement, such as avoiding contact with animals and being bitten by insects, and thus, complete defense against parasites is difficult. Each parasite has a life cycle, and there are certain stages to be aware of when preventing parasitosis. Therefore, it is better not to think that it always corresponds to all illnesses. It may be necessary to take limited measures such as restricting popular items known to carry certain parasite types and prevention spread from infected people.

A parasitic disease is a group of diseases that requires treatment and prevention as the patient number increases in the future. Symptoms may be alleviated and healed spontaneously without needing to go to the hospital and receiving treatment. However, it is necessary to

understand that the symptoms may become severe, and thus, one should not underestimate the disease. For example, information on which foods are the cause or how they are propagated should be distributed to the general public. When considering patients attending medical checks at the hospital, it is essential for medical personnel to improve their knowledge about parasitosis[2)]. Even if an infected person visits a hospital due to poor physical condition, it is difficult to cure parasitosis the doctor or clinical technician cannot make a sufficient diagnosis. To improve this, we recommend the inclusion of more items related to parasitosis within the range of questions in qualification tests for doctors and clinical technicians. Each school's educational content has its individuality and unique content. It is difficult to standardize this, but the curriculum must include the contents of the national examination for qualification acquisition. Depending on the scope and requirements of the test, it is expected that the education content will inevitably be changed to include more content related to parasitosis. There is a need to reduce the number of patients who become severe or die without disregarding parasitosis.

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Table No. 1: Typical examples of food-derived parasitoses

Foodstuff	Cooking method[*1]	Parasitosis	Detection target (inspection)	Comment
Bear	Sashimi, ruibe	Trichinosis	Larvae in muscle	Gibier cuisine[*2]
Pig	Raw meat, raw blood	Taeniasis saginatus	Eggs in feces	Prohibition of raw provision at the store, Commercially available ingredients
Cow	Minced, sashimi	Taenia solium		
	Liver sashimi	Fascioliasis		
Chicken	Sashimi, liver sashimi	Toxocariasis canis, Toxocariasis cati		
Frog, snake	Sashimi	Sparganosis mansoni	Subcutaneous larvae	Eating bizarre food[*2]
Mitten crab(*Eriocheir japonica*)	Not cooked (eaten alive), pickled in old sake	Paragonimiasis	Eggs in feces	Eating in a limited area
Ayu(sweetfish)	Chopped, pickled	Metagonimiasis		Commercially available ingredients
Seafood fish (especially mackerel and sardines)	Sashimi, sushi	Anisakiasis	Larvae in stomach and intestines	
	Sashimi, pickled	Diplogonoporiasis	Eggs in feces	
Salmon, trout	Sashimi, ruibe	Diphyllobothriasis		
Carp, crucian carp	Sashimi, slices of fish washed in cold water	Clonorchiasis		
	Sashimi	Gnathostomiasis	Larva in muscle	
Snakehead, catfish	Sashimi			Eating bizarre food[*2]

*1: Everything is close to being eaten raw.

*2: Not included in the combination of ingredients and how to eat in normal Japanese food.

Based on the data in references 1) and 9).

Table No. 2: Major parasitosis infections in the world, and prevention and testing methods

Parasitosis[*1]	Parasite	Number of infected (100 million people)	Annual death toll (10 thousand people)	Prevention	Inspection
Ascariasis	Roundworm	10	2	Prevention of eating raw foods (vegetables, etc.) with parasite eggs	Eggs in feces (microscopic)
Ancylostomiasis	Ancylostomiasis[*1]	9	5.5	Stop bathing in sewage or walking barefoot in soil (invasion of larvae)	Eggs in feces (microscopic) or larvae in culture
Trichuriasis	Whipworm	5	a few	Stop drinking dirty raw water (oral ingestion of eggs)	Eggs in feces (microscopic)
Amoebic dysentery	*Entamoeba histolytica*	4.8	7.5	Prevention of eating raw vegetables attached withparasites, use of contraceptives in sexual activity (mucosal invasion)	Antibodies in blood, exercise amoeba in mucous bloody stool (microscopic)
Filariasis	Filamentous insect[*1]	2.8	a few	Prevention of blood-sucking by insects such as mosquitoes	Antibodies in blood (depending on the site of infection),

				(transmitting parasites from other affected people or animals)	microfilariae in blood (microscopic), lesion interpretation by roentgen, parasites in subcutaneous mass (microscopic)
Schistosomiasis	Schistosomiasis*1	2	75	Stop bathing in sewage or walking barefoot in soil (percutaneous invasion of larvae)	Antibodies in blood, worm eggs in feces, urine sediment (microscopic)
Malaria	*Plasmodium spp.*[*1]	8	150	Prevention of blood-sucking by mosquitoes (transmitting parasites fromother affected individuals)	Antibodiesin blood, parasites in blood (microscope), amplification of specific base sequence by PCR
Trypanosomiasis	Trypanosoma*1	0.25	6.5	Prevention of blood sucking by reduviid bugs or tsetse flies (transmitting parasites fromother affected animals)	Detection of parasites in blood (microscopic)
Leishmaniasis	Leishmania*1	0.12	0.1	Prevention of blood-sucking bysandflies (transmitting parasites fromother affected animals)	Antibodies in blood, parasites in blood (microscopic)

*1: Including generic terms

Based on the data in references 1) and 10).

Table No. 3: Major types of parasites included in the Infectious Diseases Law

Infectious disease type	Target diseases related to parasites	Infectivity and seriousness	Main correspondence
Category 1	No parasite-related items included	Extremely high risk	Immediate notification is required. Measures such as hospitalization are required.
Category 2	No parasite-related items included	High risk	
Category 3	No parasite-related items included	Not high risk; Possibility of outbreaks due to employment in a specific occupation	
Category 4	Malaria, echinococcosis, tick-borne encephalitis*[2], scrub typhus	Not high risk; Should be prevented from occurring and spreading	
Category 5	Cryptosporidiosis, amebiasis, giardiasis	Not high risk; Should be prevented from occurring and spreading	Report within 7 days. Collection of occurrence status and disclosure of analysis results.
Designated	—[*1]	Conform to categories 1-3	Implemented hospitalization and disinfection according to categories 1-3 infectious diseases.
New	Currently, applicable diseases do not include any parasitic diseases	Unknown infectious disease; Extremely high risk	Initially, prefectural governor receives technical guidance and advice from Minister of Health, Labor and Welfare, and will take individual emergency measures. After designating the requirements such as symptoms by the Cabinet Order, treat in the same way as category 1 infectious diseases.

The Infectious Diseases Law is officially called the "Act on Prevention of Infectious and Medical Care for Patients with Infections".

*1: COVID-19 is included as of the end of 2020.

*2: Only transmitted by mites (ectoparasites).