SARCOSPORIDIOSIS ‡ MEDICAL IMPORTANCE AND DIAGNOSIS

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Sarcosporidiosis (*Sarcocystis* infection) is caused by an intracellular protozoan parasite that predominantly affects animals. It can rarely be found in human skeletal and cardiac muscle in humans.

There are two different forms of sarcosporidiosis in humans. These cases of muscular sarcocystosis were probably zoonotic in origin and associated with close contact with definitive hosts (both domestic and wild animals) thus permitting the contamination of food and drink with sporocystis shed by these definitive hosts.

The second mode of infection for humans is ingested animal tissues which containing sporozoites (e.g., undercooked meats). These sporozoited directly intestinal epithelial cells and can enter the circulation in an manner similiar to those released from oocysts from the intermediate or accidental host. *Acta Medica Medianae 2004; 43(3): 73-76.*

***Key words**: Sarcosporidiosis, Sarcocystis spp, Sarcocystis hominis*

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Pathophysiology

There are two different forms of sarcosporidiosis in humans. These cases of muscular sarcocystosis were probably zoonotic in origin and associated with close contact with definitive hosts (both domestic and wild animals) thus permitting the contamination of food and drink with sporocysts shed by there definitive hosts (1). Sporozoites relesed from the sporocysts, penetrate the gut wall, enter the bloodstream. 20‡40 days after ingestion of sporozoites throught the blood vessels, acute lesions (edema, hemorrhages and necrosis) develop. Lesions are associated with maturation of second generation of meronts within the endothelial and subendothelial cells. The most common alterations observed are myositis, pethechial hemorrhages of heart and serosae, edema, necrosis and hemorrhages of lymph nodes. After the acute phase-cysts of *Sarcocystis spp.* may be found in various muscular tissues.

The second mode of infection for humans in ingested animal tissues which containing sporozoited (e.g., undercooked meats). These sporozoited directly invade intestinal epithelial cells and can enter the circulation in an manner similiar to those released from oocysts. Opinions of many autors are that a systemic phase and a subsequent tissue phase do not occur in this form of infection (2).

Mortality /Morbidity

Sarcocystis species may cause diarrhea in healthy individuals, episode of vomiting, cramping abdominal pain and may result in intractable illness in patients with acquired immunodeficiency syndrome or other immunosuppressive disease (2, 3). Deaths due to water lose and electrolyte inbalance have not been reported in overwhelming infections (2).

The muscular form of sarcosporidiosis is usually asymptomatic although a hystory of polymysiotis, eosinophilia, fever, swelling myositis have been reported. Habeed with assistents showed that *Sarcocystis spp.* can be considered as one of the possible causes of some idiopathic cardiac diseases (cardiomyopathy, myocarditis, valvular lesions) and idiopathic rheumatic (musculosceletal complaints and myositis) (4). *Sarcocystis spp*. was identified in the heart obtained at autopsy of a child in Costa Rica (5).

Sarcocystis infection in the intermediate host may cause abortion, yet we don't know if this could happen in humans cases (6).

History

In the muscular form of sarcosporidiosis patient showed next symptoms: fever, myalgias, fleeting pruritic raches (7). Associated conditions include muscle soreness or weakness, painful subcutaneus swellings, transient lymphadenopathy (6). Bronchospasam can also occur (7). Patients with cardiac sarcosporidiosis may have no symptoms, or they have characteristic symptoms for cardiovascular illness. After 6 do 24 hours of eating infected row beef or pork

(intestinal form) with sarcocystis all persons suffered from acute clinical symptoms, above all diarrhoea and vomiting, coldness and sweating which decreased within 12‡24 hours (8). The severity of the symptoms was related to the quantity of the meat consumed (7).

Dehydratation and diffuse abdominal tenderness occur in patients who ingest the oocyst (8).

Complication

• Dehydratation
• Eosinophilic enterocolitis
• Partial gut obstruction
• Intestinal hemorrhage
• False diverticulum with perforation (9).

Prognosis

In general, the Sarcosporidia infection produces a transitory disease which quickly disappears without remaining after-efects, exellent prognosis. Patients with muscular form usually gets persistent infection and the chronic carrier state for many years.

Laboratory studies

• Intestinal form of infection can identified by microscopic examination of a stool sample, the cysts of *Sarcocystis spp.* are quite small and usually reguire a special flotation medium for detection, the parasite can be seen on a direct smear of the feces and also on the stained preparation, with different techniques. The diagnostic forms in stool specimens are mature, 25‡33 µm oocysts containing two sporocysts. Single sporocysts measuring 13‡17 µm may also be seen and containing 4 sporozoites (3).

• Direct immunofluorescence antibody test for stool and biopsy specimens on *Sarcocystis* antigen (10).

• Routine hematologic analysis in muscular form of infection showed eosinophilia, elevated erytrocyte sedimentation rate, and elevated levels of muscle creatinine kinase (7).

• Serological tests also use for diagnosis, such as enyme-linked immunosorbent assay (ELISA), indirect fluorescent antibody technique (IFAT), complement fixation (CF), there are genus specific (5).

• Recently, have been established species-specific PCR assays based on unique ribosomal RNA gene sequences (11).

• Examination of biopsy specimens in muscular form of sarcocystosis using histological, immunohistological, histochemical and ultrastructural methods (12).

Frequency

• In Serbia and Montenegro: Sarcoporidiosis is extremely common throughout the world. Clinical sarcosporidiosis is much less commonly diagnosed than toxoplasmosis (13). There is no report and serious studies about human sarcosporidiosis in Serbia and Montenegro, there are only studies of animal sarcosporidiosis. So we have no dates about muscular and intestinal form of this disease in humans, neither the frequency. The sarcosporidia infection produces a transitory disease which quickly disappears without remaining after-effects (14). Finding of this protozoan parasite in material of patients in often incidental and many more undetected causes probably exist (1). Further research into many aspects of the biology of these organisms is urgently needed in our country.

• Internationally: Most cases of human sarcosporidiosis occur in Southeast Asia. The seroprevalence of 19,8% was reported (both the intestinal and muscular forms of sarcosporidiosis) in Malaysia (1). In Southeast Asia the prevalence of human muscular sarcocystosis was 21%. The prevalence of *Sarcocysitis spp.* in laborers from Thailand, the intestinal form, were 23,2% (15). The *Sarcocystis hominis* in the three countries of Tibet gave the prevalence of intestinal form an average of 21,8% and those of *Sarcocystis suihominis* were 0%, 0,6% and 7,0% (16). In Laos one study showed the prevalence of *Sarcocystic hominis* (intestinal form) more than 10% in the group over 20 years of age (17).

In South Africa so far no cases of infection in humans have been recorded (18).

Pathogenic protozoa are commonly transmitted to food in developing countries, but food born outbreaks of infection are relatively rare in developed countries (19).

The prevalence rates of sarcosporidiosis are undoubtebly much higher than the statistics based on reported rates of infection might indicate (3).

Race: The prevalence did not differ with regard to race, prevalence vary between the different cultural group and from one geographical regio to another. Preferential localisation of Sarcocystis in Southeast Asia were indicative of the local habit of eating and living (16, 20).

Sex: The prevalence did not differ with regard to sex (16, 20).

Age: The prevalence did not differ with regard to age, because clinically muscle involvement occurs after cyst detoriation, adults are more likely to present with skeletal muscle involvement that are children (16).

Causes

Sarcocystic can be considered as a potential risk for following people:

• Persons who are associated with close contact with definitive hosts (both domestic and wild animals), thus permitting the contamination of food and drink with sporocysts shed by this definitive hosts (2).

• People who have habit of eating raw beef and pork, and other contaminated meat (15).

• People who have poor living conditions (15).

• Persons who have low level of hygiene (15).

Medical care

No specific antiparasitic agent is indicated. Abendazole and metronidazole ameliorated symptoms of muscular form of sarcocystosis (7). Also improvement and cure coincided with treatment with contrimoxazole (21).

Intestinal form of infection usually responds to symptomatic treatment, with fluid replacement if necessery (22). The infected cases with intestinal form were generally asymptomatic, 9/10 and 5/5 of cases showed negative stool examination one month after being treated by sulfadiazine or finidazole respectively (16).

Corticosteroids can be used to reduce inflammation associated with muscular involvment.

Surgical care

There is report of six cases with intestinal sarcosporidiosis which have resection of intestinum duo to extensive necrosis (23).

Excision of the swelling painful muscle (muscular form of sarcocystosis) is not needed therapeutically.

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SARKOSPORIDIOZA ‡ MEDICINSKI ZNA^AJ I DIJAGNOZA

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Sarkosporidiozu, ~estu infekciju `ivotinja, izazivaju intracelularne protozoe roda *Sarcocystis*. Izuzetno retko ovaj parazit mo`e se na}i u skeletnim mi{i}ima ili sr~anom mi{i}u ~oveka.

Postoje dva oblika humane sarkosporidioze. Prvi oblik verovatno nastaje uno{enjem sporocista, preko zaga|ene hrane ili vode, koje poti~u od `ivotinja i povezan je sa bliskim kontaktom sa definitivnim doma}inom (doma}im i divljim `ivotinjama).

Drugi oblik humane infekcije je ingestijom `ivotinjskog mesa koje sadr`i sporozoite (to jest nedovoljno termi~ki obra|enog mesa). Ovi sporozoiti direktno ulaze u crevni epitel odakle mogu na sli~an na~in, kao i u prethodnom obliku, da u|u u cirkulaciju. *Acta Medica Medianae 2004; 43(3): 73-76.*

***Klju~ne re~i**: sarkosporidioza, Sarcocystis spp, Sarcocystis hominis*