นิพนธ์ต้นฉบับ

ความชุกของการติดเชื้อ *Sarcocystis* spp. ในกล้ามเนื้อหัวใจโคและกระบือในตลาด 4 แห่งในเขตอำเภอเมืองจังหวัดพิษณุโลก

แสงชัย นทีวรนารถ[1] นพดล จำรูญ[2] เฉลิมชัย สกุลโชควัฒนา[2] พรชัย หมีแหม่ว[2] สุวิชญา แสงนาค[2]

บทคัดย่อ

Sarcocystis hominis และ *S. suihominis* เป็นสาเหตุของโรค sarcocystosis ในคน การกินเนื้อวัวและเนื้อหมูดิบเป็นสาเหตุของโรค *Sarcocystosis hominis* และ *Sarcocystosis suihominis* ตามลำดับ การศึกษานี้มีวัตถุประสงค์เพื่อหาความชุกของ *Sarcocystis* spp. ในกล้ามเนื้อหัวใจโคกระบือที่เก็บจากตลาด 4 แห่ง ในอำเภอเมือง จังหวัดพิษณุโลก ผลการศึกษาพบว่า สิ่งส่งตรวจจำนวนทั้งหมดจำนวน 100 ตัวอย่าง ให้ผลบวก โดยพบระยะ bradyzoite ร้อยละ 100 ผลการศึกษานี้ชี้ให้เห็นว่า เนื้อดิบหรือเนื้อที่ปรุงแบบสุกๆ ดิบๆ อาจเป็นปัจจัยเสี่ยงของการติดโปรโตซัวนี้

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คำหัส: *Sarcocystis* species, กล้ามเนื้อหัวใจ, โคและกระบือ, อำเภอเมือง จังหวัดพิษณุโลก

[1] ภาควิชาจุลชีววิทยาและปรสิตวิทยา คณะวิทยาศาสตร์การแพทย์ มหาวิทยาลัยนเรศวร พิษณุโลก

[2] ภาควิชาเทคนิคการแพทย์ คณะสหเวชศาสตร์ มหาวิทยาลัยนเรศวร พิษณุโลก

Abstract : Prevalence of *Sarcocystis* spp. infection in cardiac muscles of cattle and buffaloes in 4 markets of Maung district, Phitsanulok province

Saengchai Nateeworanart[1], Noppadon Jumroon[2], Chalermchai Sakunchokwattana[2], Pronchai Meemaew[2], Suvitchaya Sangnak[2].

Sarcocystis hominis and *S. suihominis* are the causative pathogens of human sarcocystosis by eating raw meat of cattle and pigs infected with *Sarcocystosis hominis* and *Sacrocystosis suihominis*, respectively. This study aimed to survey the prevalence of *Sarcocystis* spp. in bovine cardiac muscle collected from four markets in Maung district, Phitsanulok province. The samples were examined by wet smear under a light microscope. The results showed that all of 100 specimens investigated for *Sarcocystis* were positive with bradyzoite. Our study indicated that raw and undercooked meat may be a risk factor for protozoal infection. **Bull Chiang Mai Assoc Med Sci 2007; 40: 109-113.**

Key words: *Sarcocystis* species, cattle and buffaloes cardiac muscle, Maung district, Phitsanulok province.

[1] Department of Microbiology and Parasitology, Faculty of Medical Science, Naresuan University, Phitsanulok.[2] Department of Medical Technology, Faculty of Allied Health Science, Naresuan University, Phitsanulok

Introduction

Sarcocytis species are intracellular protozoan parasites with an intermediate-definitive host life cycle based on a prey-predator relationship. Asexual stages develop in intermediate hosts after they ingest the oocyst stage from definitive-host feces and terminate with the formation of intramuscular cysts (sacrocyst). Sarcocysts in meat eaten by a definitive host initiate sexual stage in the intestine that terminate in oocysts excreted in the feces. Humans serve as the definitive host of *Sarcocystis hominis* and *S. suihominis*, for which cattle and pigs are the intermediate host, respectively. The former species are acquired by eating undercooked beef or pork containing infective stage organisms. The prevalence of intestinal sarcocystosis in humans is low and is only rarely associated with illness, except in volunteers who ingest large number of sarcocyst. If humans act as the intermediate host, myositis is the primary syndrome. The spectrum of illness ranges from acute self-limited infections to chronic, moderately severe disease. Painful muscle swelling has been reported, accompanied by erythema, muscle tenderness, generalized muscle weakness and fever. Bronchospasm has also been seen. Other reported symptoms in clued cough, arthragia, transient pruritic rashes, headache, malase, lymphadenopathy and muscle wasting. Chronic cases can have persistent or recurrent symptoms for up to seven years. Many infections may be asymptomatic. When

humans serve as the definitive host, the clinical signs may include fever, chills, sweating, diffuse abdominal tenderness, diarrhea, nausea and vomiting. Eosinophilic enteritis and rare cases of acute intestinal obstruction have been reported. Intestinal Sarcocystosis is transient and usually self-limited; chronic enteritis has not been described. Many or most cases are thought to be asymptomatic. The asexual stages, including sarcocysts, can stimulate a strong inflammatory response in cattle. Livestock have suffered acute debilitating infections, resulting in abortion and death or chronic infections with failure to grow or thrive.[1] In Thailand, six cases of human enteritis associated with *Sarcocystis* sporocysts were reported in Bangkok.[2] Moreover, *Sarcocystis* was identified in skeleton and cardiac muscle of 15 autopsy specimens whose cause of death was unknown.[3] Because both cattle and buffalo are human foods, this study aimed to survey the prevalence of *Sarcocystis* spp. in bovine cardiac muscle collected from four markets in Muang district, Phitsanulok province.

Materials and Methods

A total of 100 specimens from the cardiac muscles of cattle were randomly collected from four markets in Muang district, Phitsanulok province. All specimens were collected from local slaughter-house in Phisanulok province during April to May 2006. Approximately 10 g. of cardiac muscle was sliced, minced, wrapped with double layered using wet gauze, and then squeezed. A few drops of meat extract obtained from host tissue were examined by wet smear under a light microscope for the presence of bradyzoites. A smear from each sample was allowed to dry, fixed in absolute methanol, and stained with Wright's stain for confirmation.

Results

All 100 specimens examined (100%) were found positive for bradyzoites (Table 1). The crescentric bradyzoites were found in Wright's stain and shown in Figure 1.

Table 1 Prevalence of *Sarcocystis* spp. in cattle and buffalo cardiac muscles from 4 local markets of Muang district, Phitsanulok province

Local market	Cardiac muscles of cattle and buffalo	
	No. bradyzoites found /No. samples collected	Prevalence (%)
Phisanolok Roamjai	32/32	100
Kok Matoom	26/26	100
Tesaban 1	25/25	100
Tesaban 3	17/17	100
Total	100/100	100



Figure 1 Bradyzoite obtained from cattle or buffaloes cardiac muscle samples (Wright's stain)

Discussion

The outcome of this study revealed a very high prevalence of *Sarcocystis* infection (100%) in bovine cardiac muscle samples collected from 4 local markets in Phitsanulok province. This result was equivalent to 100% infection in cattle and buffalo studied in samples from Ratchaburi, Bangkok and Samut Prakan.[4,5] In 1990 Danseekaew *et al* also reported the prevalence of *Sarcocystis* spp. in cattle in Khon Kaen was 93.4% (283/303)[6] and In 1991 Pan-in *et al* reported 100% positive infection of *Sarcocystis* in Chiang Mai, Thailand.[7] While 42.6% (46/108) of pig were found to be infected with bradyzoites in Bangkok.[8] From the previous reports and the result of this study, it was interesting to note that uncooked meat could be a high risky for the transmission of *Sarcocystis* to people in Thailand. In this study the re-sampling was prevented by using heart meat and heart is the most commonly infected part in cattle.[9] As only 100 samples from 4 markets were used in our trial therefore, a larger sample size are necessary for further studies to confirm the present data.

The high prevalence of *Sarcocystis* spp. infection found in this study may be risk for people who live in Phitsanulok province because of their raw or undercooked eating behavior. The outcome of this study revealed that controlling of *Sarcocystis* infection in bovine in Phitsanulok province should be implemented. The present study can also be basic knowledge for future study.

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