

# A CLINICAL STUDY ON TRICHINOSIS IN CHANGWAT PHAYAO, THAILAND

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**Abstract.** An epidemic of trichinosis occurred in Northern Thailand. The source meat was a 150 kg hilltribe pig. A clinical investigation was conducted using indirect IgG ELISA as a criteria for diagnosis. 52 suspected cases who had eaten the trichinous pork and developed relevant symptoms were hospitalized. 49 of them gave positive ELISA within 64 days after infection. The most common clinical features were myalgia (100%), fever (93.88%) and facial edema (87.71%). Diarrhea was found in approximately one half of the patients (55.10%). Skin rashes of various types were unexpectedly high (40.82%).

## INTRODUCTION

Human trichinosis was first reported in Thailand in 1962 (Menakanit *et al*, 1962). Since then more than 100 well-recognized outbreaks have been noted (Pozio and Khamboonruang, 1989; Division of Epidemiology, 1962 - 1993). Most of them occurred in the northern region of the country. Epidemic confirmation in the past was only based on muscle biopsy. Case confirmation using muscle biopsy was both impractical and unsatisfactorily insensitive. ELISA was recently established in Department of Parasitology, Faculty of Medicine, Chiang Mai University for diagnosis of human trichinosis (Morakote *et al*, 1991). Its sensitivity and specificity were tested using biopsy-confirmed cases of trichinosis and various parasitologically confirmed parasitoses. IgG ELISA was demonstrated to yield 100% sensitivity from day 50 to day 411 postinfection (PI) (Morakote *et al*, 1992). It is now possible to study clinical manifestation of human trichinosis in northern Thailand using ELISA in diagnosis.

## MATERIALS AND METHODS

An epidemic of trichinosis occurred in Chiang Baan District, Amphoe Chiang Kham, Changwat

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Phayao in February 1993. The source was a hilltribe pig weighing 150 kg. A temporary trichinosis clinic was set up at Chiang Kham Hospital to receive visiting patients. All suspected patients who had a history of eating food (cooked or uncooked) prepared from the trichinous pork and had one or more presenting symptoms were hospitalized. Confirmation of the epidemic was performed by muscle needle biopsy of 5 clinically overt patients. One of them gave a positive result showing an immature uncoiled larva in muscle by compression technique. Physical examination, blood taking for CBC and ELISA were performed in all patients. Blood was also taken for the determination of ESR (Wintrobe), serum CPK and LDH (Wabo Pure chemical Industries Co). IgG ELISA was done on the 28<sup>th</sup> day after infection. For those patients who gave negative results, ELISA was done again 2 months post-infection (on the 61<sup>th</sup>-64<sup>th</sup> days) to check for seroconversion. Medical records of all patients who gave a positive result on the first ELISA or had seroconversion on the second ELISA were used in this study.

## RESULTS

Among the total of 52 hospitalized cases, 49 (94.23%) showed positive ELISA of which 45 (86.54%) were positive on the 28<sup>th</sup> day. The other 4 (7.69%) gave positive results on the second ELISA (seroconversion). There were 41 males and 8 females (ratio = 5.12:1); 4 of them were below 14 years of age. The mean age was 35.41 ± 15.62

years (median = 36, range = 7 - 67 years).

Their medical records were analyzed. The results are shown in Table 1. The most common symptom was myalgia, which 100% (49/49) of the patients reported. Fever, facial edema, and arthralgia were also common, affecting 93.88%, 85.71%, and 73.47%, respectively. 55.10% (27/49) had diarrhea reported both early within the first week and later in the second and third weeks. Interestingly, skin rashes of various types were noted in 40.82% (20/49) of the patients. There were 3 types of rashes, *ie* fine macular or maculopapular eruptions, mainly on the trunk (14 cases); urticarial rash on the body and/or extremities (5 cases); a mottling rash on the trunk (1 case). Transient pitting edema was noted in a 55-year-old female patient. She had no history of cardiovascular, lymphatic, hepatic, or renal diseases. Physical examination in this case revealed an erythematous maculopapular rash, mainly on the trunk, periorbital edema, muscle tenderness, and pitting edema of both lower extremities (grade 4+). She had diarrhea 4 times, myalgia, and fever. Urinalysis showed trace of albumin while other find-

ings were within normal limits. Stool examinations were parasitologically negative for 3 consecutive days. She had hypoalbuminemia (serum albumin = 25 g/l, total protein = 51 g/l) which converted to normal (albumin = 38 g/l) when she came to the follow-up clinic one month later, when it was found that the pitting edema had completely disappeared.

The incubation period (IP) was counted from the day of infection to the day the first symptom appeared. 95.92% of the patients (47/49) developed clinical symptoms after the 1<sup>st</sup> week. The others had IP of 4 and 7 days, respectively. Mean IP =  $13.65 \pm 3.69$  days (median = 14, range = 4-20 days).

Relative eosinophil count was done on admission in 47 patients. One was WNL ( $416 \times 10^6$  cells/l) but rose to  $2304 \times 10^6$  cells/l on the following day (data not shown). (Mean =  $3,292.57 \pm 2,420.14$  cells  $\times 10^2$ /l, median = 2,860, range = 416 - 10,752 cells  $\times 10^2$ /l).

100% (33/33) of those tested had elevated serum CPK and 78.79% (26/33) had elevated serum LDH.

Table 1

Number and percentage of patients with different symptoms and signs of trichinosis (n = 49).

Symptoms and signs	No. of patients	%
Myalgia	49	100.00
Fever	46	93.88
Facial edema	42	85.71
Arthralgia	36	73.47
Headache	29	59.18
Diarrhea	27	55.10
Malaise	27	55.10
Skin rash	20	40.82
Injected conjunctiva	18	36.73
Dizziness	18	36.73
Ophthalmalgia	14	28.57
Photophobia	14	28.57
Nausea/vomiting	13	26.53
Abdominal pain	12	24.49
Palpitation	8	16.33
Cough	5	10.20
Lacrimation	3	6.12
Pitting edema	1	2.04

## DISCUSSION

Trichinosis is one of the parasitic public-health problems in Thailand. There have been more than 100 well-recognized outbreaks during the past 31 years without decreasing trend either by the number of epidemics or by the number of patients (Division of Epidemiology, 1962 - 1993). There have been several clinical studies on trichinosis in Thailand since 1962. Mostly the diagnosis was based on epidemiological, clinical, and non-specific paraclinical data (eosinophilia, serum enzymes). Confirmation of an epidemic, not of individual cases, was done only in some studies using muscle biopsy and/or jejunal biopsy (Khamboonruang and Nateewatana, 1975; Suriyanon and Klunklin, 1972). These invasive procedures are impractical in a large-scale study. Skin tests were used with variable results. Their sensitivity varied from 46 - 81.6% (Khamboonruang and Nateewatana, 1975).

There was only one previous outbreak of trichinosis among hunters in Amphoe Chiang Kham in 1983 with 6 cases and 2 deaths. The source was bear meat (Division of Epidemiology, 1983). We

assumed that cases of chronic trichinosis in this area were few. Cross-reactivity might be expected as demonstrated by Morakote *et al* (1991), especially with intestinal capillariasis which was found sympatrically. Other common parasitoses (opisthorchiasis, taeniasis, strongyloidiasis) were also shown to cross-react (Morakote *et al*, 1991). Therefore, ELISA was used in conjunction with epidemiologic, clinical, and laboratory data to engender accurate diagnosis of acute symptomatic trichinosis. We also conducted a sero-epidemiological survey of other villagers ( $n = 153$ ), whether symptomatic or not, who had eaten foods prepared from meat, cooked or uncooked, of the same pig and had not come to the hospital. 43.79% (67/153) gave positive ELISA within 64 days PI. Most symptomatic cases had a mild illness and recovered within a few days.

In this study, the incidence in males was higher because of their food habits. Thai males (in northern and northeastern regions of the country) prefer dishes prepared from raw meat. Young boys, as novice monks, were also vulnerable for they could not refuse offered food.

Pathophysiology of different stages of the disease produces various symptoms and signs. Abdominal symptoms (abdominal pain, diarrhea) may occur early in the course of trichinosis or in the later periods of the disease. The general trichinosis syndrome ( fever, myalgia, facial edema, malaise) usually comes at the end of the IP, *ie* early in the 2<sup>nd</sup> week (Pawlowski, 1983). Other illnesses, *ie* arthralgia, headache, injected conjunctiva, dizziness, ophthalmalgia, photophobia, nausea and vomiting, accompany with variable frequencies (Table 1).

Characteristic skin lesions have long been reported (Pawlowski, 1983; Hanada *et al*, 1987). described as a maculopapular exanthema or urticarial rash as found in this study. Rash of the mottling type was not known before by the authors. The incidence of skin eruption varies according to host and parasite. It seems to be low in Caucasians and high in Mongoloids (Hanada *et al*, 1987; the present study). Hypoalbuminemia is also well known. Increased demand for protein at the site of the growing parasite, change in the metabolism of the muscle tissue, decrease in albumin synthesis, leakage of albumin and fluid from the intravascular compartment to the interstitial space and substantial loss of albumin through the

urinary tract are the probable causes of the hypoalbuminemia.

Eosinophilia can be caused by various parasitic and nonparasitic diseases; when considered with epidemiological and clinical data, it is one of constant characteristics features of trichinosis. Most, if not all, of the patients develop eosinophilia during the 2<sup>nd</sup> or 3<sup>rd</sup> week of infection (Pawlowski, 1983).

This was a preliminarily clinical study of trichinosis, being the first one in Thailand to use IgG ELISA as a confirming criterion for diagnosis. The problems of this test lie in its specificity and persistence. We can reduce false positivity by increasing the cut-off value and/or pre-adsorption with known cross-reacting antigens. To differentiate between recent and remote infection, especially in endemic foci of trichinosis, it is a good clinical practice to test at the end of the 3<sup>rd</sup> week first and then repeat the test at the end of the 2<sup>nd</sup> month to observe a positive conversion and change in titer.

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