ความชุกของแอนติบอดีต่อการติดเชื้อ Toxoplasma gondii ในสุกรจากโรงฆ่าสัตว์ทางภาคเหนือของประเทศไทย

Seroprevalence of antibodies against Toxoplasma gondii infection among slaughtered pigs in the northern part of Thailand

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บทคัดย่อ

Toxoplasmosis เป็นโรคติดต่อจากสัตว์สู่คน มีสาเหตุเกิดจาก Toxoplasma gondii ซึ่งเป็นเชื้อโปรโตซัว มีความสัมพันธ์ทางด้านสาธารณสุขที่มีมานานแล้วที่จะให้เกิดการแท้งหรือความผิดปกติของตัวอย่างในครรภ์ แม้เป็นโรคติดต่อสามารถตีต่อสัตว์สู่สุราเท่านั้น ในขณะที่สัตว์อื่นๆ เช่นสุนัขและแมว เป็นเครื่องย่อมคัดแยกการศึกษาในครั้งนี้เพื่อหาความชุกของแอนติบอดีต่อการติดเชื้อ T. gondii ในสุกรจากโรงฆ่าสัตว์ทางภาคเหนือของประเทศไทย โดยทำการเก็บตัวอย่างซีรัมจากสุกรจำนวน 141 ตัวอย่างจากโรงฆ่าสัตว์ในจังหวัดสุโขทัย ลำปาง ลำพูน พิษณุโลก เชียงใหม่ และเชียงราย และนำมาตรวจหาแอนติบอดีต่อเชื้อ T. gondii ด้วยเทคนิค latex agglutination(Eiken®, Japan) ซึ่งผลการทดสอบพบว่า 11 ตัวอย่างให้ผลบวกติดเป็นความชุกของโรคระบาด 7.8 โดยระดับที่สูงที่สุดในช่วงระหว่าง 1:64 ถึง 1:4096 (ค่า cut off > 1:64) ซึ่งครั้งหนึ่งศูนย์โดยมีปัญหาการให้ผลบวกต่อเชื้อต่วยที่สูงที่สุดร้อยละ 12.5 (5/40) ผลของการศึกษาในครั้งนี้จะเป็นประโยชน์ในการบ่งชี้ถึงความปลอดภัยในการบริโภคนมสัตว์ในภาคเหนือของประเทศไทย

ABSTRACT

Toxoplasmosis caused by the apicomplexan protozoa. Toxoplasma gondii, is one of the most important zoonoses worldwide. It is not only having an impact on animal production but also has an impact on a public health for neonatal complication in humans since it leads to abortions. Cats are the definitive or natural hosts and the other animals, such as swine serve as the intermediate hosts. The objective of this study was to assess the seroprevalence of T.gondii antibodies in slaughtered pigs from the Northern part of Thailand. A total of 141 swine sera from slaughtered houses in Sukhothai, Lamphun, Phitsanulok, Chiang Mai and Chiang Rai provinces were collected and examined for antibodies against T. gondii infections with commercial latex agglutination test kits (Eiken®, Japan). Of these, 7.8% were positive with antibody titers ranged from 1:64 to 1:4096 (1:64; cut off). Phitsanulok province was the highest endemic area for T. gondii infections in swine (12.5%). This result will be critical to demonstrate the safety to consume pork from the northern part of Thailand.

Keyword: Toxoplasma gondii, seroprevalence, slaughtered house, pigs, northern Thailand,
INTRODUCTION

Toxoplasmosis caused by the apicomplexan protozoa, *Toxoplasma gondii*, is one of the most important zoonoses worldwide. It does not only have an impact on public health for neonatal complication in humans, but also has an effect on animal production since it leads to abortions (Jittapalapong et al., 2007). Toxoplastic encephalitis has been reported as a cause of death in immunocompromised individuals with Acquired immunodeficiency syndrome (AIDS) (Luft et al., 1984). In Thailand, 21.3% HIV-seropositive and 13.1% HIV-seronegative pregnant women have been reported to be positive for *T. gondii* antibodies (Chintana et al., 1998).

Serological studies of *T. gondii* in Thailand have been found the evidence of widespread in humans (Chintana et al., 1998. Maruyama et al., 2000; Sukthana et al., 2001), dogs and cats (Jittapalapong et al., 2007), pigs (Sriwaranard et al., 1981; Nishikawa et al., 1989), goats (Jittapalapong et al., 2005), and elephants (Tuntasuvan et al., 2001), and rodents (Jittapalapong et al., 2007). However, there is no report of toxoplasmosis in slaughter pigs in the country.

Cats are the definitive or natural hosts and other animals, such as pigs serve as the intermediate host. The shedding of *T. gondii* oocysts in cat feces is capable of the contamination in food, water, and soil so that it will transmit to the nearby animals. Transmission to swine also occur by consumption of tissues of infected animals such as rodents and birds or infected by consuming tissues cysts (Dubey et al., 1995). Humans become usually infected with *T. gondii* by ingesting sporulated oocysts from food and water contaminated by cat feces or by consuming tissue cysts directly from undercooked meat (Chia-kwung et al., 2004). In a national serological survey of USA from 1983 to 1984, antibodies to *T. gondii* were found at 23% of 11,229 market-aged <7 months and 41.4% of 613 adult pigs (Dubey et al., 1995) and 23.9% of 11,842 slaughtered pigs (Dubey et al., 1997).

The Latex agglutination test is now widely available as a useful tool for serological diagnosis of toxoplasmosis (Jittapalapong et al., 2007). The objective of this study was to assess the seroprevalence of *T. gondii* infections in slaughtered pigs in the Northern part of Thailand by using the latex agglutination test.

MATERIALS AND METHODS

Sample size

A total of 141 slaughtered pigs were randomly selected from 5 provinces in the northern part of Thailand including Sukhothai, Lamphun, Phitsanulok, Chiang Mai and Chiang Rai (Fig1). Blood samples were collected from the jugular vein, centrifuged at 500G for 15 minutes, separated for sera, and stored at -20°C until used.
Serological assay

The presence of *T. gondii* antibodies was detected by latex agglutination test (Eiken®, Japan) kit. This test was evaluated as a screening serologic test for toxoplasmosis in animals. The procedure described in briefly, 25 μl of latex agglutination buffer was added to each well of a U-shaped 96 well cluster plated. Then 25 μl of sera was mixed with the buffer in the first well. Serial two-fold dilutions were performed in all wells and the final 25 μl was discarded. Then 25 μl of *T. gondii*-antigen-coated latex beads were added to each well. The plate was shaken gently and then incubated at room temperature overnight. The cut-off titer for this test was $\geq 1:64$

RESULTS AND DISCUSSION

Totally, *T. gondii* antibodies was detected in 11 (7.8%) of the 141 swine sera. The seroprevalences were 11.8 % (2/17), 12.5% (5/40), 5% (2/40) and 5% (2/40) in Sukhothai, Phitsanulok, Chiang Mai and Chiang Rai, respectively. No positive sera were found in Lamphun. (Table 1.)
Table 1. Result of *T. gondii* antibodies in slaughtered pigs from the northern part of Thailand

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Numbers of examined sera</th>
<th>Numbers of positive sera (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sukhothai</td>
<td>17</td>
<td>2 (11.8)</td>
</tr>
<tr>
<td>Lamphun</td>
<td>4</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Phitsanulok</td>
<td>40</td>
<td>5 (12.5)</td>
</tr>
<tr>
<td>Chiang Mai</td>
<td>40</td>
<td>2 (5)</td>
</tr>
<tr>
<td>Chiang Rai</td>
<td>40</td>
<td>2 (5)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>141</strong></td>
<td><strong>11 (7.8)</strong></td>
</tr>
</tbody>
</table>

In the present study, was revealed the seroprevalence of *T. gondii* antibodies in slaughtered pigs from five provinces of the northern part of Thailand. In Thailand, epidemiologic data of the reservoirs of *T. gondii* in swine in the northern part of Thailand are limited. Tuntasuvan *et al.* (1998) reported 50% of swine sera from 71 breeding farms were positive for toxoplasmosis. Sukthana (2006) summarized the prevalence of *Toxoplasma* infections in swine in Thailand was ranged from 2.3 to 21.9%.

Many serological methods, such as Sabin-Feldman dye test, latex agglutination test (LAT), indirect fluorescent antibody test (IFAT) and immunoblot can detect antibody that are specific for *T. gondii* (Aize Kijlstra et al., 2004). Some studies have indicated that the LAT is not the best serological tool to detect latent *T. gondii* infections in pigs (Dubey *et al.*, 1995). However, Sukthana *et al.* (2006) found that the commercial latex agglutination test was very useful test since its sensitivity (100%) and specificity (94.8%) was high when compared to the Sabin-Feldman dye test.

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