EPIDEMIOLOGICAL STUDY OF SEROTYPING AND GENOTYPING OF
STREPTOCOCCUS SUIS IN THAILAND

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SUMMARY

Streptococcus suis is a Gram positive, facultative anaerobic coccus. Streptococcus suis type 2 is a frequent cause of diseases in pigs and humans worldwide including Thailand. Diseased pigs are the cause of the spreading of the disease in food, especially fresh pig blood, raw or undercooked pork as well as causing infection through human contact to raw meat. In Thailand, a lack of studies concerning epidemiological serotyping and genotyping in pigs and human isolates in the same time period was reported. So our study collected data from both pig and human infection during 2007 and 2010. Objective of the study is to know the serotype or genotype of diseased strains from pigs and human being. Design. Our groups gathered data by collecting of eleven diseased pig isolates from the Veterinary research and development center (uppermost Northeast region) and human isolates from the hospital of uppermost Northeast and North of Thailand, then isolated and identified by performing biochemical test, serotyping and PCR method. Results. This study found that three of S. suis serotype 2, three of serotype 9 and the less non-typical in diseased pigs from uppermost Northeast region. It showed that serotype 2 was present in all human isolates from Khon Kaen,(Northeast region), Lumpoon and Chiang Mai in the North region of Thailand. Conclusion. Many serotypes of S. suis caused animal infection. S. suis capsular type 2 represented at least one-third of all cases isolated from diseased pigs, which was also shown in our study and many previous studies. In many previous studies, most S. suis serotype 2 is a causative agent of human diseased, our study showed that all cases are also S. suis serotype 2, in North region found most S. suis serotype 2 and some serotype 14. The human infections in the Northeast Thailand are sporadic cases. We have 2 human cases in three years, while in the endemic area such as the North of Thailand more than twenty of Human cases are found per year. The people of North Thailand like to have raw pork and fresh pig blood, so that why they always have this particular infection. Humans in the Northeast of Thailand like to have fresh beef or fish meat, so that S. suis infection in humans are rare cases. Unlucky people in Northeast Thailand commonly experience serious parasitic infections such as liver fluke that causes cholangiocarcinoma in chronic infection.

Key Words: Streptococcus suis, pig, human, Thailand
1. Introduction

*Streptococcus suis* is positive Gram, facultative anaerobic cocci. It is an important pathogen in pigs. These organisms have been found in the nasal tract and tonsils of healthy pigs and causes severe diseases such as pneumonia, septicemia, meningitis, endocarditis, arthritis, abortion in pigs and sudden death in piglets. It is a serious zoonosis in human, with most case occurring in workers that have frequent exposure to sick or carrier pigs including raw pork contaminated with *S. suis*.

Many serotypes of *S. suis* cause clinical infection in pigs or piglets, one-third to nearly half of the isolates are capsular serotype 2. The other types 3, 4, 8, 5, 7 and ½ have been reported in China between 2003 and 2007. A spanish group survey of palatine tonsils from healthy pigs suspected the origin of transmission to humans is carried out. They reported half of these isolated are serotype 2, the less 15, 9, ½, 6, 4, 24, 1, 3, 21, 22, 23, respectively.

Human infection caused by *S. suis* is first reported in 1968 and becomes serious zoonosis in many countries with intensive swine production in Europe as Netherlands, United Kingdom, Denmark, France, Germany, Sweden and Italy, in Asia as Hong Kong, Thailand, Singapore Taiwan and Viet Nam.

Thailand has cases reported in central, north and northeast Thailand. Most reports from humans in Thailand are not classified as these organisms by any typing method. Genetic analysis (PFGE) of *S. suis* isolated from six healthy pigs and sixty-three human cases in northern Thailand has been reported since 2006. However, the serological or molecular epidemiological study in diseased pigs has not been investigated. This study carried out serological or molecular epidemiological relationships in diseased pigs in some parts of northern including northeastern of Thailand and compared them to human isolates in North and Northeast Thailand.

2. Methodology

Our groups gathered data by collecting of eleven diseased pig isolated from Veterinary research and development center (North and uppermost Northeast region) and Seventy four humans isolated from the hospitals of uppermost Northeast and Northerrn Thailand. Humans were those already diagnosed by a clinician and confirmed the infection was caused by this agent, by the microbiogical laboratory in each hospital.

*S. suis* is identified and classified by morphological, biochemical, serological characteristics and performed genotyping by PCR assay for detection of *Streptococcus suis* and *S. suis* serotype 2. In this study confirmatory biochemical tests are performed to identify *Streptococcus suis* by Gottschalk, M et al. (1991), then further identifies to serotype 2 capsule by coagglutination test from SSI Copenhagen, Denmark and confirmed to serotype 1, 2, 7, 9 or 14 by PCR method.
3. Results

Seventy-four of S. suis human isolates have confirmative tests using the Gottashalk method (show negative growth in 6.5% NaCl, VP negative, hydrolysis of esculin positive; trehalose, Lactose, salicin and sucrose positive, amylase production positive, glycerol negative and give alpha hemolysis on sheep blood agar). The capsular type 2 identification is performed by coagglutination tests. (SSI, Copenhagen, Denmark) The PCR method is using 16s and CPS 1,2,7,9 and 14 gene amplification for alternated confirmatory tests.

This study finds that three of S. suis were serotype 2, three were serotype 9 and the other nontypical in diseased pigs from the uppermost Northeast region.

It shows that serotype 2 was present in two humans isolated from Khon Kaen, (Northeast Thailand), fifty-three isolated from Lumpoon and twenty isolated Chiang Mai in the Northern of Thailand.

Table 1. Clinical and Laboratory diagnosis of Streptococcus suis from Pig and Human infection

<table>
<thead>
<tr>
<th>Samples</th>
<th>No of Streptococcus suis*</th>
<th>No of S. suis serotype 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease Pigs</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Humans</td>
<td>74</td>
<td>73</td>
</tr>
</tbody>
</table>

Three isolates are serotype 9

4. Discussion

Many serotypes of S. suis are caused by animal infection. S. suis capsular type 2 represents at least one-third of all isolated diseased pigs, which was also found in our study, and many previous studies. Many previous studies show that most S. suis serotype 2 is a causative agent of human disease. Our study also shows that almost all cases are also S. suis serotype 2, in North Thailand find most S. suis is serotype 2 and some serotype 14. The human infections in the Northeast Thailand are sporadic cases. We collected 2 human cases in three year, while in the endemic area such as Northern Thailand found more than twenty human cases per year.

5. Conclusion

The people in the North of Thailand liked to have raw pork and fresh pig blood, which is that why they always have that infection. Humans in the Northeast of Thailand like to have fresh beef or fish, so that S. suis infection in humans are rare cases. One human case had only contact with pigs without a history of having raw pig meat. This finding indicates that small skin abrasions can be the source of infection. Unlucky people in the Northeast region commonly experience serious parasitic infections such as liver fluke, which caused cholangiocarcinoma in chronic infection.
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REFERENCES


