

A SURVEY OF *TOXOPLASMA GONDII* ANTIBODIES IN PIGS IN INDONESIA

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Abstract. In August 1994, blood samples were collected from 110 pigs at a slaughter house in Bandar Lampung (Sumatra) and from 98 pigs in a slaughter house in Ujung Pandang (Sulawesi), 208 pigs in total. Anti-*Toxoplasma gondii* antibody titer in these samples was surveyed using the latex agglutination test. The positivity rate was 3.6% (4/110) in Bandar Lampung, and 9.2% (9/98) in Ujung Pandang. The antibody titer was 1:128 in two and 1:512 in two in Bandar Lampung, and 1:64 in six, 1:128 in two, and 1:256 in one in Ujung Pandang, showing that the titer was higher in Bandar Lampung.

INTRODUCTION

Toxoplasma gondii (Tp) is considered an important zoonotic pathogen, to which many animal species including humans are sensitive, and animals of the cat family are the final host. According to the review by Gandahusada (1991), the first human case in Indonesia was reported by Cartar in 1962 (quoted by Nelwan *et al*, 1975), and more than 10 cases were reported thereafter. In these reports, the positivity rate was stated to be 2-63% by Gandahusada (1991), 9.7-51% by Durfee *et al* (1976), 8.9% by Yamamoto *et al* (1970), 50% by Matsuo and Husin (1996), and 64% by Uga *et al* (1996). The positivity rate is high, despite the variation among regions, showing that Tp is widely spread. Regarding domestic animals, the positivity rate was reported for cats, dogs, goats, cattle, and pigs. Durfee *et al* (1976) reported the positivity rate to be 41% in cats, 61% in goats, and 0% in cattle. Gandahusada (1991) reported 35-73% in cats, 75% in dogs, 11-61% in goats, 11% or less in cattle, and 11-36% in pigs. Yamamoto *et al* (1970) reported 11.1% in goats and 0% in cattle and pigs, Wallace

et al (1974) reported 14-34% in cats, and Matsuo and Husin (1976) reported 47.5% in goats and 9% in cattle.

Therefore, the positivity rate is high in cats and goats, indicating that these animals play significant roles as an infection source for humans. Transmission from pigs was the major infection source in Japan, but infection via pork may be limited to a specific Indonesian subset of people because about 90% of the Indonesian population are Muslims who do not eat pork. Therefore, pigs may not be a major infection source in Indonesia. However, since the prevalence in cats and goats is high, transmission between these animals and highly sensitive pigs may occur, becoming a cycle that should not be ignored in the prevention of human infection. However, there has been almost no survey in pigs in Indonesia. Therefore, to investigate the prevalence in pigs, anti-TP antibody was surveyed in two districts: Bandar Lampung (Sumatra) and Ujung Pandang (Sulawesi).

MATERIALS AND METHODS

The survey was performed in August 1994. The animals examined were shipped pigs weighing 80-100 kg: 110 pigs at a slaughter

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house in Bandar Lampung (Sumatra) and 98 pigs at a slaughter house in Ujung Pandang (Sulawesi), 208 pigs in total. The blood samples were adsorbed to filter paper strips at exsanguination, and immediately dried. The filter paper strips were brought back to the laboratory, and the antibody titer was measured according to the method reported by Tsubota *et al* (1979) using a latex agglutination test (Lat Toxocheck-MT, Eiken, Japan). The blood-adsorbed filter papers were cut into small pieces, and extracted in 300 µl of buffer for 60 minutes. Two-fold serial dilutions of the eluate (eight-fold diluted) were prepared up to 1,024-fold. Latex emulsion was added and mixed well by shaking. After the mixture was allowed to stand at room temperature overnight, the titer was determined. An antibody titer of 1:64 or higher was judged to be positive.

RESULTS

The overall positivity rate was 6.3%. In Bandar Lampung, four of 110 pigs were positive (3.6%), and the antibody titer was 1:128 in two and 1:512 in two. In Ujung Pandang, nine of 98 pigs were positive (9.2%), and the titer was 1:64 in six, 1:128 in two, and 1:256 in one. The positivity rate was higher in Ujung Pandang, but the antibody titer was higher in Bandar Lampung.

DISCUSSION

The positivity rate was 3.6% in Bandar Lampung and 9.2% in Ujung Pandang, showing that the rate was low in Bandar Lampung. A high antibody titer, which is observed at onset of infection, was not detected in either district. Although the results of this study were lower than the positivity rate reported by Gandahusada (1991) (11-36%), distribution of *Tp* in Bandar Lampung and Ujung Pandang districts was clarified. Regarding the relation to human infection, since the results of this survey in pigs were lower than the positivity rates in cats and goats in previous reports, the major source of human infection may be oocysts

excreted by cats and contained in goat meat. However, pigs are highly sensitive to *Tp*, and infection of pigs is likely to serve as an infection source and may cause an epidemic. Therefore, better hygienic control is important.

Since the host range of *Tp* is broad, not only domestic animals but also wild animals should be considered. Yamamoto *et al* (1970) performed an antibody survey in orangutans in the Surabaya district (Jawa); the positivity rate was 37.5%. Murata (1989) performed a survey in zoo animals; the positivity rate was 5% in mammals and 6.7% in birds. These findings indicate that further investigation of wild animals, as well as domestic animals, is necessary.

The present survey was performed in pigs shipped to a slaughter house in only two districts. To investigate the prevalence throughout Indonesia, surveys in many other districts are necessary.

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