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SEROLOGICAL EXAMINATION AND DEMONSTRATION OF TOXOPLASMA GONDII IN SLAUGHTER PIGS

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Abstract

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Over a 12-month period of 1979 and 1980 examined were 432 slaughter pigs, viz. serologically using the Sabin-Feldman reaction (SFR), using microprecipitation in agar gel (MPA) and an isolation biological experiment on toxoplasma-negative white mice. In the animals examined SFR and MPA were positive in 9.25 % and 0.46 %, resp. *T. gondii* was isolated from the brain or diaphragm of 14 animals, i. e. 3.24 % of the total number of 432 animals examined and 35 % of SFR positive animals. The highest occurrence of *T. gondii* was found in pigs slaughtered in November followed by those slaughtered in June.

Toxoplasmosis, pigs, causative agent, occurrence of antibodies.

In the domestic pig toxoplasmosis occurs rather frequently and clinical cases are described of the disease under spontaneous and experimental infections. The infestation of pigs with toxoplasmosis found serologically varies from a few per cent to nearly 100 %. Krilyk and Kobalskij (1973) observed an infestation in 1.6 %, Boch et al. (1964) in 97.6 %. Also isolation collections of *Toxoplasma gondii* are relatively frequent in pigs. In Czechoslovakia e. g. Zástěra et al. (1967) isolated *T. gondii* in 11 cases from 40 animals examined. Čatár et al. (1969) isolated the originator from slaughter pigs in 43.3 % and 73,3 %. In slaughter pigs the parasite was proved also using direct microscopical examinations in native preparations from the organs. Garcia et al. (1979), for example, microscopically examined 50 pig kidneys and they found *T. gondii* cysts in 16 cases (32 %). In the present study the authors aimed at serological and isolation examinations lasting one whole year of slaughter pigs from the same district. The aim the study was to verify serologically in a larger number of animals the occurrence of antibodies and mainly the presence of *T. gondii* in the tissues of the slaughter pigs, and the same time to apprehend also the dynamics of its isolation from these animals in the course of a year.

Materials and Methods

In the course of 12 months, i. e. from March 1, 1979 till February 29, 1980, groups of pigs slaughtered at the district slaughterhouse in Strakonice were examined twice a month using serological and isolation tests. The pigs came from agricultural enterprises of the Strakonice district only and had been reared in older types of buildings for pig fattening or in adapted pigsties (animals from modern large scale units are slaughtered in meat plants outside the district). When exsanguinating the animals a blood sample was taken for serological testing. After elaboration of the sample in the laboratory each serum was tested using two serological methods: Sabin-Feldman reaction (SFR) and microprecipitation in agar gel (MPA). The SFR was performed according to Standard laboratory methods of the ÚSVÚ (Central State Institute for Veterinary Medicine) in Prague. The MPA was performed according to the official methods of the national enterprise ÚSOL (Institute of Sera and Inoculation Substances) in Prague. For the isolation of the parasite in toxoplasma-negative white mice, samples of the brain and diaphragm taken after slaughtering the

animals. In the laboratory each sample of the pig diaphragm and brain was elaborated separately using a direct method (mechanical homogenization) in such a way that 15 g of the sample were cut into a thick-walled beaker with 20 ml of buffered saline solution with an addition of antibiotics (1 g of STM and 600 000 I. U. of PNC per 1000 ml of buffered saline solution).

Homogenization of the samples was done with a submersible electric mixer with exchangeable fitters in order to prevent mutual contamination of the samples. The suspension thus formed was applied intraperitoneally at a dose of 1 ml to toxoplasma-negative white mice. A minimum of three mice were used for each sample. After five weeks the mice were exsanguinated, from the brain of each three compression preparations were prepared and were microscopically examined for the presence of *T. gondii* cysts. The blood sera of all mice infected with one sample were totally tested serologically using SFR and MPA.

Results

The results of examinations performed are summarized in the Table 1 and Fig. 1. As evident from the table a total number of 432 slaughter pigs were examined during a 12—month period using serological (SFR and MPA) and isolation testing. The SFR and MPA were positive in 9.25 % and 0.46 %, resp. *T. gondii* was isolated from 14 animals, i. e. 3.24 % of the number of slaughter pigs examined, and in 35 % of the number of SFR-positive slaughter pigs. *T. gondii* was isolated from 5 slaughter pigs with an antibody titre of 1 : 4, i. e. 35.7 % from the isolation-positive animals, from 8 pigs with a 1 : 8 titre, i. e. 57.1 % from the isolation-positive animals, and from one pig with a higher titre, i. e. 7.1 %. The number of isolations of the causative agent from slaughter pigs was the highest in November followed by June, and was sporadic in March, August and October.

Table 1

Isolation of Toxoplasma gondii from slaughter pigs

Number of animals examined	% of SFR, MPA positive	Number of isolations		Total number of isolation-positive animals	Of this the number of animals with positive SFR in titre			% of positive isolations from the number examined	% of positive isolations from SFR positive animals
		from brain	from diaphragm		1 : 4	1 : 8	higher		
432	9.25 0.46	14	12	14	5	8	1	3.24	35.0

Discussion

In the course of the one-year period examined were 432 slaughter pigs using serological (SFR and MPA) and isolation testing. From this group of slaughter pigs 9.25 % and 0.46 % were SFR and MPA positive, resp. The causative agent was found in 3.24 % of the total number of animals examined and in 35 % of the SFR positive animals. When comparing the percentage of positive isolations from the whole group of animals examined (3.24 %) with the results of other authors it can be seen that the percentage of *T. gondii* isolations from slaughter pigs is relatively low in our experiments. Boch et al. (1964) isolated *T. gondii* from 9 % of slaughter pigs. In Czechoslovakia Čatár et al. (1969) proved positive isolation from slaughter pigs in 73.3 % and 43.3 %. Also Zástěra et al. (1967) isolated *T. gondii* from 27.5 % of slaughter pigs examined. However, these results

are of an earlier date. The lower percentage of isolations from slaughter pigs in the present examinations can be explained by the fact that improved hygiene in large-scale animal production units introduced lately results in a better epizootiological situation, i. e. in a decrease of infestation with *T. gondii* as far as the occurrence of antibodies and *T. gondii* presence in the tissues of slaughter pigs are concerned. In this respect also the feeding of industrially produced feed mixtures showed to be benefical. In spite of the fact that the rate of infestation of slaughter pigs with *T. gondii* has recently decreased in Czechoslovakia it is still necessary to consider the meat and organs of slaughter pigs to be a potential source of toxoplasmosis for the human population. When studying the dynamics of occurrence of positive isolations during the one-year period the frequency of isolations was higher in June and the highest in November. The findings show a frequent infection of porkers in the spring months and an expressive infection in the autumn months. In the latter case it is possible to consider the small free-living mammals to be a source of infection because a strong migration of these animals begins at the beginning of autumn from the free nature into the stables of domestic animals.

Sérologické vyšetření na toxoplazmózu a průkaz Toxoplasma gondii z jatečných prasat

Sérologicky Sabin-Feldmanovou reakcí (SFR), mikroprecipitací v agarovém gelu (MPA) a izolačně biologickým pokusem na toxoplazma negativních-bílých myších bylo v průběhu 12 měsíců r. 1979 a 1980 vyšetřeno 432 kusů jatečných prasat. U vyšetřeného souboru byla SFR pozitivní v 9,25 %, MPA v 0,46 %. *T. gondii* byla izolována z mozku nebo bránice 14 zvířat, tj. ve 3,24 % z celkového počtu 432 vyšetřených a v 35 % ze SFR pozitivních kusů. Nejvyšší výskyt *T. gondii* byl zjištěn u prasat poražených v listopadu, dále pak v červnu.

Серологическое исследование токсоплазмоза и определение из боенских поросят

Серологически реакцией Сабин-Фельдмана (SFR), микропреципитацией в агаровом геле (MPA) и изоляционно биологическим испытанием на токсоплазму негативно белых мышей в течение 12 месяцев 1979 и 1980 гг. были обследованы 432 головы боенских поросят. У обследованных животных реакция Сабин-Фельдмана была положительной в 9,25 %, MPA — в 0,46 %, Токсоплазма гондии была изолирована из мозга или диафрагмы 14 животных, т. е. в 3,24 % из общего количества 432 обследованных животных и в 35 % из СЯР положительных голов. Самое большое наличие *Toxoplasma gondii* было выявлено у поросят, битых в ноябре и в июне.

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