A CASE OF GIARDIASIS *(GIARDIA DUODENALIS)* IN PIGLETS

Pozzi S.P[1], Lavi J[2]and Rabl-Avidor M [3]

[1] Intervet-Shering Plough, Italy; [2] Shavey-Zion, Israel; [3] Dyn-Diagnostic, Kfar Nahalal, Israel.

Correspondence should be sent to:
paolo.pozzi@sp.intervet.com +39 335 7720466

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SUMMARY

A case of atypical piglet pre-weaning diarrhea, non-responsive to antibiotics, was investigated in a farrow-to-finish swine herd in northern Israel. The presence of Giardia spp. was confirmed without further classification.

Giardia is a common contaminant of water and feed in some places. It has been diagnosed previously in the Israeli human population, irrespective of socio-economic background..

The clinical case was successfully controlled by dimetridazole therapy. It is highly unlikely that porcine Giardia presents a zoonotic problem or a source of water contamination.

INTRODUCTION

In Israel pigs are bred on 24 premises from a nucleus of 13000 to 14000 sows which produce 170,000 slaughtered pigs per year. All except one of the farms is located in the north (Galilee), while the exception is located in southern Israel (Negev). The Israel swine population is well isolated for two main reasons: i) the swine population of all neighbouring countries is minimal; ii) no pigs are imported. However, semen for artificial insemination is imported from central Europe (mainly Germany) and Cyprus.

Thus the epidemiology of the Israeli pig population differs substantially from that of western Europe (3). Israel seems to be substantially free from Aujeszky Disease, Porcine Reproductive Respiratory Syndrome and Swine Influenza (3), which are widespread in most EU countries. In contrast, epidemic transmissible gastroenteritis, that has nearly disappeared from western Europe since the middle 1980s is still present (2).

More than half of the sow population and pig production is concentrated in a small geographic area. Because of the confined nature of the area however, the farms are interconnected and share access roads for vehicles, pedestrians and feed suppliers.

We report here a clinical case of chronic enteritis of pre-weaning piglets, on an Israeli pig farm. The enteritis was caused by *Giardia* infection which is rare in western Europe.

Giardia is a protozoan, belonging to the phylum *Protozoa*; subphylum: *Sarcomastigophora*; class: *Mastigophora* (4).

Giardia is bilaterally symmetrical, with eight flagella, and provided with a large adhesive disk on the body's ventral surface. The disk allows the attachment to the epithelial cells of the intestinal mucosa (4). Giardia parasitizes humans and can be found also in the faeces of dogs, cats, farm animals and wild animals (5) *(Fig. 1)*. Giardia can be a responsible for chronic diarrhea of man and also of domestic animals. (4).

Giardia's distribution in pigs in western countries as shown in table 1 is not homogeneous.

Table 1. Distribution of Giardia in pig breeding units in Canada and western Europe.

Year	Country	Sample	Herds/Areas	% positive	Ref.
1997	Canada	236 pigs	15 areas	9% pigs - 66% units	6
1998/2002	Germany	1427 pigs		0,1% pigs	7
2006	Denmark	1500 pigs	50 herds	18 to 84% pigs (age related)	8
2007	Norway	684 litters	100 herds	1.5% litters - 10% herds	9

Giardia isolated from pigs indicates clearly that its origin might be human, livestock or dogs, or vice versa, but the role of pigs in transmission to humans is still unknown (10). In USA (4) and in Italy (11) it was found that the origin and spread of Giardia might be from water or via feed contamination (12).

An explanation of Giardia's easy transmission is likely due to: i) its high resistance to the environment; ii) low sensitivity to disinfectants; iii) low infectious dose; iv) wide spreading in several hosts including humans (11). Different Giardia species have been recognized, however, from humans and animals and

are morphologically similar, giving rise to some controversy on their taxonomic classification.

Giardia duodenalis is the preferred name for *Giardia* infecting humans and mammals; in addition also *Giardia intestinalis* and *G. lamblia* are known. These belong to assemblage A of the phylogenetic map as proposed by Thompson (13) based on the 18S rRNA gene sequence. Here we will adopt the generic name *Giardia.*

MATERIAL AND METHODS.

In a closed breding unit of 1200 gilts and sows chronic diarrhea was observed in piglets before weaning, starting at the second and up to 4th week of age and persisting until weaning at 30 – 35 days. The diarrhea was grey-green or grey-yellow in color; not watery; but dense and formed in some cases.

The distribution was about 6,5% - 7% among the litters affecting 80% of the piglets from each litter (about 150 affected piglets in total). The mortality reached 20-25%. In addition, the surviving piglets had a reduced growth rate compared with the healthy animals.

The diarrhea was insensitive to the common antibiotic treatments - mainly quinolones, gentamicine or cephalosporines.

At necropsy, the abdominal cavity was affected severely. The stomach appeared soft and engorged. The small intestine was partially empty and extended by gas, with tracts full of soft yellow-grey dense material. The large intestine appeared soft and contained similar material (Fig. 2)

The mesenteric lymph nodes appeared congested and enlarged *(Fig. 3).* The stomach showed a mild gastritis *(Fig. 2)* and the presence of undigested food.

Differential diagnosis with E.coli and TGE virus enteritis were made because of the piglets' age, diarrhea characteristics, and antibiotic resistance (2). *Cryptosporidium* and *C. perfrigens* were suspected, while the latter generally affects older piglets.

Pooled samples of diarrhea from different litters were sent to the laboratory for identification, isolation and a sensitivity test of the causative agent.

At the laboratory, the following investigations were made:

- Flotation for parasites examination
- Direct microscopic observation of a glass-dragged oil drop
- Bacteriological examination.

RESULTS

Giardia species was detected by microscopy examination in oil immersion and identified by morphology (4). The flotation excluded *Criptosporidium* and other parasites. The bacteriological examination confirmed the presence of a rare *E. coli* (sensitive to amoxy-clavulanic- cefthriaxone).

The most active compounds against Giardia belong to the benzimidazole carbamate group (mebendazole, fenbendazole, albendazole), but the latter requires a long and repetitive treatment, which might be difficult to apply in young animals.

The metronidazole (5-nitroimidazole) syrup was the ideal choice for Giardia treatment, because it is commercially available, cheap and easily given *per os.*

All the diseased piglets received immediate treatment with 30 mg/kg of metronidazole, *per os,* once per day, for 3 -5 days. All the contact piglets in the same pen received the same treatment. As a result the clinical incidence decreased rapidly to 0.8–1.3% per litter, and mortality to a few cases.

DISCUSSION

Among the parasites, *Giardia* should be considered in cases of sporadic diarrhea in pre-weaning piglets, along with *Clostridium* and *Cryptosporidium.*

*Giardia duodenalis (*syn. *G. intestinalis; G. lamblia)* is distributed worldwide, and identified in humans and domestic livestock, particularly in young animals and children. Its presence in Israel has been already documented (14, 15 ,16).

The precautions for humans should be based on personal hygiene and the environment. In livestock farming focus should be made on drinking water quality; water collection and distribution systems, and the sanitary status of personnel working at the farm.

Sanitization of drinking water for livestock is achieved with iodine, while chlorine seems to be less efficacious. Water filtration is justified if there is a very high incidence and heavy losses.

The possibility of zoonotic infection *from* pigs *to* human populatios is unlikely. *Giardia* cysts are degraded in liquid pig manure and it is unlikely that pig manure is a threat for water contamination (17, 18). On the contrary, reducing the proportion of pig manure by mixing it with human slurry contributes to the survival of cysts (18).

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Figure 2: Impacted intestinal contents consisting of yellow grey material. Enlarged inguinal lymph nodes (probably PC correlated).

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Figure 3: Undigested stomach contents. Mild gastritis. Congest enlarged mesenteric lymph nodes.