Bruno Gottstein et al. 2007

Bruno Gottstein et al. 2007
Trichinellosis: Crossing the Chinese Wall

outline
- In this issue of The Veterinary Journal, the epidemiology of animal trichinellosis in China, based mainly upon original Chinese literature published between 1937 and 2004, is reviewed (Wang et al., 2007). This review provides a fascinating insight into the prevalence of swine trichinellosis in China where virtually all reports have up to now been published in Chinese and so are inaccessible to the international scientific community. The authors record outbreaks of human trichinellosis resulting from the consumption of dog meat in North-eastern China, where the population eats raw or scalded dog meat. Mutton and game meat have also become important sources of infection for human trichinellosis, but testing for Trichinella larvae in meats other than pork is not mandatory in China at present and there is a clear need for greater education and effective quarantine if the incidence of the disease is to be effectively decreased.

Not only in China, but throughout much of the world, Trichinella spp. are found as the causative agent of human trichinellosis, a disease representing both a public health hazard and an economic problem. Being an important zoonotic infection, considerable efforts are made to control or eliminate the parasite from the food chain; success however has been scant in many areas. Infection occurs with the ingestion of Trichinella larvae that are mostly encysted in muscle tissue. The cyst is digested in the stomach and the larvae penetrate into the duodenal and jejunal mucosa. Within approximately four days the parasites are sexually mature and mate. The newborn living larvae migrate through the lymphatic system to striated muscle cells. Diaphragm, tongue, masseter and intercostal muscles are most heavily involved in infections in, for example, domestic pigs. The larvae penetrate individual muscle cells and encapsulate themselves approximately 15 days after infection and encapsulation is complete by four to eight weeks. The encapsulated larvae are infective but their development only continues after ingestion of infected muscles by the next host. In humans, the lowest infectious dose causing disease is not clearly defined. It was assumed that the infectious dose causing disease was 70?150 larvae, but other studies have claimed the range is 60?750 larvae (EFSA, 2005). The most important sources of human infection in Europe have been the meat of horses, wild boar, and pigs bred on small farms with outdoor access.

Due to political and economic changes, recent increases in prevalence and incidence have been observed in many former Eastern European countries. This represents a serious problem for the meat trade within the European Union (EU) and for the exportation of pork outside EU countries. Thus, the EU legislation to monitor and survey the problem has changed and will change again in the near future. Several attempts have been made to define Trichinella-free regions, but recent developments have focused more on a focal strategy to certify Trichinella-free pig production enterprises rather than whole areas.

There are three different internationally recognized diagnostic tools to detect Trichinella spp. in animals (OIE, 2004). Two methods allow the direct detection of the parasite. The first, trichinoscopy, is an insensitive method with a detection limit of three larvae per gram (lpg) of tissue and may not therefore detect non-encapsulating Trichinella. Trichinoscopy is no longer recommended for routine inspection. A second procedure, known as the artificial digestion method, is more sensitive (with a limit of detection of 1 lpg) and is generally considered sufficiently sensitive to prevent clinical trichinellosis in humans. There are recent indications that the limit of detection may actually be >1 lpg (EFSA, 2005). The third method is an indirect detection method based upon detection of antibodies against Trichinella spp. in serum or meat juice samples. Although this third method is not recommended for meat inspection or food safety programs, it is an important tool for the surveillance of infection and epidemiological investigations in animal populations and has a limit of detection of 0.01 lpg of tissue. In pigs, trichinoscopy and the digestion method allow detection of infection starting from approximately 17 days post

infection, as soon as the larvae have reached the muscle cells and start encapsulating (always given that the level of infection is above the limit of detection (OIE, 2004)).

Trichinella spp. occurs throughout most of the world, and has formerly been classified as a List B disease by the World Organisation for Animal Health (OIE). In the EU, however, the organism is rarely reported in domestic animals. Within the EU and Norway, a Trichinella monitoring program has been implemented for pigs, horses, wild boar and other wildlife species. In 2003, the percentage of domestic pigs tested varied between <1% and not, vert, similar100% of the slaughtered population, which roughly equalled 140 million tested animals (EFSA, 2005). The highest number of positive animals was reported in Spain, where 24 pigs out of 34.6 million animals tested were found positive. Other countries that reported Trichinella infected pigs in 2003 were Finland (2 pigs) and Germany (1 pig). This contrasts markedly with the figures from China between 1974 and 1998 (Wang et al., 2007), where the average prevalence of the infection in dogs slaughtered in abattoirs was 16.2% (5654/34,983). In this context, it may nevertheless be interesting to note that the last four outbreaks recorded in Switzerland (between 1935 and 1968) were all related also to the inappropriate consumption of infectious dog meat, thus pointing at some common habits obviously shared by Swiss and Chinese consumers.

In many European countries, trichinellosis has been declared a disease that must be monitored. Suspect cases of trichinellosis must be reported, but further actions are not necessarily taken. However, the European Commission (EC) is preparing a new regulation laying down rules for the official controls for Trichinella in meat in order to improve food safety for European consumers (EC, 2005). The legislation covers meat inspection for domestic pigs, horses, wild boars, and other farmed and wild species that are susceptible to Trichinella infection and slaughtered for consumption, and proposes a testing program of all carcases. It foresees the possibility of a reduced testing program for holdings or categories of holdings that are declared Trichinella-free, although these will have to meet several requirements related to rodent control, feed, animal disposal, animal purchase and traceability, and general hygiene. Additionally, fattening pigs will not be allowed to have access to outdoor facilities as of their fourth week, and during the first four weeks only if strict conditions are met. Additional requirements apply to categories of holdings that may be recognized as Trichinella-free, including the need for a 10-year national surveillance program that would have detected a prevalence exceeding 0.0001% with 95% confidence. Reduced testing programs may also apply to regions where the risk of Trichinella in domestic swine is officially recognized as negligible.

In contrast to the EC, the OIE recognizes the possibility that a country or zone might be considered free from trichinellosis caused by T. spiralis in domestic swine. This may occur when trichinellosis is notifiable in the country and an effective disease reporting system is in place that has been shown to be capable of capturing the occurrences of cases. Additionally, a surveillance program must be in place (OIE, 2005). For surveillance of the slaughter sow population, the OIE stipulates the serological test methods to be used, but the test method for surveillance in slaughter pigs is not prescribed.

The work from China (Wang et al., 2007) opens a new doorway on the epidemiology of this infection in a hitherto unknown large population. The problems facing the Chinese authorities are immense when this report is contrasted with the OIE specifications and the narrow range of potential sources of the parasite faced by many countries in the EU. Nonetheless, the evidence is that the disease can be monitored and to some extent controlled with a rigorous reporting and testing system in place. It is to be hoped that the Chinese will in time be able to join in the campaign to minimise human infection from this zoonotic and costly disease.

Source

Volume 173, Issue 2, March 2007, Pages 243-244

Oui