Emerging Parasites and the Threat They Pose to the UK

Part 2: Hydatid Disease

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Hydatid disease and meat/offal condemnation from Taenia spp.

*Echinococcus granulosus* is a small tapeworm of dogs (5-6mm long, fig 4.). Ruminants, pigs and man may all act as intermediate hosts with the formation of hydatid cysts. These can lead to offal condemnation in farm animals but more seriously can lead to significant pathology in man with cysts forming in the bone, liver, central nervous system and heart. Ingestion of the cysts by canids occurs mostly through scavenging of carcasses or feeding of offal.

![Adult Echinococcus tapeworms](image)

**Fig 4. Adult *Echinococcus* tapeworms**

Canine *Taenia* spp tapeworms are found throughout the UK in lagomorph and livestock intermediate hosts. With the exception of *Taenia multiceps* which can lead to CNS signs in young ruminants (“gid”), infection is well tolerated in intermediate hosts and the greatest consequence of cyst formation is economic. This is because cysts will lead to meat and offal condemnation. FSA data showed considerable economic loss from liver (742,000 ovine livers being condemned in 2012 costing 1 million pounds, 548,000 livers condemned in 2015) and carcass condemnation (66,500 lamb carcasses rejected in 2012 at a cost of 5 million pounds). *Taenia* segments however, are sometimes seen in the faeces of dogs whose lifestyles and diets put them at risk of infection. These proglottids are very visible to clients and reduce the human-animal bond due to owner revulsion, providing another important reason for their control in first opinion practice.

Historically, hydatid disease in the UK has been limited to regional foci in Wales, the Welsh border, Herefordshire and the Western Isles of Scotland. Between 1974 and 1983 there were 2 cases of human hydatid disease in Wales and 0.2 cases per million in the rest of the UK. A voluntary control programme of supervised praziquantel dosing of dogs in Wales reduced this incidence and this was replaced by a health education programme in 1990. In 2001 the foot and mouth epidemic proved a setback
in hydatid disease control as more carcasses were easily available to dogs to scavenge. This led to an increase in prevalence of *E. granulosus* in Welsh dogs from 3.4% in 1993 to 8.1% in 2002. Since then the number of annual cases of human hydatid disease in the UK has remained fairly constant with 12 cases in 2011. The Welsh assembly continues to raise public awareness of the disease and promotes praziquantel deworming programmes in dogs. This strategy in place of more intensive control measures in the 1980s has kept the incidence of disease low in Wales but the low numbers of carcass rejections in Wales in 2006/7 led the FSA and the Welsh Government to consider the possibility that the practice of many adult sheep being sold to other areas of Great Britain for slaughter, may be inadvertently spreading the infection around the country. Work carried out by the FSA on behalf of the Welsh Government found that the incidence of *E. granulosus* was much more widespread in England than previously thought. Postmortem inspections in abattoirs across Britain have produced positive cases with a particularly high incidence on the Welsh border and North Midlands. In 2015, FSA data showed the incidence of hydatid cyst rejections in sheep and cattle offal to be 0.12% in cattle and 0.3% in sheep across England and Wales. While there is the possibility that some of these condemnations may have been misidentified *Taenia hydatigena* cysts, these figures still present a significant risk that dogs will be exposed to infection through offal fed directly in hunts, kennels, farms and through unprocessed diets.

**Diagnosis**

It is currently unknown, to what extent canine infection is occurring and diagnosis in dogs is difficult due to faecal flotation being an insensitive method for taeniid ova detection. Even if *E. granulosus* ova are seen, they are indistinguishable from the eggs of *Taenia* spp. Coproantigen ELISA and PCR tests have been developed to try and provide more sensitive faecal diagnostic techniques but these are prohibitively expensive for routine use in first opinion practice at present. Marisol Collins from the Institute of Infection and Global Health, University of Liverpool has launched the HyData Project to use these tools to establish prevalence of *E. granulosus* in hunting dogs around the UK. This data will provide valuable insight into the extent to which *E. granulosus* is establishing in dogs around the UK and therefore presenting a zoonotic risk.

**Control of *E. granulosus* and canine *Taenia* spp infection**

Control measures require a “One Health” approach with veterinary professionals, parasitologists, meat inspectors and Government agencies all being required to play their part in bringing infection under control.

- **Regular tapeworm treatments of at risk dogs** – In traditionally endemic areas dogs with any potential exposure to ruminant carcasses, fed offal or on unprocessed raw diets should be dewormed with praziquantel every 6 weeks. Outside of these areas, treatment of dogs every 3 months has reduced human hydatid disease over time so this should be a minimum recommendation. It is uncertain however, to what extent deworming 4 times a year impacts on meat and offal condemnation rates so for this reason dogs producing tapeworm segments should be dewormed monthly.
This will eliminate proglottid shedding and minimise transmission risk to ruminants.

- **Prevention of access of dogs to ruminant carcasses and unprocessed/uninspected offal** – Raising awareness of the risks of tapeworm infections and encouraging dog owners to keep pets on leads will help to limit transmission to livestock. Similarly, raising farmer awareness in relation to clearing fallen carcasses and not feeding raw offal to dogs is beneficial.

- **Anti dog fouling campaigns** – While county councils heavily promote responsible disposal of dog faeces by owners, Veterinary professionals can also help to promote anti dog fouling among clients and local schools.

- **Accurate meat inspection** – Well trained meat inspectors will help to prevent cysts entering dog food preparations.

- **Traceability and adequate preparation of raw diets** – Raw diet feeding of dogs is increasing and while this trend is unlikely to reverse in the short to medium term, it is vital that raw meat and offal ingredients have been adequately inspected and frozen prior to incorporation into raw diets to minimise the risk of tapeworm transmission.