Hydatid Disease (Echinococcosis)

Questions and Answers

1. What is hydatid disease?
Hydatid disease is infection with immature tapeworms of the genus *Echinococcus* in the intermediate host (sheep or human). Echinococcosis refers to the presence of adult tapeworms in the gut of the definitive host. The species *Echinococcus granulosus* (which causes cystic echinococcosis) is found in the British Isles. The disease may take many years to develop and to produce clinical symptoms. This small tapeworm is found most commonly in the intestines of dogs (the final host) that consume the meat or viscera of infected sheep (the intermediate host).

Eggs produced by the adult tapeworm, and passed in their hundreds in dog faeces, may be transmitted to humans by a number of routes. The eggs can adhere to dog fur; close contact with infective dogs creates a risk of infection. Where *E. granulosus* is present, areas where dogs defaecate may present increased risks for children or anyone in contact with the contaminated soil or grass. Secondary contamination of garden vegetables which have been contaminated by dog faeces may also be a source of infection.

The egg hatches in the intestine of the intermediate host animal (or person) and the early stage of the parasite penetrates the gut wall and is carried via the blood stream to various parts of the body, especially the liver and lungs, where they slowly develop into hydatid cysts.

In a person, the occurrence of symptoms depends on the location of the cyst and its size – in locations such as the abdomen, where growth of the cyst is not restricted by anatomical structures, it can grow very large and contain several litres of fluid. In a food animal, these cysts can be seen at slaughter and are recognised as round swellings in the liver and lungs of infected animals.

If a dog is fed, or allowed to scavenge on infected carcasses, the young tapeworms are released from the cysts and grow inside the dog’s intestine. These in turn, produce more eggs and cause further spread of infection.

Human concerns

2. How do humans become infected?
Humans can pick up the infection directly from infected dogs. People, especially children, become infected by ingesting eggs through hand to mouth transfer of eggs after contact with the faeces or contaminated fur of infected dogs. Eggs may also be passed when dogs lick people. It may also occur following ingestion of food, water or soil which has been contaminated by infected dog faeces. Eliminated segments of the tapeworm present in dog faeces have been reported to migrate some distance over grass or garden vegetables before expelling eggs that subsequently adhere to the vegetation. Humans are intermediate
hosts; they do not play a role in the biological cycle although they may act as agents in perpetuating the infection by feeding dogs with infected meat and viscera.

3. What are the symptoms of hydatid disease in humans?
Hydatid disease in humans arises when cysts cause pathological damage in, or dysfunction of infected organs by space-occupying repression of, or displacement of tissues. Cases usually present with well-delineated primary cysts. Most cysts occur in the liver or lungs, but can occur in almost any location. Cysts can grow quite large, but clinical presentations depend on the size, site and number of cysts. Hydatid cysts develop slowly and may be tolerated until large enough to cause problems within the body.

4. How is hydatid disease treated in humans?
The only effective treatment for hydatid disease in humans is surgical removal of cysts. However, surgery is specialised as there is a risk of the cysts bursting and causing acute shock. The immediate consequence of a ruptured cyst is life threatening, with the associated risk of releasing thousands of worm heads into the body. Less invasive methods may also be used, guided by ultrasound, with cyst contents aspirated and drugs injected that kill the parasite (see 5.).

5. Diagnosis and treatment
Diagnosis uses a combination of clinical, imaging, serological and molecular techniques. Treatment is by a combination of surgical removal of the cyst and aspiration of the cyst contents followed by complementary chemotherapy with mebendazole or albendazole to reduce the risk of recurrence of infection. In countries with modern medical facilities case-fatality rates are low.

There are currently no effective drug treatments or vaccines to protect humans against the disease.

6. Is hydatid disease contagious? Can I pass the disease onto other members of my family?
No. Hydatid disease is not contagious, and cannot be passed from person to person but it is possible that more than one family member could get hydatid disease if the family dog is infected.

6. How many cases of human hydatid disease have there been in the last 10 years?
Between 10 and 20 human cases are reported in the UK each year and many have arisen following exposure abroad. For further information go to:

7. How many humans have died from hydatid disease in the last 10 years?
There are no data to suggest there have been significant numbers of deaths from hydatid disease in the UK. Data from the Office of National Statistics shows that there have been no deaths directly attributable to hydatid disease, between 1993 and 2006.
Animal concerns

8. How are dogs, cattle, sheep and other domestic animals affected by *Echinococcus* infection?
There are no specific signs of hydatid disease in farm animals, although this may be accounted for by their truncated life expectancy. There is no evidence for clinical signs or symptoms of *E. granulosus* in dogs. Hydatid infection in food animals is in most cases, confined to the lungs and the liver; infected organs must be condemned and destroyed. There may be up to 5% loss of productivity in infected sheep, but the majority of the losses are through condemnations; however the main clinical significance of infection is the risk to humans.

9. How are *Echinococcus* tapeworms identified in dogs?
Eggs are passed in the faeces of infected dogs. It is not possible to specifically identify these eggs by microscopic examination of faeces as they are visually identical to eggs of other tapeworms that may infect dogs. The coproantigen test is available to detect the presence of the hydatid worm in dogs. This test is able to detect proteins excreted by the worm present in the dog faeces. Dogs may also be purged and the purge examined for entire worms; this should however not be used on pregnant bitches, elderly dogs or young puppies. Safety precautions must be taken when collecting and examining these purges.

10. How is *Echinococcosis* identified in farm animals?
There are no specific signs of hydatid disease in farm animals. There may be a slight loss in production of around up to 5%, but this would not be diagnostic for hydatid disease. Hydatid infection may be detected at slaughter or at post mortem examination. Hydatid cysts can be recognised as cysts in the liver and lungs and may be more common in older animals.

11. How can dogs become infected with *Echinococcus*?
Dogs can pick up hydatid protoscoleces (infective immature tapeworms) if they are fed raw carcass meat and offal. Dogs who are allowed to roam may come into contact with dead animals and pick up hydatid tapeworms from scavenging their tissues.

12. How can *Echinococcus* infection be prevented in dogs?
*Echinococcus* can be eliminated from dogs with a dose of wormer containing the drug praziquantel. Dog owners should discuss worming needs with their vet who will carry out a risk assessment based on the particular needs of the dog. Treatments at intervals recommended by your vet will ensure that at-risk dogs become free of infection.

Dog owners should ensure that only cooked food is fed, that dogs do not gain access to sheep carcasses or offal and that they are not allowed to roam, especially out of sight. Some dog owners worm their animals infrequently or not at all, and allow them to roam freely on the hills and to scavenge. Offal from farm livestock may also be given to farm dogs as a treat.
13. If my dog is infected with hydatid disease will this infect my other animals?
Many species of animals may become infected with hydatid cysts if they swallow infective eggs. Commonly sheep and cattle are most at risk, but potentially any mammal can be infected e.g. goats and pigs. Following excretion, the eggs of *E. granulosus* may remain viable for a long time; up to a year after excretion in faeces, especially at low temperatures. In nature, some hydatid eggs disappear from pasture with time as a result of washing into the soil following rain. There is a strain of *Echinococcus granulosus* in Britain that infects horses, this is a separate strain to the one found in sheep and cattle and does not appear to pose a threat to human health.

14. How can *Echinococcus* infection be prevented in sheep and cattle?
It is currently thought that the elimination of the tapeworm from dogs will free sheep and cattle of infection, though tapeworm eggs can persist in the environment for years. Wild foxes are not considered to be important in the spread of disease in the UK.

15. Can all dog breeds become infected with *Echinococcus*?
Yes. It has been suggested that the Border Collie is especially susceptible to infestation with *Echinococcus*, but this may merely reflect the level of exposure of some members of this breed, as Border Collies are often kept on sheep farms.

16. Why is there current concern about a potential re-emergence of hydatid disease in Wales?
Buishi *et al.*, (2005) identified an increased risk of cases of human hydatid disease to be acquired in mid-Wales. This was based on an increased prevalence of 8.1% positive dogs for *Echinococcus* coproantigen in 2002 compared with 3.4% in the same areas during the period 1989 to 1993 (Palmer *et al.*,1996). There was also evidence of infection in areas previously free of hydatid disease. Re-emergence of infection in farm dogs was probably due to cessation of the supervised dog worming scheme (1983-1989) which was replaced by a health promotion and education campaign in Powys schools.

17. What plans are there to deal with the re-occurrence of hydatid disease?
The Welsh Assembly Government is introducing an eradication campaign for Hydatid Disease under the Animal Health and Welfare Strategy. This campaign was launched at the Smallholders Show on the Royal Welsh Showground in May 2006. Information packs were sent to all vets and GPs in Wales to inform them of the risk of re-occurrence of the disease. Welsh Ministerial approval has been given for an organised dog dosing scheme in the areas most at risk in Wales. The dosing of dogs is scheduled to begin in early 2008.

18. Will I be able to take my dog into Wales if visiting from other parts of the UK?
Tourists are advised that it is safe to take dogs into Wales provided they are routinely wormed beforehand, to ensure that agricultural livestock are protected against disease. Following your visit, and if you believe your dog may have been exposed to sheep carcasses or uncooked offal, you are advised to treat the dog with a licensed dog wormer containing the drug praziquantel. There is no harm to your dog from the use of these
wormers and it may be a wise precaution to worm your dogs after your trip to Wales. When walking in country areas your dog should always be under close supervision and should always be on a lead if walking through sheep or other livestock.

19. Is it safe to walk my dog in fields containing sheep?
Dogs can only become infected if they swallow infected cysts found within carcasses or on material contaminated by them such as uncooked sheep meat or offal. Extreme care should be taken when walking dogs in areas where sheep and cattle graze so as not to disturb or distress them, particularly during the lambing and calving season. In more extensive hill and mountain grazing areas, which are popular with walkers, sheep carcasses may not be detected or removed by the farmer but may be readily found by dogs. Walkers in such areas should be particularly vigilant and keep their dogs under close control at all times. There may be a greater risk during the winter months as there is higher mortality rate in sheep that may remain on the hills during this period. However, most sheep deaths occur around the lambing season when carcasses are likely to be found near farm yards awaiting disposal.

20. I regularly walk my dog in the countryside of Wales. What should I do?
Ensure your dog is well supervised when walking. Regular worming protects your dog’s health, and appropriate treatment should be discussed with your vet, who will recommend which wormers to use and at what frequency treatment should be given. The risk of hydatid is low if your dog avoids contact with sheep carcasses.

21. Can my dog pick up *Echinococcus* tapeworm heads from grass?
Dogs do not become infected from eggs, but from the larval form found in cysts. It is theoretically possible for material from a burst cyst in a dead animal that has been scavenged to contaminate grass but this is unlikely and any such material would not survive for long. Thus, this is very unlikely.

22. What is a praziquantel wormer?
Many prescription wormers available from your Vet contain praziquantel to kill all species of tapeworm including *Echinococcus*. They are safe, effective and do no harm to your dog. Some over the counter wormers at pet shops and pharmacies contain praziquantel. Always ask if the wormer you plan to use contains praziquantel. Not all tapeworm medicines contain this drug. Praziquantel is the only tapewormer known to be 100% effective against *Echinococcus*. It is important that you plan the worming regime of your dogs and that it is discussed with your vet. Dose rates and timings of drugs are very important; an accurate weight of your dog is an essential part of the treatment.

General concerns

23. How can hydatid disease be prevented?
The incidence of Hydatid Disease can be reduced if the following are adhered to:

- Feed dogs with cooked dog foods
• Worm dogs at the frequency suggested by your vet with a wormer containing praziquantel
• Do not allow dogs to roam
• Closely control dogs whilst out walking
• Wash hands after handling dogs
• Do not allow dogs to lick faces
• Wash all fruit and vegetables thoroughly before eating or cooking

24. Why is hydatid disease found more commonly in Wales?
It is not confined to Wales but the occurrence in England and Scotland is at a much lower rate. The high level of infection in Wales is thought to be due to the high density of sheep and the extensive farm management systems of hill farming. Numbers of sheep die on the high grazings and will be found by straying dogs before the farmer can remove them. Below a certain density of infection in either host (dog or sheep), and without sufficient opportunities for animals to become infected, the life-cycle of the parasite becomes unsustainable.

25. Can hydatid disease be eradicated?
Hydatid disease has previously been eradicated in Iceland, New Zealand and Tasmania. In Iceland it took 100 years to eradicate, New Zealand 50 and Tasmania 10 years. Tasmania quarantined infected dogs and undertook an education campaign. It is estimated that Wales will be able to eradicate it in 10 - 20 years following a campaign of dog dosing and education. If the disease is eradicated in Wales, it is thought that it will also be eradicated from the UK provided suitable control measures are taken in other areas.

26. Is it possible to eradicate hydatid disease from the UK by dealing only with dogs in Wales?
No this is not possible. A survey of dogs in other livestock rearing areas would be needed to determine infection status and appropriate [compulsory?] control measures implemented.

27. Can I pick up *Echinococcus* eggs from unwashed fruit and vegetables?
Yes, if they inadvertently become contaminated by dog faeces containing *Echinococcus granulosus* eggs. It is always wise to wash fruit and vegetables before eating to reduce the risk from a number of potentially harmful infections.

28. Where are the at-risk areas?
Information we have suggests that the main areas for hydatid disease are south Powys, Radnor, Monmouthshire and farms on the Southern slopes of the Brecon Beacons and the Black Mountains. However, the message should be spread throughout Wales to ensure that dogs in all areas are not subjected to conditions which will lead to infection. There is also a pocket of disease in Herefordshire, England adjoining mid Powys in Wales. This has the potential to introduce re-infection in Wales if no control is carried out there.

29. There is already a hydatid disease campaign in Powys? How is that connected with this one?
The current campaign in Powys is based on educating children in the area and includes a publicity campaign aimed at farmers and dog owners. It is anticipated that this campaign will be incorporated into the scheme approved by the Welsh Assembly Government.

30. What problems can other worms cause?
There are a number of other species of intestinal worm with which dogs may become infected. These are roundworms (Nematodes) and tapeworms (Cestodes). There are a number of dog worming products available, some of which contain Praziquantel in combination with other drugs, some contain Praziquantel only. Praziquantel kills tapeworms very effectively but is not effective against roundworms. Contact your vet for further information. Details of these worms are below:

- The tapeworms that dogs may become infected with include a number of species of the *Taenia* family which have eggs which look identical to the Hydatid worm. *Taenia multiceps* causes gid in sheep but in very rare cases this has caused cysts in the human central nervous system.

  - *Dipylidium caninum* can have implications for human health. It is a tapeworm which has a tiny cyst stage in the dog / cat flea. Dogs (and cats) become infected when grooming and swallowing fleas. This is a relatively common but harmless tapeworm but on occasion it has been known to infect children who accidentally swallow fleas when playing with dogs. This can be prevented if your dog has been provided with an appropriate flea treatment.

  - *Toxocara canis* is a roundworm of dogs. Puppies in particular can have heavy, life threatening infections. Humans can act as an accidental host for the migrating larval form with children being at particular risk. *Toxocara* eggs are very resistant and remain infective for a long time in the environment e.g. in parks where dogs are frequently walked. Eggs from dog faeces may stick to the fur of the dog. Humans become infected from contact with areas contaminated with dog faeces, or from ingestion of eggs from the dogs’ fur. *Toxocara* larvae can be found in any organ of the body, commonly they migrate to the liver and lungs causing fever and disease. The most serious condition results from larvae migrating into the retina which can result in blindness. Roundworms can be controlled by regular worming (not praziquantel). Speak to your vet to discuss worming treatments for your dog. For further information on *Toxocara*, go to: http://www.hpa.org.uk/infections/topics_az/zoonoses/toxocarosis/default.htm.

31. Recently, hydatid awareness literature was circulated to General Practitioners (GPs), Veterinary Practices and Agricultural Merchants in the English counties bordering Wales. What was the significance of the covering letter being signed by both the Chief Medical Officers and Chief Veterinary Officers for England and Wales?

The material being distributed is almost identical to that previously distributed within Wales during 2006. The Welsh Assembly Government had agreed to circulate this material on behalf of Defra and Department of Health (England) to General Practitioners and Veterinary
Surgeons in the English counties bordering Wales. It is the correct protocol for the correspondence to be sent by the Head of Profession as it is a cross Government and cross border issue.

32. Who do I contact for further information?
Contact your vet for information on worming your dog, your GP for advice on human health concerns and for general information please visit: www.hpa.org.uk/infections/topics_az/zoonoses/hydatid or the National Public Health Service for Wales, at: http://www.wales.nhs.uk/sites3/page.cfm?orgid=457&pid=27729

Further information on the public awareness campaign:

What you can do to prevent Hydatid disease – information for farmers and dog owners:
http://new.wales.gov.uk/topics/environmentcountryside/ahw/disease_surveillance_control/hydatiddisease/?lang=en

Hydatid disease – Q & A’s prepared by the Welsh Assembly Government:

Leaflet (available in both English and Welsh) (pdf 106kb):

Poster (239kb):

Question and Answer briefing (in English and Welsh) provided by the Welsh Assembly Government (277Kb):

References:
