

3. *Indirect - labelled antibody tests* — In this the indirect fluorescent antibody test (IFA) and the enzyme linked immunosorbent assay (ELISA) are available. IFA usually employs whole protoscoleces or protoscolex fragments. The test is quite sensitive, but non-specificity can be a significant problem. ELISA is highly sensitive and compares favourably with IHA. If the antigen is purified prior to testing, the specificity is greatly increased.
4. *Precipitation tests* — Immuno-electrophoresis (IEP) has been used with success. IEP shows a specific band known as 'Arc 5'. Since very large quantities of concentrated antigen is required to turn this test it does not lend itself to epidemiological studies. Instead of IEP simple double diffusion (DD) tests can also be performed.

Ideally, a combination of IHA with IFA, DD or IEP gives the most reliable results. In Pakistan, mostly imported commercial kits are used although the antigenic material is readily available. If these kits are prepared locally, costs will be greatly reduced and this in turn will help in better diagnosis all over the country.

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EDITORIAL

Serological Tests for Echinococcosis

Echinococcosis (hydatidosis) is a zoonosis in which the dog acts as the main definitive host. Humans acquire the infection by the ingestion of eggs passed in the dog faeces. Dogs are infected by the ingestion of hydatid cysts containing the protoscolexes from various herbivores such as buffalo, cattle, goat, sheep and camels. It seems that there are significant differences between the strains of this parasite and this could reflect on its pathogenicity on the human host.

In Pakistan the incidence of hydatidosis is on the increase because many herbivores are infected and the incidence of stray dog population is high. It is my impression that about 30% of all the animals slaughtered in the main Karachi abattoir (Landhi) are infected with this parasite.

Serological tests, as a means of diagnosis, are very useful because no diagnostic stage of the parasite is shed externally. A variety of tests are available but they differ a lot in their sensitivity and specificity. Hydatid cysts in the lung and calcified or dead cysts are less likely to produce a strong antibody response. In contrast, if the cysts are located in the liver, peritoneal cavity, bone and if multiple organs are involved antibody response is usually strong. Cysts which are damaged and 'leaking' also give a strong antibody response. If the titre does not drop or continues to rise over a period of time then it is indicative of the presence of other cysts and further investigations are needed. 'False-positive' results generally indicate the presence of some other tissue invading helminth. Cross-reaction is particularly marked in cysticercosis. In Pakistan, this infection is, however, not seen because pork is not generally consumed.

The following serological tests are available:

1. *Casoni's Intradermal test* — This is one of the oldest tests and depends on the appearance of immediate type hypersensitivity on intradermal injection of hydatid cyst fluid. This test is still in wide use, since it is very simple to perform. It is not a very sensitive test and about 30% may give a false negative. In view of its simplicity it has a place in the rural setting and district hospitals.
2. *Indirect Agglutination tests* — In these tests, antigens are coupled to inert particles so that when divalent antibodies binds specifically with it, agglutination occurs. Two such tests are available, namely the latex agglutination (LA) and the indirect haemagglutination (IHA). IHA is more sensitive than LA and commercial kits are available. Sera with high IHA titres (256 or above) are usually indicative of active infection. Low titres (64 or below) are not diagnostic and may become positive in collagen diseases, liver cirrhosis, schistosomiasis and other tissue dwelling parasites. IHA test may remain positive for many years even after the removal of the cyst. Both IHA and LA are available in commercial kits.