E-4. Epidemiology, Biology, Pathology and Clinical Science: Cysticercosis

S-E4-3 NEUROCYSTICERCOSIS IN INDIA

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Like other developing and tropical countries, there is high prevalence of cysticercosis in India, though true epidemiological data is is not available. Two forms of cysticercosis seen here are striking. One common, presenting with a focal or generalized seizure without any other symptoms or signs, the other rare manifesting with intractable epilepsy, dementia and pesudohypertrophy of muscles. In the former, the parasitic load is very low and a single cysticercus seen in the brain on CT/MRI. In the latter thousands of living cysticerci invade the brain and muscles, producing striking images on CT/MRI, like a "starry night" in the brain and "honeycomb" in the muscles.

The former is benign and can be easily treated, often with anticonvulsant drugs only. The latter has a poor prognosis and anti-cysticidal drugs have to be carefully administered with steroids for fear of complications and even death.

S-E4-4

EPIDEMIOLOGY OF TAENIA SOLIUM INFECTION IN PERU.

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The availabilty of the immunoblot using purified glycoprotein antigens as the first serological assay with enough sensitivity and especificity to be applied in field settings, permitted to perform a series of populational studies aimed to know the epidemiological characteristics of taeniosis/cysticercosis in endemic populations in Peru. The principal findings in neurological patients included a clear association between seropositivity and epilepsy, especially late-onset cases or patients from outside Lima; constant prevalences between 6 and 12 % in neurological patients (in contrast to 1% in general population in Lima), sub- and overdiagnosis in clinical basis. In field studies in rural areas, the findings included: the description of endemic and hyperendemic zones, with seroprevalences around 10% of general population in humans, and over 40% of porcine population; the use of porcine serology as a marker of infection pressure, and the introduction of sentinel pigs to measure it; the introduction of oxfendazole as the first effective, single-dose therapy for porcine cysticercosis. Applying all this information, an intervention program for controlling human and porcine cysticercosis was conducted in 12 communities near Huancayo, Peru. A clear decrease in porcine cysticercosis seroprevalence and incidence was achieved four months after the second round of porcine chemotherapy. Combined human and porcine chemotherapy is a feasible approach for the control of this endemic zoonosis, and changes in porcine infection rates are a sensitive and pactical method for monitoring changes in disease burden.

S-E4-5

THE IMMUNOPATHOGENESIS OF NEUROCYSTICERCOSIS: IMPLICATIONS FOR TREATMENT

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Cysticercosis is an important cause of neurological disease in many developing countries. *Taenia solium* larvae (cysticerci) within the central nervous system cause focal encephalitis, often resulting in epilepsy. Symptomatic therapy includes anticonvulsant drugs for epilepsy and corticosteroids when intracranial pressure is increased. The role of the cestocidal drugs albendazole and praziquantel in the management of neurocysticercosis is controversial. These drugs appear to kill viable intracranial cysticerci precipitating their immune mediated degeneration but the resultant inflammatory cell influx around cysticerci may be associated with transient clinical deterioration. Viable cysticerci actively evade and suppress immune mediated inflammation and are usually asymptomatic. However, when viable cysticerci do cause epilepsy or other symptoms, cestocidal drugs together with corticosteroids may rationally be administered.

In contrast, most neurocysticercosis patients present with epilepsy associated with radiological evidence of inflammation around one or more degenerating intracranial cysticerci. Randomised placebo-controlled trials of cestocidal drugs in selected neurocysticercosis patients have shown no clinical or radiological benefit from the addition of cestocidal therapy to symptomatic care. In such cases an expectant policy is reasonable: symptomatic therapy combined with monitoring. If neuro-radiological improvement does not occur within 12 weeks then alternative diagnoses, such as tuberculoma, should be considered. Intracranial cysticerci that show ring enhancement on neuroimaging and intracranial calcifications usually are not living parasites and available evidence does not support the use of cestocidal drugs in these cases.

S-E4-6 DIAGNOSTIC 10 KDA ANTIGEN FOR *TAENIA SOLIUM* CYSTCERCOSIS

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Effective chemotherapy and frequent equivocal CT/MRI findings in neurocysticercosis have increased the necessity of differential serodiagnosis. To obtain the sensitive and specific antigenic protein, we investigated antigenicity of crude antigens prepared from different anatomical parts of the metacestodes. The cyst fluid (CF) antigen was most sensitive (83%) and specific (88%) as observed by ELISA. An antigenic protein at 150 kDa (pI at 9.2), which comprised about 70% total protein in CF, was purified by monoclonal antibody ligand affinity chromatography. It was composed of 3 subunits at 6.5, 10, and 15 kDa by SDS-PAGE analysis and shared the structural similarity with antigen B of hydatid fluid in biochemical analysis. The 150 kDa protein was the most reliable diagnostic antigen because it reacted neither with alveolar (AE), cystic echinoccosis (CE) nor with sera from other infections. In immunoblot, sera from neurocysticercosis recognized the 10 kDa protein strongly (209/247 cases, 84.6%), while a few sera from other parasitic diseases including AE (2/20, 100%) and CE (2/25, 8%) showed faint reactions. Both immunoprecipitation and differential immunoblot revealed that the 10 kDa was the most specific and sensitive for cysticercosis and highly antigenic. IgG subclass immunoblot analysis demonstrated that IgG4 reaction was predominant and recognized the 10 kDa. λZAP II cDNA library of *T. solium* metacestodes was constructed and the full-length cDNA of the 10 kDa containing both 5'- and 3'- untranslated regions was cloned employing PCR products amplified by degenerated primers based on the sequence of *T. crassiceps* 10 kDa immunodiagnostic antigen (Ts10IA). The first ATG was followed by 19 hydrophobic amino acid sequence that was finished in a putative recognition site for signal peptidase. When deduced, it had a molecular weight of 9,582 Da and showed the sequence homologies with 10 kDa antigen of *T. crassicep* and that of 12 kDa of *E. granulosus* by 76 and 51%, respectively. Single mRNA transcript of an approximate 500 bp in length was seen by Northern blot analysis. The recombinant protein, generated using pGEX-4T-2 vector as a GST-fusion protein, also exhibited the sensitive reactions with the patient sera.

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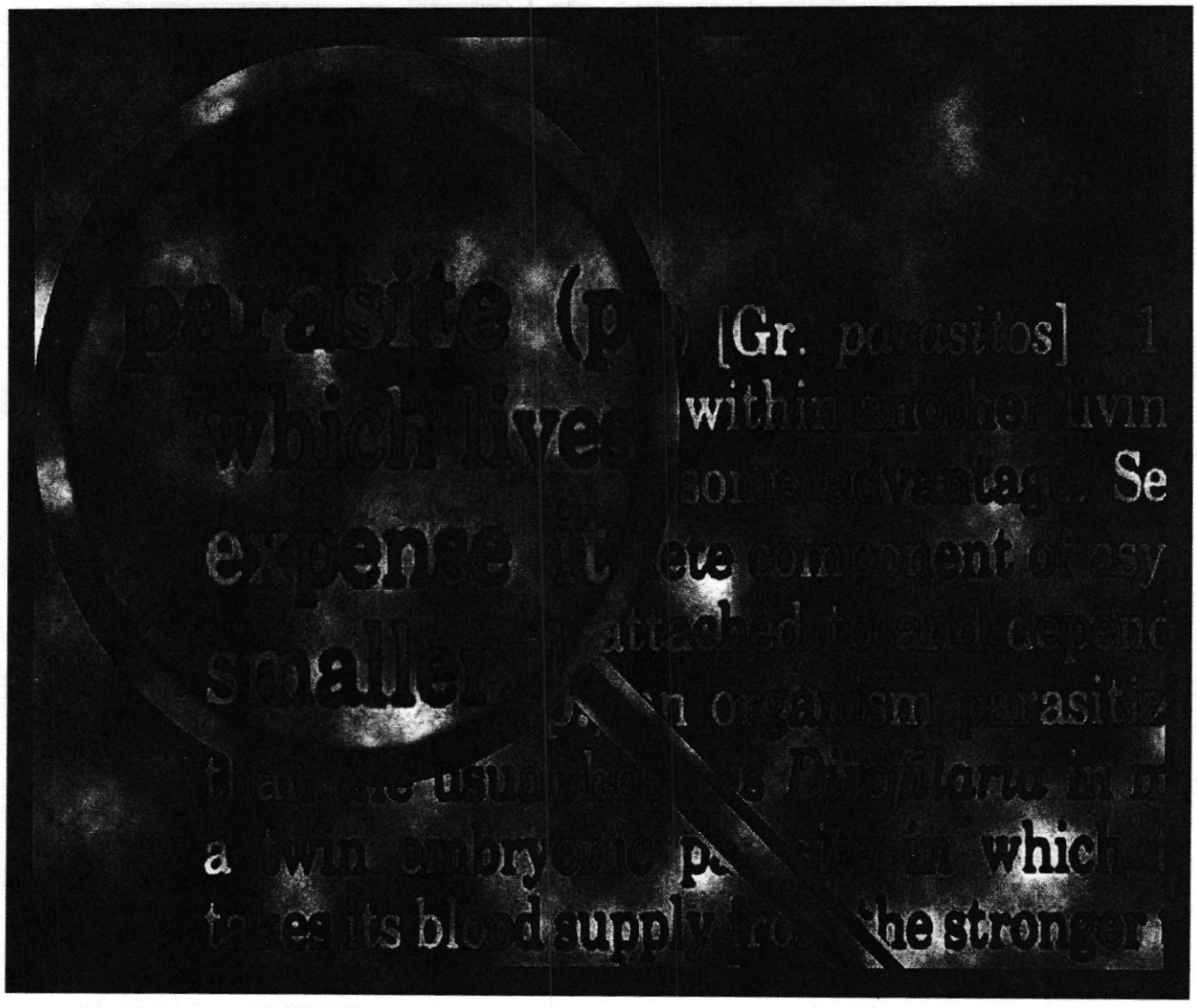

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