Serodiagnosis of Parasitic Diseases

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Objectives

After the class, students should be able to

• Explain need for serodiagnosis of parasitic infection

• Explain drawbacks of serodiagnosis of parasitic infection

• Explain parameters required to interpret results of serodiagnostic tests
Diagnostic methods

– Direct methods, e.g., stool exam
– Indirect methods
  • Serological methods (antibodies, antigens)
  • Molecular genetic methods (parasite DNA)
Need for serodiagnosis

1. Unattainable “classical” parasitological diagnosis
   - Special specimens & Tests
     - trichinosis - muscle biopsy
     - toxoplasmosis - lymph node, placenta
   - No method available, e.g., gnathostomiasis
   - Infection in prepatent period, e.g., filariasis
• Micros. exam of excreta tedious, time-consuming, impractical
• Negative in light infection or fluctuated egg excretion, e.g., strongyloidiasis, opisthorchiasis, intestinal capillariosis

2. Cost-effective in epidemiological survey
   • Labour
   • Time
Drawbacks

1. Specificity and sensitivity not 100%
2. Sophisticated methods and expensive equipment
Antibody detection methods

• Skin test
• Agglutination test
• Indirect immunofluorescent test
• Enzyme immunoassay
  – ELISA, Immunoblot
Leishmanin test (type IV)

• Skin test
  – Easiest to perform

*Gnathostoma* skin test (type I)
Antibody assays (cont.)

Immunofluorescence (IF)

P. falciparum
Enzyme immunoassay
-microplate ELISA

• Measure reactions as optical density
• Cut-off point for +/-
• Electroimmunotransfer blot (EITB)
• Separate antigens into different size and react with serum antibodies
• Positive reaction is indicated by the presence of “diagnostic bands” e.g., 27 kDa for gnathostomiasis
Antigen assays

Merits:
1. Appear earlier than antibody
2. Amount directly varies with degree of infection
3. Not persist

Commercial kit
Intestinal amoebiasis, giardiasis, cryptosporidiosis, etc.
ICT (immunochromatographic test)
How to interpret serodiagnostic test results?

• Every assay must be tested for
  – Sensitivity (% positive among proven cases)
  – Specificity (% positive in healthy cases)
  – Positive predictive value (probability of having disease among seropositive cases)
  – Negative predictive value (probability of no disease among seronegative cases)
ELISA for fascioliasis

- **Abstract.** Immunodominant antigens of an approximate molecular mass of 27 kD were obtained from an excretory-secretory product of adult *Fasciola gigantica* by a continuous-elution method. An indirect ELISA using the antigens obtained by this relatively simple procedure was developed for detecting specific antibodies from patients infected with *F. gigantica*. Sera from patients with other parasitic infections, healthy volunteers, and cholangiocarcinoma were also analyzed. The sensitivity, specificity, and positive and negative predictive values for this ELISA using the fractionated antigens were 100%. The data indicated a possible correlation of antibodies to *F. gigantica* with cholangiocarcinoma.
Home-made Tests

- Hepatic amoebiasis
- Angiostrongyliasis
- Gnathostomiasis
- Trichinellosis
- Intestinal capillariasis
- Fascioliasis
- Sparganosis
- Echinococcosis
- Cysticercosis
The End