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Cover: Two Young Girls at the Piano, by Pierre August RENOIR (© 1989 The Metropolitan Museum of Art; Robert Lehman Collection, 1975. 1975.1.201)). Two Young Girls at the Piano is one of at least five versions of the same scene by Renoir, including a lovely pastel recently sold at auction. Renor was 51 years of age at the time he did this work in 1892, and at the height of his popularity. This lovely presentation evokes a former era when adolescents, at least those in favored economic status, spent their leisure learning skills such as playing the piano and singing. One of the major tasks of adolescence is to develop one's identity and sense of competence. Whether it is the charming skills so beautifully depicted in this painting or others, the task of pediatricians is to assist young people in developing skills of which they can be proud.

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Toxoplasmosis

Bishara J. Freij, MD* and John L. Sever, MD, PhD†

Toxoplasma gondii is an obligate intracellular parasite capable of infecting humans and a variety of other warm-blooded animals. The organism is distributed widely in nature and may infect as many as 1 of 3 persons worldwide. Most Toxoplasma infections are either asymptomatic or otherwise benign; notable exceptions include the infections of the developing fetus whose mother acquires an acute T gondii infection during gestation and of immunosuppressed patients, such as those with the acquired immunodeficiency syndrome (AIDS), in whom the illness may be severe or even fatal. The cat and other felines (such as the lynx) appear to be the only definitive hosts for this protozoan.

The name Toxoplasma is derived from the Greek word toxon (meaning arc or bow) and is a reference to the shape of the organism. The gondii is a North African desert rodent related to the gerbil in whose splenic and hepatic mononuclear cells the parasite was observed initially.

This article briefly reviews the biology of T gondii and its epidemiology in man and other animals, as well as its pathogenesis, clinical manifestations, methods for accurate diagnosis, and preventive strategies. Information on prenatal diagnosis and treatment modalities is emphasized.

THE ORGANISM

T. gondii is a protozoan parasite that exists in three developmental stages: tachyzoite, tissue cyst, and oocyst. Only one species of Toxoplasma is known.

The tachyzoite (proliferative form, trophozoite, endozoite) is the form encountered during the acute stage of infection. It is destroyed easily when it is exposed to adverse environmental conditions, such as freezing and thawing, desiccation, and very low pH (eg, gastric juices). After gaining entry into a host cell, the tachyzoite typically resides in the cytoplasm within a parasitophorous vacuole and multiplies every 5 to 7 hours. The infected cell may eventually lyse and release progeny parasites that either infect contiguous host cells or become engulfed by phagocytic cells; alternatively, pseudocysts containing large numbers of infectious tachyzoites develop within host cells, and these can persist indefinitely.

The tissue cyst form of Toxoplasma may be present in any organ, although the brain, eyes, myocardium, and skeletal muscles appear to be areas of special predilection. Within the cyst, one may find a variable number of cystozoites or bradyzoites, which are essentially slowly multiplying or dormant parasites. Cysts tend to remain viable in tissues throughout the life of the host. They are susceptible to destruction when frozen to less than −20°C for several hours and then thawed, when heated to 66°C or higher, when desiccated, or when exposed to distilled water for 30 minutes; however, they may survive refrigeration at 4°C for approximately 2 months. Pepsic and trypptic digestive enzymes can easily disrupt tissue cyst walls; liberated bradyzoites can survive digestion for as long as 6 hours, affording them the opportunity to invade the gas-

Self-Evaluation Quiz—CME Credit

As an organization accredited for continuing medical education, the American Academy of Pediatrics certifies that completion of the self-evaluation quiz in this issue of Pediatrics in Review meets the criteria for two hours of credit in Category I of the Physician’s Recognition Award of the American Medical Association and 10% of the CME credit.

The questions for the self-evaluation quiz are located at the end of each article in this issue. Each question has a SINGLE BEST ANSWER. To obtain credit, record your answers on your quiz reply cards (which you received under separate cover), and return the cards to the Academy. On each card is space to answer the questions in six issues of the journal: CARD 1 for the July through December issues and CARD 2 for the January through June issues. To receive credit you must currently be enrolled in PREP or a subscriber to Pediatrics in Review—and we must receive both cards by August 31, 1991.

Send your cards to: Pediatrics in Review, American Academy of Pediatrics, 141 Northwest Point Blvd, PO Box 927, Elk Grove Village, IL 60009-0927.

The correct answers to the questions in this issue appear on the inside front cover.
Toxoplasmosis

on initial testing should be evaluated for the presence of specific IgM antibodies. A negative IgM test result early in pregnancy strongly argues against the infection being acquired postconception. A positive IgM test result is difficult to interpret in an asymptomatic individual unless an increasing IgG titer is documented. Sever and colleagues recently reported that untreated pregnant women with anti-Toxoplasma antibodies (detected by the indirect hemagglutination test) were twice as likely as seronegative mothers to have children with deafness; by the age of 7 years, a 60% increase in microcephaly and a 30% increase in intelligence quotient scores less than 70 was documented in association with maternal titers of 256 to 512.

Routine serologic screening of pregnant women is fraught with problems, including interlaboratory variability in test results, difficulties in accurate timing of maternal infection, misinterpretation by physicians of laboratory data, and questions of cost-effectiveness. Until these and other issues are resolved, it is best that serologic tests be confirmed and interpreted by reference laboratories to avoid potentially tragic management errors.

SUGGESTED READING


Self-Evaluation Quiz

1. The definitive host for the sexual phase of Toxoplasma gondii is:
   A. The feline genus
   B. The gondi (an African desert rodent)
   C. Man
   D. Unknown

2. The most common manifestation of T gondii infection is:
   A. An asymptomatic illness
   B. A severe congenital infection
   C. A febrile illness following blood transfusion
   D. A complication of immunosuppression

3. Congenital T gondii infection is most severe when the pregnant mother has:
   A. Chronic T gondii infection before conception
   B. An acute primary infection during the first trimester
   C. An acute primary infection during the third trimester
   D. Previously given birth to an infected infant

4. Among the following, the agent least likely to be useful in the treatment of T gondii infection is:
   A. Pyrimethamine
   B. Clindamycin
   C. Folinic acid
   D. Penicillin
   E. Spiramycin

5. Diagnostic tests for T gondii infection include each of the following except:
   A. The Sabin-Feidman dye test
   B. Tests for antibody in serum
   C. Tests for antigen in serum
   D. Growth of the organism in tissue culture
   E. Growth on blood agar media
pore or prod them further, and they become increasingly more dependent, more clinging, and more fearful. By addressing these concerns in the manner outlined above, these unfortunate consequences can be diminished.

The pain associated with diagnostic procedures should be treated aggressively with pharmacologic and behavioral techniques.

SUMMARY

There are now safe and effective techniques which can decrease significantly the amount of pain a child will experience in an acute care setting. For such techniques to work, however, the importance of pain management in children must be recognized. It should be assumed that anything that will hurt an adult will also hurt a child and that children are, in fact, often more sensitive to hospital procedures than are adults. Pain assessment should be a part of the child's care plan, and developmentally appropriate ways of recognizing pain should be in place in all hospitals that care for children. Behavioral and pharmacologic techniques should be tailored to the needs of the individual child. The skill of physicians should be assessed not only by their cure of illnesses, but by the comfort they provide in the process.

SUGGESTED READING

McGrath PJ, Unruh AM. Pain in Children and Adolescents. Amsterdam: Elsevier; 1987
Olness K, Gardner GG. Hypnosis and Hypnotherapy with Children. Philadelphia: Grune & Stratton; 1988

Self-Evaluation Quiz

6. The physiologic responses of the newborn infant to pain include elevation of blood levels of each of the following except:
A. Catecholamines.
B. Insulin.
C. Hydrocortisone.
D. Growth hormone.
E. Glucagon.

7. The control of pain in children has had relatively scant attention for each of the following reasons except:
A. Less acute sensitivity to pain by children than adults.
B. Lack of research findings.
C. Attitudes of the medical profession that tend to discount pain in children.
D. Community attitudes encouraging stoicism in children undergoing painful procedures.

8. In children older than 3 years of age, the most reliable indicator of the intensity of pain is:
A. Pulse.
B. Blood pressure.
C. Blood catecholamine level.
D. Blood corticosteroid level.
E. The child's verbal report.

9. Among the following the least effective method for helping children to cope with pain is likely to be:
A. Rehearsal of the procedure to be done.
B. Hypnosis.
C. Presedation.
D. Relaxation imagery.
E. Encouragement to be brave.

10. Among the following, the least likely side effect of opiates or opioids is:
A. Pruritus.
B. Respiratory depression.
C. Nausea and vomiting.
D. Diarrhea.
E. Sedation.

DEPARTMENT OF CORRECTIONS

In the article on "Aplastic Crisis" published in the November 1990 issue of Pediatrics in Review, the second sentence of the final paragraph in the middle column of page 144 should read as follows: "IgM usually is detectable for 1 to 2 months and serves as a marker of recent infection."
Erythropoietin


**SUGGESTED READING**


**Self-Evaluation Quiz**

11. Erythropoietin is produced in the fetus mainly by cells of the:
   A. Hepatocyte.
   B. Bone marrow.
   C. Reticuloendothelial system.
   D. Renal interstitium.
   E. Juxtaglomerular apparatus.

12. Erythropoietin is produced in children mainly by cells of the:
   A. Hepatocyte.
   B. Bone marrow.
   C. Reticuloendothelial system.
   D. Renal interstitium.
   E. Juxtaglomerular apparatus.

**Streptococcal Perianal Disease**


Group A β-hemolytic streptococcus caused perianal disease in children 1 to 10 years of age in two reported series of 31 and 11 cases. Signs and symptoms were perianal itching (78%), rectal pain (52%), and blood-streaked stools (35%). Systemic symptoms or perianal cellulitis were not observed in these 42 cases.

In the study reported by Kokx, concurrent pharyngeal colonization was found in 64% of cases, and clinical pharyngitis was found in only 13%. It is unclear whether perianal streptococcal disease precedes or follows pharyngeal colonization. Intrafamilial spread of perianal disease was reported, but communal bathing was not found to be a statistically significant factor. Diagnosis was confirmed by culture using 5% sheep blood agar and/or direct antigen studies.

Oral penicillin was the treatment of choice in both series, although clinical response occurred in only 61% of the 31 patients studied by Kokx. Intramuscular penicillin, clindamycin, or penicillin/trimethoprim were required for failures of treatment. In other series, 100% of perianal disease initially responded to oral penicillin, but 6 of 11 children required retreatment after recrudescence.

**Comment:** Pediatricians should be aware of the many causes of perianal dermatitis, a common pediatric entity. Good clinical suspicion is required to diagnose perianal streptococcal disease, especially if the dermatitis is long-standing. Office laboratory confirmation of perianal disease parallels the experience with streptococcal pharyngitis. Pharyngeal cultures or direct antigen studies add little to the diagnosis of perianal disease. Rheumatic fever following streptococcal perianal disease has not been reported, but the traditional 10-day course of oral penicillin or other appropriate antibiotics is prudent. Failures of treatment and recurrences are common, and careful follow-up is necessary. (Daniel D. Chapman, MD, Editorial Board)


Shipman WG. Age of menarche and adult personality. Arch Gen Psychiatry. 1964; 10:155-159


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**Self-Evaluation Quiz**

16. Features of physical development during adolescence include each of the following except:

A. Peak velocity in weight gain in girls is closely associated with the timing of menarche.

B. Contributions of fat and lean body mass to weight gain are proportionately equal in both sexes.

C. Peak of height velocity precedes peak of weight velocity.

D. Linear growth spurt occurs earlier in the limbs than in the trunk.

17. Among the following, the concern of adolescents that is least likely to be brought to the attention of the physician is:

A. Early breast development in girls.

B. Breast development in boys.

C. Delay in menarche.

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**Roseola**


Asano and colleagues showed that human herpes virus-6 (HHV-6) viremia was found in 66% of patients with roseola and in 100% of patients (26 of 26) having viremia between days 0 and 2 of the onset of clinical illness and before the appearance of the rash. On day 8 or thereafter, 100% of patients had neutralizing antibodies to HHV-6. Other investigators have demonstrated that human transmission of the disease can occur.

Veda et al showed that maternal antibody persists until 4 to 5 months of age and that 7% of infants acquire their own antibody by 10 to 11 months. Subclinical infection with HHV-6 is common.

Comment: HHV-6 causes roseola. That we now know. What else, if anything, HHV-6 causes is not known. HHV-6 was found initially as an acquired immunodeficiency syndrome passenger—ie, it was first isolated in human immunodeficiency virus-infected patients. It probably has no relation at all to human immunodeficiency virus except as an opportunistic infection. (Richard H. Rapkin, MD, Children’s Hospital of New Jersey)