TOXOPLASMOSIS IN PREGNANCY

An essay
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by

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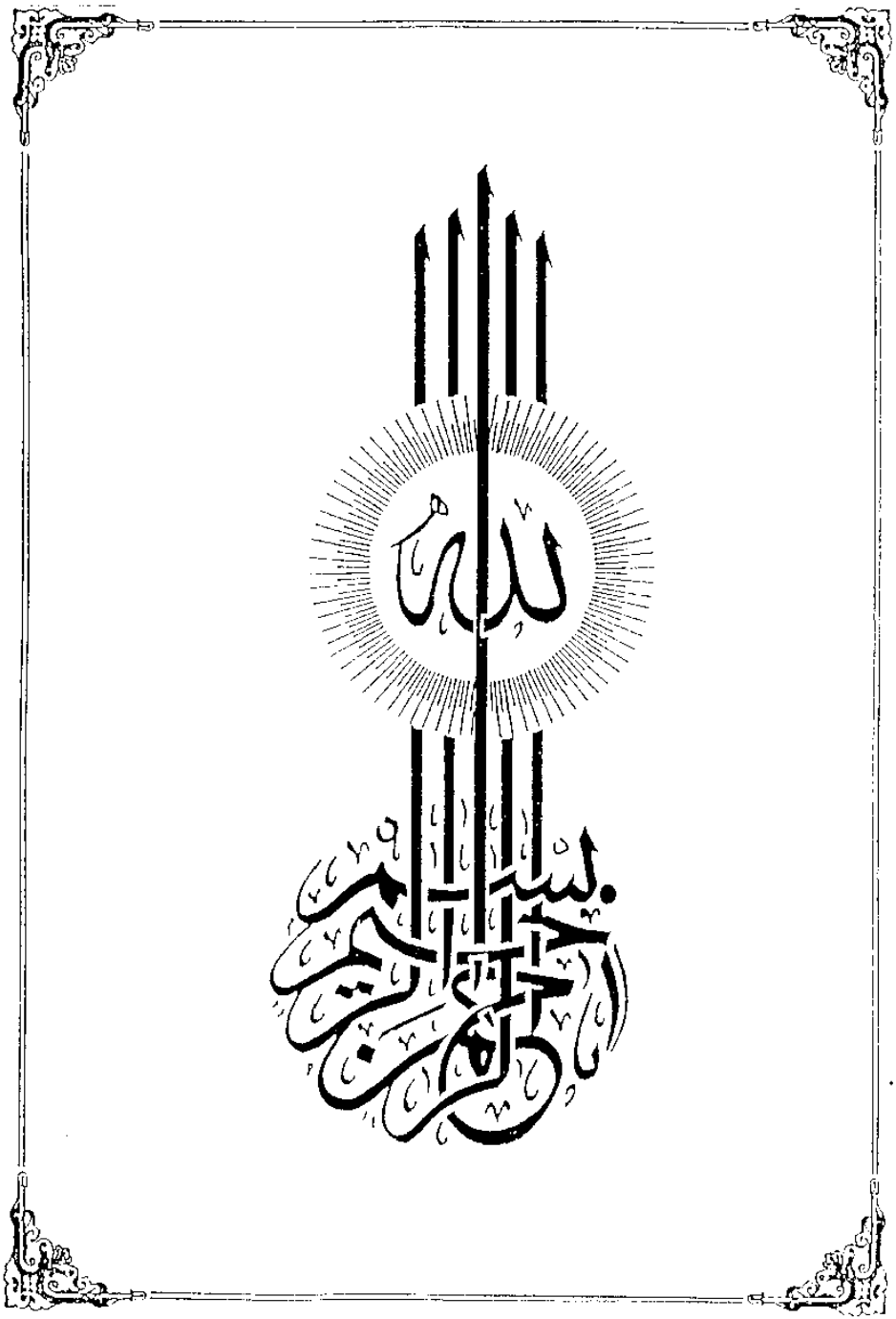

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INTRODUCTION

Toxoplasmosis is a common infection and a rare disease . Most acute toxoplasma infections are asymptomatic and only a small number gives rise to a brief illness that usually remains undiagnosed . Because of its rarity as illness , few general physicians are sufficiently familiar with toxoplasmosis and its diagnosis to requisite the appropriate tests . However , even an asymptomatic or mild first infection in a pregnant woman may be transmitted to her fetus in utero .

The fate of placental transmission has been calculated to be between 17 and 25 % when maternal infection develops during the first and second trimesters and 65% when infection develops in the third trimester , (Desmonds and Couvreur , 1975) . Toxoplasmosis may lead to spontaneous abortion , stillbirth , or congenital infection of the fetus . Transmission of the parasite to the fetus occurs most often when maternal infection has been acquired during the last trimester , but the disease in the neonate is almost always subclinical . If the mother is infected early in the pregnancy , transmission to the fetus occurs less frequently , but the disease in the neonate is more severe (McLeod and Lee ,1988) .

This work demonstrates the parasite , its epidimiology , pathophysiology , clinical manifestations of both acquired and congenital toxoplasmosis , diagnosis , treatment and prevention . Special recommendations to the pregnant woman is also discussed .

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REVIEW OF LITERATURE

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THE ORGANISM .

[1] Taxonomy :

Kingdom : Animalia .
Subkingdom : protozoa .
Phylum : Apicomplexia .
Class : Sporozoea .
Subclass : Coccidia .
Order : Eucoccidiida .
Suborder : Eimeriina .
Toxoplasma gondii (Levine et al ., 1980)

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[2] MORPHOLOGY

Toxoplasma gondii is a coccidian parasite which exists in three forms : the trophozoite or the tachyzoite , the tissue cyst and the oocyst (Levine 1973 ; Frenkel , 1973) .

The tachyzoite (Fig . 1) is crescent shaped with one end pointed and the other rounded , being about 3-4 microns in breadth by 6-7 microns in length (Remington et al ., 1960) . Evident in Giemsa stained preparations are a delicate azure cytoplasm and a reddish , spherical or ovoid nucleus that is usually nearer to the blunt end of the parasite . Electron micro graphs reveal a complex system of organelles that clearly demonstrate the taxonomic relationship of toxoplasma to the Apicomplexa (Sheffield and Melton , 1988 ; Beaver et al ., 1984) . The ultra structure of toxoplasma gondii has been described (Sheffield and Melton , 1986 ; Levine 1985) , (Fig . 2) . The organism has a 3 membraned complex at the surface , each membrane is consisting of 2 electron dense layers separated by electron - light material . It has an apical complex consisting of 2 polar rings at the anterior end (and a similar ring at the posterior end) a short truncated hollow conoid 0.2 _ 0.36X 0.15X0.36 um composed of 6-7 micro tubules spirally coiled at an angle of 45 - 50 degrees ; 20 to perhaps 30 cylindrical or club - shaped rhoptries of variable length , which apparently open to the outside at the anterior end after passing through the conoid ; about 50 curved rodlike micronemes anterior to the nucleus and 22 longitudinal subpellicular micro tubules arising from a ring at the level

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of the conoid and running posteriorly for about one-fifth to two - thirds of the body length . Just in front of the nucleus is the golgi

Fig. (1): Toxoplasma gondii Tachyzoites. [From Yamaguchi, T. ; Inatomi, S. ; Kamo, H.; Otsuru, M.; Suzuki, T.; and Yoshida, Y. (eds) : A Colour Atlas of Clinical Parasitology. Wolfe Medical Publication, Ltd, 1981.]

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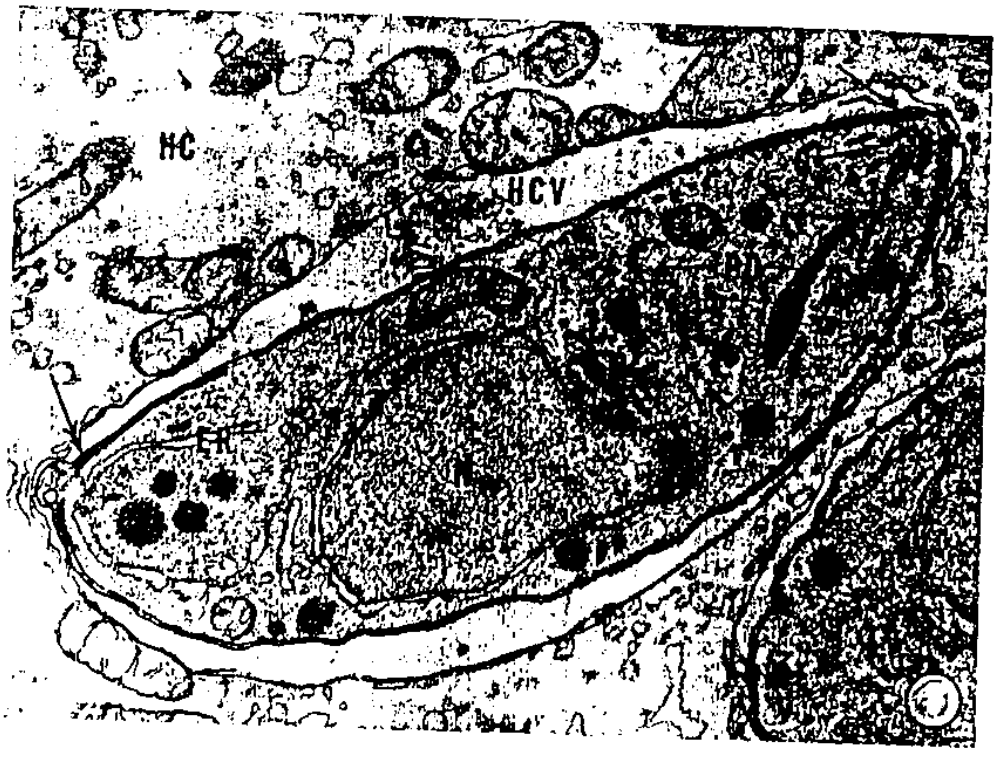

Fig. (2) : The Ultrastructure of T. Gondii : ↓ polar ring, c: conoid, po : paired organelles, G: Golgi complex, M : mitochondria, N : nucleus, ER : endoplasmic reticulum, HCV : host cytoplasmic vacuole, HC : host cell, ↓ : pillicle. [From Sheffield and Melton, 1968.]

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apparatus . There are one or more micropoles in the pellicle . The cytoplasm is somewhat vacuolated and contains numerous ribosomes , rough endoplasmic reticulum , and one to several mitochondria . The nucleus is about 1-2 um in diameter and contains a large nucleolus ; the nuclear membrane has a double layer that is interrupted . During acute infection , groups of proliferative stages may be seen in a wide range of host cell types . These aggregations of parasites bound to the plasma lemma of the host cell are called pseudo cysts (Frenkel , 1971) . The pseudocyst is small and contains up to 100 endozoites (Kreier and Baker , 1987), (Fig . 3) .

The second form of the parasite , the tissue cyst , is formed within the host cell cytoplasm and may vary in size from small cysts containing only few cystozoites or bradyzoites to those containing approximately 3000 organisms (Lainson, 1958) , (Fig .4) . The cyst wall is produced by the parasite and is distinct from the membrane of the host cell (Hogan et al ., 1960) . The wall of intact toxoplasma tissue cysts within the brains of mice with congenital toxoplasmosis was investigated by Sims et al (1989) . The contained cystozoites were shown by ultra structural examination to be surrounded by a layer of micro tubules which was found to be of neuronal origin , (Fig .5) . Interior to this layer was a much convoluted parasitophorous vacuole membrane ; exterior was the host cell membrane . The cyst wall is eosinophilic , argyrophilic , and weakly PAS positive ; the organisms within the cyst are strongly PAS positive (Beaver et al ., 1984) .

The third form of the parasite , the oocyst , (Fig . 6) , is produced in the epithelial cells of the small intestine of cats and other felids

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, but not , so far is known , in other animals (Work and Hutchison 1969 ; Frenkel et al ., 1970) . When freshly passed

Fig. (3) : T. Gondii pseudocyst : intracellular and liberated trophozoites. [From Yamaguchi et al ., 1981.]

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