Recent updates on common congenital infections affecting the nervous system

Essay

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By

Mina Refaat Habib Gobran
M.B. B.Ch.

Supervised by

Prof. Dr. Mahmoud Haroun Ibrahim El-Balkemy

Professor of Neuropsychiatry
Faculty of Medicine, Ain Shams University

Prof. Dr. Ayman Mohamed Ahmed Nassef

Professor of Neuropsychiatry
Faculty of Medicine, Ain Shams University

Dr. Maha Ali Mohamed Nada

Lectuer of Neuropsychiatry
Faculty of Medicine, Ain Shams University

Ain Shams University

Faculty of Medicine

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الحديث عن العدوى الوليدية الشائعة التي تؤثر على الجهاز العصبي

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تحت إشراف

ا.د. محمود هارون ابراهيم البلكيمى

أستاذ العصبية و النفسية

كلية الطب ، جامعة عين شمس

ا.د. أيمن محمد أحمد ناصف

أستاذ العصبية و النفسية

كلية الطب ، جامعة عين شمس

د. مها على محمد ندا

مدرس العصبية و النفسية

كلية الطب ، جامعة عين شمس

جامعة عين شمس

كلية الطب

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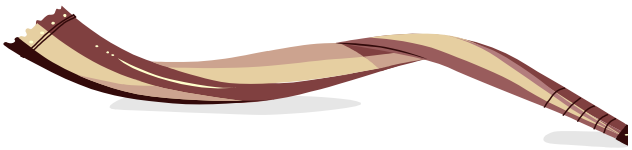

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LIST OF ABBREVIATIONS

Abbrev.	Meaning
ACOG	American College of Obstetricians and Gynecologists
AIDS	acquired immunodeficiency syndrome
ANC	antenatal care
ART	Antiretroviral therapy
bid	bis in die = twice per day
^{o}C	Celsius
CASG	Collaborative Antiviral Study Group
CID	Cytomegalic inclusion disease
CMV	Cytomegalovirus
CNS	central nervous system
CRS	congenital rubella syndrome
CSF	cerebrospinal fluid
CT	Computed tomography
dl	deci litre
DWl	diffusion weighted imaging
FLAIR	fluid attenuated inversion recovery technique
FTA-ABS	fluorescent treponemal antibody absorption
g	Gram
HAART	highly active Antiretroviral therapy
HD	high-dose
HEENT	Head ,eyes, ears, nose, and throat
HIG	hyper immunoglobulin
HIV	Human immunodeficiency virus
HSE	Herpetic Encephalitis
HSV	Herpes Simplex Virus

LIST OF ABBREVIATIONS (Cont…)

Abbrev.	Meaning
IgA	immunoglobulin A
IgE	immunoglobulin E
IgG	immunoglobulin G
IgM	immunoglobulin M
IM	Intramuscular
MRI	Magnetic Resonance imaging
MTCT	mother-to-child transmission
NCCBTS	National Collaborative Chicago Based Congenital Toxoplasmosis Study
NECT	non enhanced Computed tomography
NIAID	The National Institute of Allergy and Infectious Diseases
PCR	polymerase chain reaction
PO	per oral
PRP	Progressive rubella panencephalitis
qid	quater in die = four times per day
RNA	ribonucleic acid
RPR	rapid plasma reagin
SD	standard dose
SEM	Skin Eye Mouth
SNHL	sensorineural hearing loss
SSPE	sub acute sclerosing panencephalitis
STD	sexual transmitted diseases

LIST OF ABBREVIATIONS (Cont…)

Abbrev.	Meaning
T gondii	Toxoplasmosis gondii
T pallidum	Treponema pallidum
TORCH	Toxoplasma gondii, Rubella virus, Cytomegalovirus, and Herpes simplex virus
TPI	Treponema pallidum immobilization
TPPA	Treponema pallidum particle agglutination
US	Ultrasonography
VDRL	Venereal Disease Research Laboratory
WISC-III	Wechsler Intelligence Scale for Children third edition
WK	Week
WM	White matter

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INTRODUCTION

There is a number of organisms that can cause congenital neonatal illness in which rubella was the first discovered neonatal congenital infection ***(Tian et al., 2010).***

Congenital infections include a well-known group of fungal, bacterial, and viral pathogens: **(TORCH) toxoplasmosis, rubella, CMV, HSV**, varicella-zoster virus, syphilis, parvovirus, HIV, hepatitis B, Neisseria gonorrhoeae, Chlamydia, Lymphocytic Choriomeningitis Virus and Mycobacterium tuberculosis ***(Klein and Remington, 2001).***

Although fortunately rare, congenital infections commonly damage the CNS, and are important causes of long-term disability and neurological abnormality. CMV which is the most common congenital infection can lead to sensorineural hearing loss, mental retardation, retinal disease, and cerebral palsy ***(Fowler and Boppana, 2006).***

Other infections, such as toxoplasmosis can cause manifestations, for example; mental retardation and blindness, besides; Hydrocephalus, intracranial calcification, and retinochoroiditis which are the most common manifestations of tissue damage from congenital toxoplasmosis ***(Jones et al., 2001).***

Other than TORCH, Untreated primary or secondary syphilis in the mother usually is transmitted, but latent or tertiary syphilis usually is not. In neonates, manifestations of syphilis are classified as early congenital (i.e., birth through age 2 yr) and late congenital (i.e., after age 2 yr). In early congenital syphilis a few infants develop meningitis, choroiditis, hydrocephalus, or seizures, and others may be intellectually disabled while in late congenital syphilis optic atrophy, sometimes leading to blindness, may occur. Interstitial keratitis, the most common eye lesion, frequently recurs, often resulting in corneal scarring. Sensorineural deafness, which is often progressive, may appear at any age ***(Robert, 2011).***

Intracranial infections are one of the important causes of neonatal seizures include meningitis, encephalitis (including herpes encephalitis), toxoplasmosis, and cytomegalovirus (CMV) infections. Clinical evidence of infection may be seen at birth, soon afterward, or not until years later. Since we can't diagnose all recognized congenital infections with one panel, the original TORCH diseases continue to be of clinical importance, and advances in medicine and new findings in epidemiology, preventive medicine, developmental biology, and immunology have brought optimistic changes and interesting insights to the field ***(Remington et al., 2006).***

Aim of the work

The aim of the work is to provide a systemic review about the most common congenital infections affecting the nervous system and the available preventable strategies that protect the nervous system from such infections, and also highlighting the recent advances in management of congenital infections of the nervous system.

Epidemiology of common congenital infections

Infections acquired in utero are categorized under "congenital" infections, while those acquired around the time of delivery and the immediate postpartum period are termed "perinatal" infections. The constellation of pathogens implicated in maternally-transmitted neonatal infections is listed in ***Table(1)***. The manifestations of congenital infections are influenced by several independent factors such as the effect of the pathogen on organogenesis, timing of infection with respect to gestational age, the presence or absence of maternal immunity and mode of acquisition of infection (transplacental, contact with infected lesions within the genital tract or via breast feeding) ***(Anita, 2011).***

The usual way in which the fetus is infected is by transplacental spread after maternal infection in which the organism circulates in the mother's blood. These infections, acquired in utero, can be severe enough to cause fetal loss or can result in intrauterine growth restriction, prematurity, or chronic postnatal infection. In most cases the maternal illness is mild but the impact on the developing fetus is more severe. The degree of severity is dependent on the gestational age of the fetus when infected, the virulence of the organism, the damage to the placenta, and the severity of maternal disease ***(Cox and Marton, 2009).***

The original ***TORCH*** complex was a concept that described a group of clinically similar congenital infections caused by **T**oxoplasma gondii, **R**ubella virus, **C**ytomegalovirus, and **H**erpes simplex virus . Following the expansion of the acronym to include "**O**ther" infections such as syphilis, varicella zoster virus, hepatitis B and HIV ***(Anita, 2011).***

Table (1)*: Infections during pregnancy that can affect the fetus or infant* ***(Cox and Marton, 2009).***

Viruses	Bacteria, parasites and others
Cytomegalovirus	*Toxoplasma gondii*
Rubella	*Treponema pallidum*
Herpes simplex virus	*Mycobacterium tuberculosis*
Varicella zoster virus	Plasmodium
Parvovirus B19	*Listeria monocytogenes*
Hepatitis B	Group B streptococcus
Hepatitis C	E. coli and other gram negative bacteria
HIV	
Enteroviruses	
Papilloma virus	

Toxoplasmosis gondii

Toxoplasmosis gondii is an obligate intra-cellular protozoan parasite that is responsible for the disease toxoplasmosis. The prevalence of toxoplasmosis varies greatly around the world .Prevalence rates are thought to depend on food production and harvesting practices, water treatment,