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List of Abbreviations

ABM	Acute bacterial meningitis
AIDS	Aquired immunodeficiency syndrome
ALT	Alanine transaminase
AM	Aseptic meningitis
ARDs	Acute respiratory distress syndrome
AST	Aspartate transaminase
AUC	Area under the curve
BCG	Bacillus Calmette-Guérin
BBB	Blood brain barrier
BM	Bacterial meningitis
CAT	Computed axial tomography
CBC	Complete blood count
CD	Crohns disease
CP	Chronic pancreatites
CXC-R	Chemochine receptor
CIE	Counter immuno-electrophoresis
CMV	Cytomegalovirus
CNS	Central nervous system
CRP	C- reactive protein
CSF	Cerebrospinal fluid
DIC	Disseminated intravascular coagulation
DNA	Deoxyribonucleic acid
EBNA	Epstein-Barr nuclear antigen
EBV	Epstein-Barr virus
ED	Emergency department
EDTA	Ethylenediaminetetraacetic acid
ELISA	Enzyme Linked Immuno-sorbent Assay
ES	Epidemiological study
ESR	Erythrocyte sedimentation rate
FDA	Food and Drug Administration
FN	False negative
FP	False positive
GBS	Group B streptococci

GCS	Glasgow coma scale
GI	Gastrointestinal
Gm/dl	Gram/dice letter
Hb	Hemoglobin
H. influenzae	Haemophilus influenzae
HIB vaccine	Haemophilus influenzae type B vaccine
HIV	Human immunodeficiency virus
HRP	Horseradish peroxidase
HS	Highly significant
HSV	Herpes simplex virus
IBD	Inflamatory bowel disease
IL	Interleukin
LCMV	Lymphocytic choriomeningitis virus
L. monocytogenes	Listeria monocytogenes
LP	Lumbar puncture
LPS	Lipopolysaccarides
MC	Meningeal carcinomatosis
MCP	monocyte chemoattractant protein
MCV4	Quadrivalent meningococcal conjugate vaccine
MIC	Minimum inhibitory concentration
MIP	Macrophage inflammatory protein
MMR	Measle-mumps-rubella
MOHP	Ministry of health and population
MRI	Magnetic resonance imaging
M. tuberculosis	Mycobacterium tuberculosis
µL	Mille letter
NDL	Non diagnostic line
N	Normal
ng/ml	Nanogram/mille letter
N. meningitides	Neisseria meningitides
NS	Non significant
P.aeruginosa	Pseudomonas aeruginosa
PCR	Polymerase chain reaction
ROC	Receiver Operating Characteristic
RR	Respiratory rate
S	Significant
S. aureus	Staphylococcus aureus
SD	The standard deviation
	Stapyhlococcus epidermidis

S. epidermidis	Significance
Sig.	Specious
SP	Streptococcus pneumoniae
S. pneumoniae	
SPSS	Statistical Package for the Social Sciences
TBM	Tuberculous meningitis
TGB- β	Transforming growth factor beta
TLC	Total leukocytic count
TMB	Tetramethylbenzidine
TMP-SMZ	Trimethoprim-sulfamethoxazole
TN	True negative
TNF	Tumour necrosis factor
TP	True positive
UTI	Urinary tract infection
VCA	Viral capsule antigen
VUR	Vesicoureteral reflux
VZV	Varicella-zoster virus
WBCs	White blood cells
WHO	World health organization
Z.N	Ziehl- Neelsen

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القيمة التشخيصية لمعدل الإنترليوكين 8 في السائل النخاعي في مرضى التهاب السحايا الحاد

رسالة

توطئة للحصول على درجة الماجستير فى طب المناطق الحارة

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Diagnostic Value of Cerebrospinal Fluid IL-8 in Patients with Acute Meningitis

Thesis

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Introduction

Meningitis is common in tropical areas and also in Egypt and has a world-wide distribution ***(Adly et al., 1986).*** Meningitis is inflammation of the protective membranes covering the brain and spinal cord, known collectively as the meninges. The inflammation may be caused by infection with viruses, bacteria, or other microorganisms, and less commonly by certain drugs ***(Ginsberg, 2004*)**. Most cases are due to infection with viruses ***(Attia et al., 1999).*** Bacteria, fungi, and parasites are the next most common causes ***(Ginsberg, 2004).***

Microorganisms reach the meninges either by direct extension from the ears, nasopharynx, cranial injury or congenital meningeal defect, or by blood-stream spread ***(Kumar and Clark, 2002).*** Host factors as lack of humoral immunity and lack of integrity of cerebrospinal fluid space may predispose to meningitis ***(Saif El-Din and Abdel-Wahab, 1995).*** Meningitis can be life-threatening because of the inflammation's proximity to the brain and spinal cord; therefore the condition is classified as a medical emergency **(*Sáez-Llorens and McCracken, 2003; Tunkel et al., 2004).***

The most common symptoms of meningitis are headache and neck stiffness associated with fever, confusion or altered consciousness, vomiting, and an inability to tolerate light

(photophobia) ***(Van de Beek et al., 2006).*** The classic triad of diagnostic signs consists of nuchal rigidity, sudden high fever and altered mental status; In infants up to 6 months of age, bulging of the fontanelle may be present***(Theilen et al., 2008).***

Distinguishing acute, subacute, and chronic meningitis helps to identify the pathogen. Approximately 25% of patients with bacterial meningitis present acutely within 24 hours of onset of symptoms. Other patients with bacterial meningitis and most patients with viral meningitis present with subacute neurologic symptoms developing over 1-7 days. Chronic symptoms lasting longer than 1 week suggest meningitis causedby some viruses ***(Lippincott and Wilkins, 2006).***

Meningitis can lead to serious long-term consequences such as deafness, epilepsy, hydrocephalus and cognitive deficits, especially if not treated quickly **(*Sáez-Llorens and McCracken, 2003; van de Beek et al., 2006)***.

Cerebrospinal fluid (CSF) analysis is the cornerstone and diagnostic test of choice for suspected meningitis. Measure the opening pressure and send the fluid for cell count (and differential count), chemistry (ie, CSF glucose and protein), and microbiology (ie, Gram stain and cultures) ***(Razonable, 2007)***. However lumbar puncture is often delayed or deferred owing to concern about the risk of cerebral herniation, this risk is thought to be over emphasized ***(Scarborough and Thwaites, 2008)***.

Meningitis is defined as bacterial according to CSF laboratory findings [(increased protein > 100mg/dl, decreased glucose < 40mg/dl, and leukocyte count 100-5000/mm^3 with polymorph nuclear leukocyte domination > 80%), identification of bacterial agents in Gram staining, and/or positive bacterial culture ***(Razonable, 2011)***]. Also, CSF/serum glucose ratio ≤ 0.4 is indicative of bacterial meningitis ***(Straus et al., 2006)***.

Meningitis is defined as viral if the viral culture, serological testing, pleocytosis, or reverse transcriptase polymerase chain reactions were positive, and the bacterial culture was negative ***(Dubos et al., 2008)***.

In practice, before definitive CSF bacterial cultures are available, most patients with acute meningitis are treated with broad spectrum antibiotics targeting bacterial meningitis. In general, this does not seriously harm the aseptic meningitis patient; however, it may enhance the local frequency of antibiotic resistance ***(Wise et al., 1998),*** and cause antibiotic adverse effects, nosocomial infections ***(Raymond, 2000),*** and high medical costs ***(Parasuraman et al., 2001).*** Thus, it is not only important to recognize bacterial meningitis patients who promptly need antimicrobial therapy but also aseptic meningitis patients who do not need antibiotics and/or hospital stays ***(Huy et al., 2010).***