Diagnostic and Prognostic Value of Serum Apelin in Early Onset Neonatal Sepsis

Thesis

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List of Abbreviations

ACTH : Adrenocorticotropic hormone
ADH : Antidiuretic hormone
ANC : Absolute neutrophil count
Apelin-LI : Apelin like immunoreactivity
APJ : Apelin receptor
APPs : Antimicrobial proteins and peptides
AVP : Arginine-vasopressin
BBB : Blood–brain barrier
CDC : Center for Disease Control and prevention
CHD : Coronary heart diseases
CMV : Cytomegalovirus
CNS : Central nervous system
CONS : Coagulase-negative staphylococcus
CORTICUS : Corticosteroid therapy of septic shock
CRH : Corticotrophin-releasing hormone
CRIB : Clinical Risk Index for Babies
CRP : C-reactive protein (CRP)
CSF : Cerebrospinal fluid
CVOs : Circumventricular organs
DCM : Dilated cardiomyopathy
DIC : Disseminated intravascular coagulation
EOS : Early onset sepsis
ESR : Erythrocyte sedimentation rate
FFP : Fresh frozen plasma
FIZZ : Found in inflammatory zones
GBS : Group B streptococcus
G-CSF : Granulocyte Colony Stimulating Factor
GD : Gestational diabetes
GM-CSF : Granulocyte-Macrophage Colony Stimulating Factor
HCWs : Healthcare workers
HIV : Human immunodeficiency virus
HNS : Hypothalamic–neurohypophysial system

HPA : Hypothalamo-pituitary-adrenal
HRC index : Heart rate characteristics index
HSS : Hematological scoring system
HSV : Herpes simplex virus
I:T : Immature to total neutrophil
IVH : Intraventricular hemorrhage
IVIG : Intravenous gammaglobulin
LOS : Late onset sepsis
MABP : Mean arterial blood pressure
MRSA : Methicillin-resistant S. aureus
NEC : Necrotising enterocolitis
NICU : Neonatal intensive care unit
NK : Natural killer
NO : Nitric oxide
PBEF : Pre-B-colony enhancing factor
PCR : The polymerase chain reaction
PMNL : Polymorphonuclear leucocytes (PMNL)
PRBC : Packed Red Blood Cells
PROM : Premature rupture of membranes
PT : Prothrombin time
PTT : Partial thromboplastin time
PVN : Paraventricular nucleus
RDS : Respiratory distress syndrome
RELMs : Resistin-like molecules
SIRS : Systemic inflammatory response syndrome
SIV : Simian immunodeficiency virus
SNAP : Score for Neonatal Acute Physiology
UTI : Urinary tract infection
VLBW : Very low birth weight
WAT : White adipose tissue
WBC : White blood cell count

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Introduction

Sepsis is a significant cause of morbidity and mortality in the newborn, particularly in preterm, low birth weight infants, despite advances in neonatal care, overall case-fatality rates from sepsis range from ٢٪ to as high as ٥٠٪ ***(Bizzarro et al., ٢٠٠٥).***

Despite extensive investigation, no single test meets the criteria that would make it an ideal marker for early diagnosis of sepsis in the newborn. Generally, screening includes a complete blood count with differential and may be accompanied by other adjuvant tests such as a C-reactive protein (CRP) ***(Hawak, ٢٠٠٨).***

Neonatal blood culture positive rate have been found to range from ٢٥-٥٤٪ ***(Kayange et al., ٢٠١٠).***

Apelin is a novel bioactive peptide identified as the endogenous ligand of the orphan G protein-coupled receptor. Cardiovascular system appears to be a primary target of apelin because blood pressure decreases and heart rate increase after IV administration of apelin in rats. Apelin also exerts a positive inotropic effect in rats. Moreover, dramatic changes of apelin and apelin receptor (APJ) expression have been found in human heart with cardiac dysfunction ***(Boucher et al., ٢٠٠٥).***

Immunolocalization of apelin and its receptor have been identified in brain, including in the hypothalamus. This is in agreement with a potential role of apelin in the control of pituitary hormone release, body fluid equilibrium, and drinking behaviour. A modest, although unclear role in the control of food intake has been described ***(Boucher et al., ٢٠٠٥).***

Apelin and other adipocytokines may be associated with inflammation and its clinical consequences ***(Malyszko et al., ٢٠٠٨).***

Serum apelin level changes in patients with severe sepsis and septic shock, which may provide clues in diagnosis and prognosis ***(Chen et al., ٢٠٠٨),*** although it has not yet been investigated in neonatal sepsis.