



Frequency of Hyponatremia in Community Acquired Pneumonia and Its Relation to Severity and Gender among Children

Thesis

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List of Abbreviations

ABG	Arterial Blood Gases
ACIP	Advisory Committee on Immunization Practice
ANP	Atrial Natriuretic peptide
ARI	Acute respiratory infection
AVP	Arginine vasopressin
BTS	British Thoracic Society
BUN	Blood Urea Nitrogen
C.T.	Computed Tomography
CAP	Community Acquired Pneumonia
CF	Cystic fibrosis
CNS	Central nervous system
CRP	C-reactive protein
D.D	Differential diagnosis
ECF	Extracellular fluid compartment
ESR	Erythrocyte Sedimentation Rate
ETS	Environmental Tobacco Smoke
Fio ₂	Fraction of Inspired Oxygen
HAP	Hospital-Acquired Pneumonia
Hib	Haemophilus influenza type B bacteria
HIV	Human Immune Deficiency Virus
HN	Hyponatremia
HRCT	High resolution CT
ICF	Intracellular fluid compartment
IDSA/ATS	Infectious Disease Society of America/ American Thoracic Society
IMCI	Integrated management of childhood illness
K ⁺	Potassium
LRTI	Lower Respiratory Tract Infections

List of Abbreviations (Cont.)

MPV	Metapneumovirus
Na ⁺⁺	Sodium
NCIRD	National Center for Immunization and Respiratory Diseases
PaCO ₂	Partial pressure of carbon dioxide
PCR	Polymerase Chain Reaction
PEM	Protein energy malnutrition
PICU	Pediatric intensive care unit
RR	Respiratory rate
RSV	Respiratory syncytial virus
SaO ₂	Oxygen Saturation
SARS	Severe acute respiratory syndrome
SGOT	Serum Glutamic Oxaloacetic Transaminase
SGPT	Serum Glutamate Pyruvate Transaminase
SIADH	Syndrome of Inappropriate Anti Diuretic Hormone
TBW	Total body water
WHO	World Health Organization

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Introduction

Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality in young children, even in industrialized countries **(De Schutter et al., 2014)**. It is still the leading cause of childhood mortality globally **(Liu et al., 2012)**.

WHO has set definitions for severe pneumonia (cough and difficult breathing with lower chest wall indrawing) and for very severe pneumonia (cough and difficult breathing with danger signs). These definitions are useful as they are applied at the community level for guiding the case management and referral of children to a hospital, hence are purposefully highly sensitive and poorly specific for truly life threatening disease **(Lanata et al., 2004)**.

Hyponatremia is defined as a plasma sodium concentration of less than 135 mmol/L, it is a very common disorder, occurring in hospitalized patients. Hyponatremia often results from an increase in circulating arginine vasopressin (AVP) levels and/or increased renal sensitivity to AVP, combined with an increased intake of free water. Hyponatremia is subdivided into three groups, depending on clinical history and volume status: hypovolemic, euvolemic, and hypervolemic hyponatremia **(Gopinath et al., 2013)**.

Optimal management of volume status as well as normalizing serum sodium levels is essential. Sodium concentration is the major determinant of plasma osmolality; therefore, hyponatremia usually indicates a low plasma osmolality. Low plasma osmolality rather than hyponatremia, per se, is the primary cause of the symptoms of hyponatremia. Hyponatremia not accompanied by hypo-osmolality does not

cause signs or symptoms and does not require specific treatment **(Robertson, 2012)**.

Hyponatraemia is considered a common laboratory finding in children with community-acquired pneumonia (CAP), which can be defined clinically as the presence of signs and symptoms of pneumonia in a previously healthy child due to an infection which has been acquired outside hospital **(Don et al., 2008)**. Few studies explored the correlation of HN and pneumonia in children. Based on the published studies, the severity of CAP and HN are associated with the need of hospitalization, the presence of prolonged and high fever, and elevated serum non-specific inflammatory markers, such as serum C-reactive protein (CRP) and serum procalcitonin **(Don et al., 2008 & Sakellaropoulou et al., 2010)**.

Moreover, lower respiratory tract infections (LRIs), including acute lower respiratory tract infections, pneumonia, atypical pneumonia, bronchitis, bronchiolitis, and severe acute respiratory syndrome (SARS), continue to threaten the health of children worldwide and especially in developing countries, where poor nutrition prevails and access to health care is scarce **(Eboriadou et al., 2008)**.

Aim of the Work

The purpose of this study is to identify the frequency of hyponatremia in children with community acquired pneumonia (CAP), to find predictive tools in order to classify the severity and outcome of CAP and also to explore possible differences of clinical importance between the two sexes.