PROGNOSTIC VALUE OF PROTEIN S-100 IN ACUTE CEREBROVASCULAR STROKE

Thesis

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List of Abbreviations

µg/L	Microgram per litre
AcPAO	Acetylpolyamine oxidase
AD	Alzheimer disease
ATP	Adenosine triphosphate
B-FABP	Brain fatty acid binding protein
BI	Barthel index
CABG	Coronary artery bypass surgery
CBF	Cerebral blood flow
CK-MB	Creatine kinase
CPB	Cardio pulmonary by pass
CRP	C-reactive protein
CSF	Cerebrospinal fluid
CT	Computed tomography
DHC	Decompressive hemicraniotomy
DWI	Diffusion weighted imaging
FABP	Fatty acid binding protein
GFAP	Glial fibrillary acidic protein
H-FABP	Heart fatty acid binding protein
ICH	Intracranial hemorrhage
ICU	Intensive care unit
IL_6	Interlukin_6
IP	Ischemic penumbra
IVH	Intraventricular hemorrhage
LMWH	Low molecular weight heparin
MCA	Middle cerebral artery

MMP-9	Matrix metalloproteinase nine
MRA	Magnetic resonance angiography
MRI	Magnetic resonance imaging
mRS	Modified Rankin Scale
NDKA	Nucleotide diphosphate kinase A
NDP	Nucleoside diphosphate
ng/L	Nanogram per liter
NIHSS	National institute of health and stroke scale
NSE	Neuro specific enolase
P S-100B	Protein S-100 Beta subunit
PET	Positron emission tomography
PMN	Polymorphonuclear leucocytes
PWI	Perfusion Weighted imaging
rhEPO	Recombinant human erythropoietin
SAS	Sleep apnea syndrome
SD	Standard deviation
sICAM-1	Serum intracellular adhesion molecule one
SMO	Spermine oxidase
SPSS	Statistical package for social science
sVCAM-1	Serum vascular adhesion molecule one
TIA	Transient ischemic attack
VR	Valve replacement
VWF	Von Wellbrand factor

Introduction

In recent years many techniques have been investigated for their usefulness in monitoring the patient's neurological status and predicting the outcome of therapy for ischemic brain disease. Neurological examinations are helpful when neurological function is largely intact but are of little value in assessing infarct volume or in patients who are comatose after cerebral infarction. Modern neuroradiological imaging techniques such as CT, MRI, and ultrasound help clinicians identify the location and volume of an infarct and thus plan treatment, such as intravenous or intra-arterial administration of fibrinolytic agents and neuroprotective drugs to halt tissue damage. However, repeating neuroradiological imaging—usually daily—is impractical ***(Missler et al., 1997).***

Several monitoring techniques have been developed based on measuring levels of various proteins, including neuron-specific enolase (NSE), myelin basic protein, glial fibrillary acidic protein, and S-100 protein ***(Missler et al.,1997).***

During the past decade the analysis of neurobiochemical markers of brain damage has attracted increasing attention in a variety of central nervous system disorders. Because of commercial availability and detectability in peripheral blood, neuron-specific enolase (NSE) and protein S-100B were the biochemical markers of brain damage studied most often in clinical settings. Both proteins are considered specific markers of brain damage after stroke ***(Cunningham et al, 1996, Abraha et al., 1997)***.

Poststroke S-100B serum concentrations were reported to correlate significantly with the size of infarcted brain areas, and the release pattern of the brain-originated protein was interpreted to mirror the underlying pathophysiology of acute stroke ***(Wunderlich et aal., 1999).***

As it is released from dead astroglail cells followed by a leakage of the protein through an impaired blood-brain barrier ***(Foerch et al, 2003).***

Studies on cell cultures indicate that protein S-100B not only reflects glial cell function but also modulates complex

neuronal-glial interactions. This finding suggests a major role of S-100B in brain repair mechanisms and plasticity ***(Herrmann et al., 2000).***

The analysis of the poststroke kinetics S-100B may possibly give a hint of potential brain repair mechanisms. The present data also suggest that the postischemic S-100B release may be a useful tool of monitoring and evaluating therapeutic interventions such as neuroprotective drug treatment, which is expected to be a major part of future stroke treatment (***Herrmann et al., 2000).***

Recently ***Foerch et al (2004)*** ruled out that the serum marker S100B can predict a malignant course of infarction in proximal MCA occlusion. This finding may improve the identification and monitoring of patients at particularly high risk for herniation.

Aim of the work:

(1) Analyze the poststroke serum protein S100 as a marker of neuronal death.

(2) Evaluate the association with stroke subtype and volume of infarcted brain areas.

(3) Contrast the ability of protein S100 to predict the early neurological and functional outcome after acute stroke (with 3 and 6 months follow up).