The Value of Serial Plasma Nuclear and Mitochondrial DNA Levels in Acute Spontaneous Intra-cerebral Hemorrhage

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Introduction

Increased plasma nuclear and mitochondrial DNA levels may be connected to disease severity following spontaneous intra-cerebral hemorrhage (ICH). This study tested the hypothesis that plasma nuclear and mitochondrial DNA levels are substantially increased in acute ICH and can predict treatment outcomes.

Methods

Serial plasma nuclear and mitochondrial DNA levels were examined in 60 consecutive patients admitted within 24 h after onset of spontaneous ICH and in 60 volunteer control subjects. Additional samples were obtained on Days 4, 7, 10, and 14 after onset of ICH regardless of clinical deterioration.

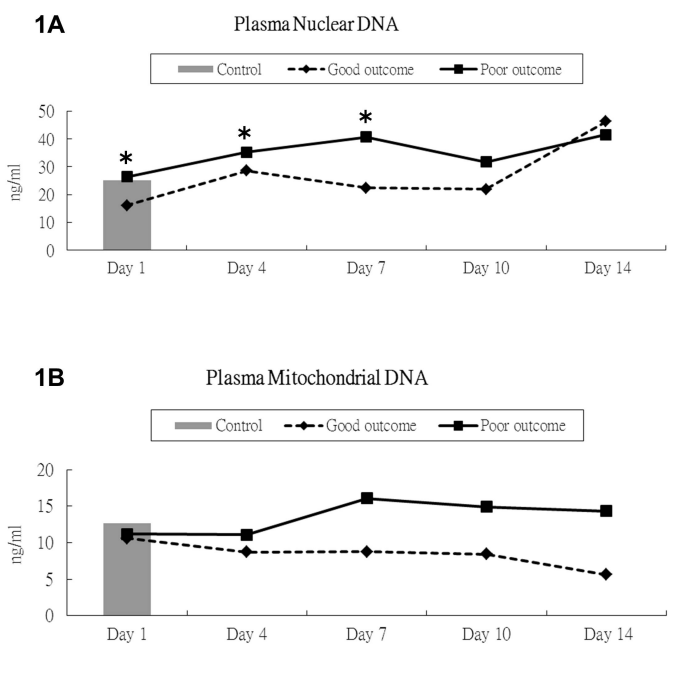
Results

Only plasma nuclear DNA, not plasma mitochondrial DNA, levels in patients with spontaneous ICH significantly correlated with GCS (r=-0.467, p=0.001) and ICH volume (r=0.515, p=0.001) on presentation. Plasma nuclear DNA levels increased significantly from Day 1 to Day 7 in patients with poor outcome. Higher plasma nuclear DNA levels (cut-off value >18.7 ng/ml) on presentation were associated with poor outcomes in spontaneous ICH patients.

Conclusions

Plasma nuclear DNA levels reflect the severity of cerebral damage such that higher levels are associated with poorer outcome. Plasma nuclear DNA level can be considered a neuro-pathologic marker of acute spontaneous ICH.

Time course of plasma DNA in ICH patients



(A) Plasma nuclear DNA and (B) plasma mitochondrial DNA levels on various days (Days 1, 4, 7, 10, and 14) in ICH patients and volunteer controls.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of the time course of plasma nuclear and mitochondrial DNA concentration changes in spontaneous ICH patients, 2) Discuss, in small groups, increased plasma DNA occurred in a variety of critical conditions associated with cell death, including cancer, stroke, major trauma, and bacterial meningitis, 3) Identify an effective treatment for plasma DNA to improve the outcome of spontaneous ICH patients.

References

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