"Using vital signs to diagnose impaired consciousness"

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<Question>

Are there any vital signs which can be used to quickly identify brain lesions in patients with impaired consciousness?

<Methods>

・Design

Prospective observational cross-sectional study.

・Follow-up period

The patients were followed up from admission to discharge to determine the cause of their impaired consciousness.

・Setting

Emergency department of an urban hospital, Japan.

・Patients

529 consecutive patients (≧15 years, mean age 65 years) presenting with impaired consciousness (score <15 on the Glasgow coma scale) during 2000. (Patients with head injury were excluded because this was obviously the cause of their impaired consciousness.)

・Main outcome measures

The receiver operating characteristic curve was used to quantify the relation between the vital signs on arrival and the final diagnosis of a brain lesion. Stratum specific likelihood ratios were calculated to define strata with optimal discriminating power.

・Patient follow-up

100%

<Main results>

312 (59%) had a brain lesion which accounted for the impaired consciousness. Compared with those patients without a lesion, those with a lesion had significantly higher systolic blood pressure, higher diastolic blood pressure, and significantly lower pulse rate. Body temperature between the groups did not differ. The area under the receiver operating curve for systolic blood pressure was 0.90, indicating significantly higher accuracy in the identification of a brain lesion than using diastolic pressure 0.82 or pulse rate 0.63.

<Conclusion>

Systolic blood pressure is useful for diagnosing brain lesions in patients with impaired consciousness.

<Commentary>

Diagnosing impaired consciousness is always a challenge. When computed tomography is available in an emergency department, clinicians order brain scans for almost every patient with impaired consciousness, but about half of patients with impaired consciousness had no organic brain lesion.

Previous studies suggest that the vital signs are useful diagnostic tools in patients with impaired consciousness. The classic Cushing response and previous studies on systemic response to impaired autoregulation of cerebral blood flow explain the increase in systemic blood pressure in patients with impaired consciousness caused by a brain lesion. In contrast, hypotension is usually associated with metabolic brain dysfunction caused by drug intoxication, sepsis, diabetic coma, or hepatic encephalopathy.

This study says that systolic blood pressure is useful for diagnosing brain lesions in patients with impaired consciousness. But this finding is limited, because of the characteristics of the patients they studied. Firstly, the older mean age, 65 years, than in previous studies, 54 years and 58 years, may be because of an older population in the local community. Secondly, the incidence of stroke in this study (49%) was higher than in studies of Plum and Posner (26%; 130/500) and Yamashiro et al (28%; 49/175) but lower than among British patients with coma (57%). Thirdly, the high incidence of diffuse hypoxia or ischaemia (18%) probably reflects the vulnerability of the older patients in this study to severe systemic infections— for example, pneumonia, pyelonephritis, and cholecystitis.

More studies are needed to confirm the clinical validity of systolic blood pressure for discriminating between patients with impaired consciousness who have a brain lesion and those who do not.