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論文内容の要旨

Synopsis of Thesis

[論文題名 : Thesis Title]

Prognostic indicators and outcome prediction model for patients with return of spontaneous circulation from cardiopulmonary arrest: The Utstein Osaka Project
(自己心拍再開の得られた院外心肺停止症例の予後予測因子と予後予測式: ウツタイン大阪プロジェクト)

学位申請者 : 早川 航一
Name _____

[目的(Purpose)]

Recently, therapeutic hypothermia and percutaneous cardiopulmonary support therapy with coronary intervention were reported to improve neurological outcomes in a specific patients group. Such intensive treatment is, however, costly and time-consuming. Accurate prediction of neurological outcome at the time of initial hospital admission will be helpful when considering indications for these intensive therapies or to stratify patients for precise clinical research.

Although some prognostic indicators for patients with out-of-hospital cardiopulmonary arrest (OHCA) have been proposed, a mathematical model with high predictive value for neurological outcomes has not been established. The purpose of the present study was to determine the most important indicator of prognosis in patients with return of spontaneous circulation (ROSC) following OHCA and to develop a best outcome prediction model.

[方法ならびに成績(Methods/Results)]

All patients were prospectively recorded based on the Utstein Style in Osaka over a period of 3 years (2005-2007). Criteria for inclusion were a witnessed cardiac arrest, age greater than 17 years, presumed cardiac origin of the arrest, and successful ROSC. Multivariate logistic regression (MLR) analysis was used to develop the best prediction model. The dependent variables were favorable outcome (cerebral-performance category [CPC]: 1-2) and poor outcome (CPC: 3-5) at 1 month after the event. Eight explanatory pre-hospital variables were used concerning patient characteristics and resuscitation. External validation was performed on an independent set of Utstein data in 2007. Subjects comprised 285 patients in VF and 577 patients with pulseless electrical activity (PEA)/asystole. The percentage of favorable outcome was 31.9% (91/285) in VF and 5.7% (33/577) in PEA/asystole. The most important prognostic indicators of favorable outcome found by MLR were age ($p=0.10$), time from collapse to ROSC (TROSC) ($p<0.01$), and presence of pre-hospital ROSC (PROSC) ($p=0.15$) for VF and age ($p=0.03$), TROSC ($p<0.01$), PROSC ($p<0.01$), and conversion to VF ($p=0.01$) for PEA/asystole. For external validation data, areas under the receiver-operating characteristic curve were 0.867 for VF and 0.873 for PEA/asystole.

[総括(Conclusion)]

The most important prognostic indicators of patients with ROSC from VF were age, TROSC, and PROSC, whereas those from PEA/asystole were age, TROSC, PROSC, and conversion to VF. A model based on these indicators showed a high predictive value for favorable outcome in OHCA patients with ROSC and would be useful for decision making, family counseling, and review of treatment in cases of OHCA.

論文審査の結果の要旨及び担当者

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論文審査の結果の要旨

蘇生直後に心原性院外心肺停止症例の予後を予測することができれば、経皮的心肺補助装置や脳低温療法などの治療方針の決定に際し有用であると考えられる。本研究では前向きかつ地域網羅的に集計された2005, 6年のウツタイン大阪のデータを用いて、Akaike Information Criterionに基づいたロジスティック回帰分析を行い、予後予測因子の抽出および予後予測式を確立した。救急隊現場到着時VF症例の予後予測因子は年齢、病院前心拍再開の有無、虚脱から心拍再開までの時間であった。PEA/Asystole症例の予後予測因子は上記3因子に加え、蘇生中のVFへの移行の有無が抽出された。抽出された予測因子を基に得られた予測式のAUCはそれぞれ0.851、0.890と高い予測精度であった。2007年のウツタイン大阪のデータを用いて実施した外部検証でも高い予測精度が示された。蘇生直後に適用可能な精度の高い予測式は世界的にみても前例がなく、本研究成果は学位の授与に値すると思われる。