預測使用**Propofol** 做麻醉誘導時的血壓變化－使用 **Logistic Regression** 模型

Predicting blood pressure change caused by rapid injection of propofol during Anesthesia Induction with a Logistic Regression Model

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摘要

背景： 建構一個以 logistic regression 爲基礎的預測模型， 用以預測病人在全身麻醉誘導時使用 propofol 的血壓變化。方法： 在兩百個使用 propofol 做全身麻醉的病人記錄中， 每個病人的 17 個變數皆詳細紀錄。在麻醉誘導前血壓至少測量 3 – 5 次， 麻醉誘導後血壓在 10 分鐘內至少測量十次。如果麻醉前後血壓的變化超過 30%， 則被預測的變數其內容被設定爲 1， 如果麻醉前後的血壓變化未超過 30%， 則被預測的變數內容設爲 0。Logistic regression 模型使用此 17 個參數來建構， 並以 sensitivity 、specificity 及 area under ROC curve 來評估此模型的效益。結果： 在兩百個病人之中如果以此 logistic regression 模型來做預測其血壓變化， 在取臨界值爲 0.17 的情況下，sensitivity 可以達到 90%，specificity 可以達到 67.3%， 而 area under ROC curve 則爲 0.855。結論：在以 17 個取自病人的變數(包括年齡、性別、體重、麻醉前的心跳、血壓以及病人的過去病史等) 爲基礎建構而成的 logistic regression 模型， 可以相當準確的預測病人在使用 propofol 做麻醉誘導時的血壓變化。此模型可以很簡單的和醫院資訊系統整合， 以做爲一個容易使用的決策支援系統。

Abstract

Background : Propofol is a common intravenous agent for induction and maintenance of anesthesia. The advantage of propofol is rapid recovery of consciousness when the continuous infusion is stopped. Additionally, it has antiemetic effect of reducing postoperative nausea and vomiting. On the other hand, rapid infusion of propofol is painful and may cause hypotension. In this study, we aimed to develop a logistic regression model to accurately predict blood pressure change caused by rapid infusion of propofol. Methods : Seventeen variables (including

demographic data, past medical history, laboratory data, and blood pressure before induction)were assessed in 200 patients who received propofol for induction of anesthesia for routine surgery. A logistic regression model was derived using these values as independent variables to predict whether a patient would suffer a significant blood pressure change (> 30% decrease from baseline) Sensitivity, specificity, and area under the receiver operating characteristic curve (AUC) were calculated to evaluate the performance of our predictionmodel. Results : A cut-off value of 0.17 in the logistic regression model predicted decreased blood pressure with 90.0% sensitivity and, 67.3% specificity. The area under the receiver operating characteristic curve was 0.855. Conclusions : Our predictionmodel predicts propofol-induced hypotension with acceptable accuracy. Because of the straightforward mathematic formula used, our model can be integrated effortlessly into a hospital information system, providing a reliable and useful decision support for clinical anesthesia staff.