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Impact of Intraoperative Blood Pressure Control and
Temporary Parent Artery Blocking on Prognosis
in Cerebral Aneurysms Surgery

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Key words: cerebral aneurysm; intraoperative blood pressure control; prognosis;
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Objective In cerebral aneurysm clipping and embolization, blood pressure control and temporary parent artery blocking are common methods to prevent aneurysm rupture. Their influence on the prognosis is uncertain. In this study, we try to find out the association between methods above and prognostic indicators.

Methods We held a retrospective analysis on patients' medical records of cerebral aneurysms surgical clipping and endovascular coiling, and recorded gender, age, diagnosis, Hunt-Hess grade, Glasgow coma scale score, treatment methods, a history of hypertension, preoperative systolic blood pressure, with or

without controlled hypotension, systolic blood pressure difference before and after controlled hypotension, with or without temporary artery blocking, with or without hypertension after treated aneurysm, prognostic indicators including mortality after 1 month, intensive care unit (ICU) stay time of survivors, discharged Glasgow outcome scale (GOS) score. Prognostic indicators were regarded as dependent variable, all the factors were regarded as independent variable, and the strength analysis of influence factors on prognostic indicators was made by binary logistic regression.

Results Total cases were 165, including 68 males and 97 females, with an average age of 56 (12-85) years. The mortality after 1 month was 10.9% (18 cases). The ICU stay time of survivors was 7.35 (0-67) days. GOS score at discharge was 1-3 in 40 (24.2%) patients and 4-5 in 125 (75.8%) patients. Systolic blood pressure difference before and after controlled hypotension was an independent factor influencing mortality ($t=2.273$, $P=0.024$), and the greater the difference was, the higher the mortality would be. Timely hypertension after aneurysm treated was an independent factor affecting ICU stay time of survivors and patients with hypertension had shorter ICU stay time ($\chi^2=10.017$, $P=0.001$). Blood pressure control ($\chi^2=0.088$, $P=0.767$) and temporary blocking ($\chi^2=1.307$, $P=0.253$) did not show significant influence on GOS score at discharge.

Conclusions Timely controlled hypertension after aneurysm clipping and embolization can significantly shorten the stay time in ICU. The degree of controlled hypotension associates with postoperative mortality, the greater systolic blood pressure difference before and after antihypertensive treatment is, the higher the mortality will be.

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IN cerebral aneurysm patients, effects of subarachnoid hemorrhage on cerebral blood flow performed in two aspects. One is vasospasm, which reduces local or even entire cerebral blood flow. The other is the decline of vascular adjustment, which is reduced by vasospasm. During the decrease of blood pressure or temporary clipping of aneurysm, the vascular compensatory capacity decreases compared with normal state.¹ These two situations result in the decrease of cerebral perfusion, ischemia and hypoxia, which are closely associated with poor prognosis. In present, craniotomy clipping and endovascular intervention are two common surgeries in cerebral aneurysms. Intraoperative blood pressure control and temporary parent artery blocking are often adopted to avoid the rupture of aneurysms. However, these hypotheses are still controversial, and the clinical results are inconsistent. In this study, we took prognostic indicators including mortality after 1 month, intensive care unit (ICU) stay time of survivors, discharged Glasgow outcome scale (GOS), analyzing the impact of intraoperative blood pressure control and temporary occlusion on prognosis in cerebral aneurysms surgery to regulate them and improve prognosis.

PATIENTS AND METHODS

Patients and methods

In recent three years (from January 2012 to January

2015), we retrospectively collected 186 hospitalized patients in the Affiliated Hospital of Jiangsu University and Zhenjiang First People's Hospital. Patients more than 12 years of age and undergoing aneurysm clipping and coiling were included. Patients with aneurysm reinforcement or wrapping surgery, ruptured cerebral aneurysms or untreated aneurysms were excluded. Patients' gender, age, diagnosis, Hunt-Hess grade, Glasgow coma scale (GCS), with or without a history of hypertension, preoperative systolic blood pressure (SBP), treatment methods, with or without controlled hypotension, manner, extent, duration, with or without temporary vascular occlusion, with or without intraoperative rupture, the blood pressure before rupture, with or without hypertension after treatment and difference of SBP before and after induced hypotension, and prognostic indicators including ICU stay time, mortality after 1 month, discharged GOS were recorded. At our centers, intraoperative blood pressure control was mainly drug measures conducted by anesthetists including nitroglycerin, labetalol, deepen anesthesia and so on.

GOS score at discharge is divided into 5 grades, and 1 is for death, 2 is for vegetative state, 3 is for severe disability, 4 is for mild disability, and 5 is for fine prognosis. Patients with GOS scores of 1-3 are defined as poor outcome, and with GOS scores of 4-5 are regarded as good outcome.

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