Response by Chen et al to Letter Regarding Article, “Endovascular Hypothermia in Acute Ischemic Stroke: A Pilot Study of Selective Intra-Arterial Cold Saline Infusion”

In Response:

We are thankful to Mattingly et al for their interest and critical evaluation of our article. In comparison to other studies, we did not measure the temperature of brain tissue directly because we considered the risk of intracranial hemorrhage in patients with acute ischemia who usually received antithrombotic treatment. Several theoretical models demonstrated that an infusion of ice-cold saline at ≈30 mL/min through the internal carotid artery is sufficient to induce moderate hypothermia in the human brain within 10 minutes.1,2 Another study by Choi et al3 showed that intracarotid infusion of cold saline (4–10°C) at 33 mL/min led to a rapid decrease by 0.84±0.13°C in the jugular venous bulb within 10 minutes of patients undergoing diagnostic cerebral angiograms. Using this human jugular venous bulb temperature data as input in a 3-dimensional human brain model, another study inferred that the temperature of the ipsilateral cerebral anteroinferior circulation territory decreased by ≈2°C within 10 minutes.4 In this study, we modified this selective brain cooling method by infusing cold saline (4°C) not only after but also before recanalization. Thus, we determined an approximate 2°C drop at least could have been achieved in the ischemic territory within 10 minutes. This calculation is a limitation, which we have discussed in our article.

Rectal temperature was monitored continuously to reflect the systemic temperature, and it reaches its lowest point at the end of the cold saline infusion. The degree of mean rectal temperature reduction is 0.1°C, and the maximum reduction is 0.3°C.

 Vasospasm is a frequently observed adverse event in mechanical thrombectomy, which has been used to remove clots in the occluded artery, and it usually recovers spontaneously with little consequences on the patient. The incidence of vasospasm (15.4%) in our pilot study is more likely related to a mechanical clot extraction with a stent retriever, but not associated with the cold saline infusion, because the previous trial did not detect vasospasm caused by the cold saline infusion.5 In our study, 10 patients (account for 38.5%) had pneumonia after operation, which is higher than that in the control arm in ICTUS-L (Intravascular Cooling in the Treatment of Stroke–Longer window).6 Because all 8 patients who developed pneumonia received general anesthesia and experienced nausea and vomiting before the operation, the infection probably resulted from aspiration. Taken together, it is hard to assess the treatment without some baseline nonintervention cohort data, but our pilot study suggested that selective brain hypothermia is safe and feasible for acute ischemic patients with proximal artery occlusion.

Disclosures

None.

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