Hyperbaric Oxygen Therapy of Acute Ischemic Stroke

To the Editor:

We read with interest the review article by Hankey et al.1 In an attempt to assess the treatment of acute stroke with hyperbaric oxygen (HBO) the authors performed a review of 3 trials. Although we agree with the statement that there is no level I data to support the use of HBO in the treatment of acute ischemic stroke, we would like to emphasize that the trials evaluated by the authors were not adequate to support their conclusion.

First, none of these studies actually enrolled patients during what most neurologists would accept as the acute period of ischemic stroke. Two of the trials looked at patients presenting up to 24 hours after symptom onset, and the third allowed enrollment up to 2 weeks after stroke onset. Multiple trials with acute stroke therapies have clearly shown that the benefit to a penumbra is limited after the first few hours of ischemia. Numerous animal studies investigating HBO therapy of acute cerebral ischemia have also shown that the benefit of HBO is limited to the first several hours after the onset of ischemia.2

Secondly, the doses and controls were also not appropriate for the evaluation of HBO treatment of acute ischemic stroke. The authors state, “HBOT is the therapeutic administration of 100% oxygen at pressures >1 atmosphere” and “treatments involve pressurization to between 152 and 304 kPa” (1.5 to 3.0 ATA). This definition allows for doses much lower than the standard protocol for all approved indications of HBO in human clinical use which is 2.0 to 2.4 ATA.3 Indeed, numerous animal studies have suggested that if HBO is to be effective in the treatment of ischemic stroke, it must be applied at doses of 2 to 3 ATA and administered in the first several hours of ischemia. In 2 of the reported trials the dose used was 1.5 ATA.4,5 The authors misreported the study design of the Nighoghossian trial in the original Cochrane article,6 stating that 2.5 ATA of oxygen was given with 2.5 ATA of air as a control when the trial actually used 1.5 ATA of oxygen and air at “a slight pressure increase” as a control. Such a significant error calls the entire report into question. Also, the control group in Anderson et al actually received hyperbaric air as opposed to oxygen, which has been shown in animal studies to be of intermediate benefit between hyperbaric oxygen and no treatment. Thus, these 3 studies have not assessed whether hyperbaric oxygen therapy is effective in acute ischemic stroke.

The strength of any metaanalysis or review article depends on the number and quality of clinical trials or articles reviewed. In this particular article the authors reviewed 3 articles and made a statement that there is no evidence at this stage to support HBO in acute stroke. At this stage of the evidence we feel it is too early to make any conclusions regarding HBO. In fact, there have been no randomized controlled studies which have appropriately evaluated HBO for acute ischemic stroke, and thus no statement should be made about this as-yet untested modality.

Disclosures

None.

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