Delayed cerebral ischemia after aneurysmal subarachnoid hemorrhage prevention

Pharmacotherapy

Oral nimodipine, an L-type dihydropyridine calcium channel blocker, is the only FDA-approved drug for the prevention and treatment of neurological deficits after aneurysmal subarachnoid hemorrhage. Fasudil, a potent Rho-kinase inhibitor, has also been shown to improve the clinical outcome and has been approved in some countries for use in patients with aneurysmal subarachnoid hemorrhage. Although other drugs, including nicardipine, cilostazol, statins, clazosentan, magnesium and heparin, have been expected to have beneficial effects on DCI, there has been no convincing evidence supporting the routine use of those drugs in patients with aneurysmal subarachnoid hemorrhage in clinical practice. Further elucidation of the mechanisms underlying DCI and the development of effective therapeutic strategies for DCI, including combination therapy, are necessary to further improve the functional outcome and mortality after subarachnoid hemorrhage [1)]

Systematic reviews

2016

Clazosentan, magnesium, and simvastatin have been tested in large high-quality trials but failed to show a beneficial effect. Cilostazol, eicosapentaenoic acid, erythropoietin, heparin, and methylprednisolone yield promising results in smaller, non-randomized or retrospective studies and warrant further investigation. Topical application of nicardipine via implants after clipping has been shown to reduce clinical and angiographic vasospasm. Methods to improve subarachnoid blood clearance have been established, but their effect on outcome remains unclear. Haemodynamic management of DCI is evolving towards euvolemic hypertension. Endovascular rescue therapies, such as percutaneous transluminal balloon angioplasty and intra-arterial spasmolysis, are able to resolve angiographic vasospasm, but their effect on outcome needs to be proved. Many novel therapies for preventing and treating DCI after aneurysmal subarachnoid hemorrhage have been assessed, with variable results. Limitations of the study designs often preclude definite statements. Current evidence does not support prophylactic use of clazosentan, magnesium, or simvastatin. Many strategies remain to be tested in larger randomized controlled trials [2)]

The risk of delayed cerebral ischemia is reduced with oral nimodipine and probably by maintaining circulatory volume [3)].

1)
Maruhashi T, Higashi Y. An overview of pharmacotherapy for cerebral vasospasm and delayed cerebral ischemia after subarachnoid hemorrhage. Expert Opin Pharmacother. 2021 Apr 13:1-14. doi: 10.1080/14656566.2021.1912013. Epub ahead of print. PMID: 33823726.
2)
Veldeman M, Höllig A, Clusmann H, Stevanovic A, Rossaint R, Coburn M. Delayed cerebral ischaemia

prevention and treatment after aneurysmal subarachnoid haemorrhage: a systematic review. Br J Anaesth. 2016 Jul;117(1):17-40. doi: 10.1093/bja/aew095. Epub 2016 May 8. PMID: 27160932; PMCID: PMC4913393.

3)

van Gijn J, Kerr RS, Rinkel GJ. Subarachnoid haemorrhage. Lancet. 2007 Jan 27;369(9558):306-18. Review. PubMed PMID: 17258671.