SUBARACHNOID HAEMORRHAGE
Supporting information

This guideline has been prepared with reference to the following:

Hoh BL, Ko NU, Amin-Hanjani S et al. 2023 Guideline for the Management of Patients with Aneurysmal Subarachnoid Hemorrhage: A Guideline from the American Heart Association/American Stroke Association. Stroke. 2023;54:e314-70

https://www.ahajournals.org/doi/full/10.1161/STR.0000000000000436

NICE. Subarachnoid haemorrhage caused by a ruptured aneurysm: diagnosis and management. 2022. London. NICE

https://www.nice.org.uk/guidance/ng228

Subsequent management

Oral nimodipine 60mg 4 hrly improves prognosis in patients with subarachnoid haemorrhage if given immediately and continuously?

A 2022 systematic review of RCTs concluded that nimodipine can significantly reduce the incidence of a poor outcome, mortality, and cerebral vasospasm (CVS) in patients with aneurysmal subarachnoid haemorrhage (aSAH) [Hao, 2022]. Moreover, the authors strongly recommended that patients with aSAH, especially those younger than 50 years old, should use nimodipine as early as possible in order to achieve a better clinical outcome, whether oral medication or endovascular direct medication. This review included 13 RCTs and a total of 1,727 patients. Meta-analysis showed that a poor outcome was significantly reduced in the nimodipine group [RR, 0.69 (0.60 to 0.78)]. Moreover, nimodipine also dramatically decreased the mortality [RR, 0.50 (0.32 to 0.78)] and the incidence of CVS [RR, 0.68 (0.46 to 0.99)]. Remarkably, we found a poor outcome and mortality were both significantly lower among patients with aSAH, with the mean age < 50 than that mean age ≥ 50 by subgroup analysis.

Continued enteral administration at a dose of 60 mg 6 times a day can be beneficial in preventing delayed cerebral ischemia and improving functional outcome, as originally published in a 1983 clinical trial (Allen, 1983) and confirmed in a meta-analysis of 16 trials involving 3361 patients (Dorhout, 2007).

Hao G, Chu G, Pan P et al. Clinical effectiveness of nimodipine for the prevention of poor outcome after aneurysmal subarachnoid hemorrhage: A systematic review and meta-analysis. Front Neurol. 2022;13:982498 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9533126/

Dorhout Mees SM, Rinkel GJE, Feigin VL, et al. Calcium antagonists for aneurysmal subarachnoid haemorrhage. Cochrane Database Syst Rev. 2007:3 http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD000277.pub3/full

Allen GS, Ahn HS, Preziosi TJ et al. Cerebral arterial spasm: a controlled trial of nimodipine in patients with subarachnoid hemorrhage. N Engl J Med. 1983; 308:619-24

Evidence Level: I

Discharge and follow-up

The optimal duration of nimodipine treatment is 3 weeks?

Although the peak incidence of delayed ischaemia after subarachnoid haemorrhage is around 7 to 10 days after the initial bleed, it may occur as late as the 40th day; treatment for 21 days appears to be protective across the whole range. In a double blind, placebo controlled randomised trial in 554 patients (Pickard, 1989), nimodipine 60 mg orally every four hours was given for 21 days to 278 patients (276 had placebo). The incidence of cerebral infarction was 22% in the nimodipine group vs 33% in the control group, a reduction of 34%; poor outcomes were also reduced by 40%.

This is still accepted as the standard duration for treatment (van Gijn, 2007).

A retrospective study of 199 patients aneurysmal subarachnoid haemorrhage compared the effects of 2 versus 3 weeks of nimodipine therapy (Cho, 2016). A shortened duration of nimodipine was not

associated with a higher risk of a poor neurological outcome defined by Modified Rankin Scale (odds ratio = 1.85; 95% CI = 0.54-6.32; P = 0.32). Mortality rates were similar between the groups.
A 2025 systematic review concluded that dose duration reduction (< 3 weeks) nimodipine protocols do not increase aSAH morbidity or delayed cerebral ischemia (DCI) incidence compared to standard-of-care (3 weeks) and may improve outcomes. These findings support individualized treatment durations, especially for patients with adverse effects. The review included fourteen studies with 759 standard-of-care (SOC, 3 week nimodipine) and 781 dose duration reduction (DDR, < 3 weeks) patients. SOC had a pooled favorable overall morbidity of 0.52 [95% CI: 0.34 to 0.70], versus 0.74 [95% CI: 0.64 to 0.83] for DDR (p = 0.03). Subgroup analyses showed significant differences by administration route (p = 0.01), with oral DDR linked to better outcomes (p = 0.02). DCI incidence was 0.39 [95% CI: 0.20 to 0.57] in SOC and 0.31 [95% CI: 0.18 to 0.44] in DDR (p = 0.50).

Cho S, Bales J, Tran TK et al. Effects of 14 Versus 21 Days of Nimodipine Therapy on Neurological Outcomes in Aneurysmal Subarachnoid Hemorrhage Patients. Ann Pharmacother. 2016;50:718-24

Oslin S, Hoyt W, Tavakol S et al. Does duration of nimodipine therapy impact outcome in aneurysmal subarachnoid hemorrhage: systematic review and meta-analysis. Neurosurg Rev. 2025;48:531

Pickard JD, Murray GD, Illingworth R, et al. Effect of oral nimodipine on cerebral infarction and outcome after subarachnoid haemorrhage: British aneurysm nimodipine trial. BMJ 1989;298:636-42
http://www.bmj.com/content/298/6674/636.full.pdf+html

Van Gijn J, Kerr RS, Rinkel GJ. Subarachnoid haemorrhage. Lancet 2007;369:306-18

Evidence Level: I

Operative treatment is of value?
The International Surgical Trial in Intracerebral Haemorrhage (STICH) in 1033 patients from 83 centres in 27 countries (Mendelow, 2005) randomised 503 patients to early surgery and 530 patients to initial conservative treatment. Of the 468 “early surgery” patients available to follow-up, 122 (26%) had a favourable outcome, compared with 118 (24%) of 496 “conservative treatment” patients.
It has been suggested (Lutsep, 2004) that this apparently neutral effect for early surgery may have been due to the inclusion of patients with both superficial and deep haemorrhage sites.

Lutsep HL. Current status of hemorrhagic stroke and acute nonthrombolytic ischemic stroke treatment. Stroke 2004;35(Suppl I):2746-7
http://stroke.ahajournals.org/content/35/11_suppl_1/2746.long

Mendelow AD, Gregson BA, Fernandes HM, et al. Early surgery versus conservative treatment in patients with spontaneous supratentorial intracerebral haematomas in the International Surgical Trial in Intracerebral Haemorrhage (STICH): a randomised trial. Lancet 2005;365:387-97

Evidence Level: II

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