Critical care guidelines on the endovascular management of cerebral vasospasm

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CRD summary

Balloon angioplasty and intra-arterial papaverine showed a reduction in vasospasm and neurological deficits but it was unclear which treatment was most beneficial. Outcomes were positive for nicardipine and inconsistent for verapamil but data on these treatments were limited. Due to gaps in the reporting of the review and limited study quality, the reliability of the review conclusions is unclear.

Authors' objectives

To determine the role of endovascular treatment for cerebral vasospasm.

Searching

MEDLINE, Cochrane Central Registry of Controlled Trials (CENTRAL) and ClinicalTrials.gov were searched up to October 2010 for studies published in English. Search terms were reported.

Study selection

Studies that addressed endovascular treatment of vasospasm in clinical populations of at least 10 patients were eligible for inclusion. Case reports were not included.

Most studies evaluated balloon angioplasty or intra-arterial papaverine. Other interventions included verapamil and nicardipine. There was limited reporting of vasodilator dosing regimes within individual studies; it appeared that dosing regimes varied between studies.

The authors did not state how many reviewers selected the studies.

Assessment of study quality

The strength of evidence was assessed using the GRADE (Grades of Recommendation Assessment, Development and Evaluation) criteria to class evidence for each outcome as very low, low, moderate or high.

The authors did not state how many reviewers assessed study quality.

Data extraction

Data on angiographic and clinical results were extracted and reported using descriptive statistics.

The authors did not state how many reviewers extracted data.

Methods of synthesis

Studies were synthesised narratively.

Results of the review

Forty-nine articles were included. Most studies were retrospective case series. Quality of the evidence was considered low or very low for intra-arterial treatments and moderate for balloon angioplasty.

**Intra-arterial vasodilators:** Twelve case series reported good angiographic and clinical results for patients who received papaverine. Two studies found no clinical benefit and one reported neurological decline as well as possible neurotoxicity with papaverine.

Four retrospective case-series reported on the use of intra-arterial injection of verapamil. Three studies reported positive results of which two reported improvements in arterial diameter and no significant side effects while one study showed no arterial diameter improvement. Three case series reported that nicardipine led to transient neurological improvement.
Balloon angioplasty: Twenty-seven publications (1,028 patients) reported using transluminal balloon angioplasty. Twenty-four studies reported improvements in vessel diameters and in neurological deficits. Three studies did not show any significant clinical benefit for patients who received balloon angioplasty compared to intra-arterial papaverine or combination therapy.

Authors’ conclusions
Balloon angioplasty and intra-arterial papaverine generally showed a successful reduction in vasospasm and neurological deficits. Due to limited data, it was unclear which was most beneficial. Positive benefits were reported with nicardipine and inconsistent benefits were observed with verapamil but data on these treatments were limited.

CRD commentary
The review question and inclusion criteria were broadly specified in terms of population, intervention and design. Outcomes of interest were not defined. Only studies published in English were included so some studies may have been missed. The authors did not state how many reviewers assessed study quality, selected and extracted data.

Study quality was assessed but only overall quality results were reported. Most studies appeared to use a retrospective case series design and included few patients so the reliability of most of the evidence base appeared limited. Reporting of study details and results was limited, which made interpretation of the results difficult.

Due to the limited search, poor reporting of study details and results and limited study quality, the reliability of the review conclusions is unclear.

Implications of the review for practice and research
The authors did not state any implications for practice or further research.

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