Studies have been conducted using many different drugs, but many are small and retrospective. In 1993, Kassell et al. described the intra-arterial administration of papaverine for the treatment of vasospasm and showed marked angiographic improvement in 66% and clinical improvement in 33%. These findings have been replicated in other studies. Papaverine was reported to be neurotoxic and resulted in neurologic decline in one study and is very rarely used today in favor of calcium channel blockers.

Verapamil and nicardipine have also been used successfully by intra-arterial administration in the treatment of vasospasm. The exact protocol for the dosing and delivery of these agents is not clear. Some prefer a long, slow administration time, while others give the medication as a bolus. Interestingly, it has also been described to administer intra-arterial verapamil via an indwelling microcatheter in the treatment of refractory vasospasm.

This method could easily be complicated by thromboembolic events, however. All of these agents are vasodilators and administration should result in increased CBF and CBV, therefore, it is recommended that ICP be monitored during treatment. It is also important to monitor for systemic hypotension, as this may be more detrimental than the vasospasm itself. In our practice, we use verapamil and nicardipine in 10 mg aliquots in each vessel. At times, if there is no systemic hypotension it is reasonable to increase to 20 or 30 mg in divided doses if the spasm is severe. We have also seen better and somewhat more durable results when the 10 mg dose is infused slowly on a pump over 10–20 min, although this method may not be possible depending on the stability of the patient.

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