

Learning Objectives

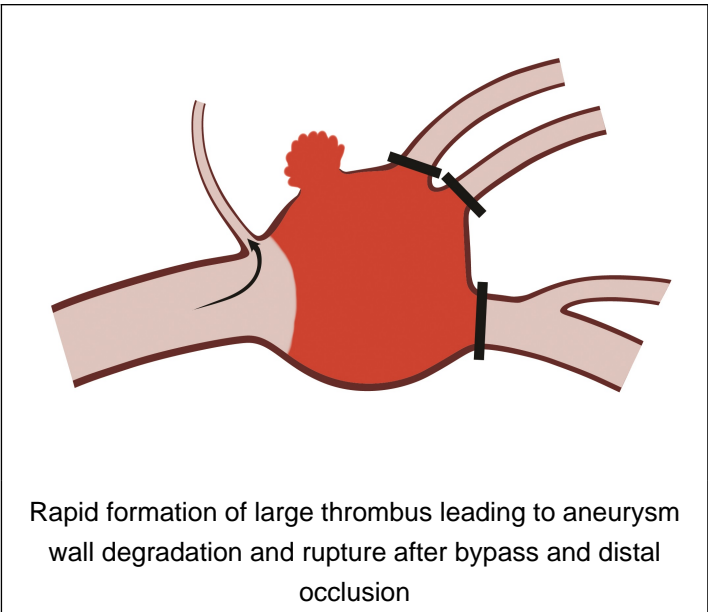
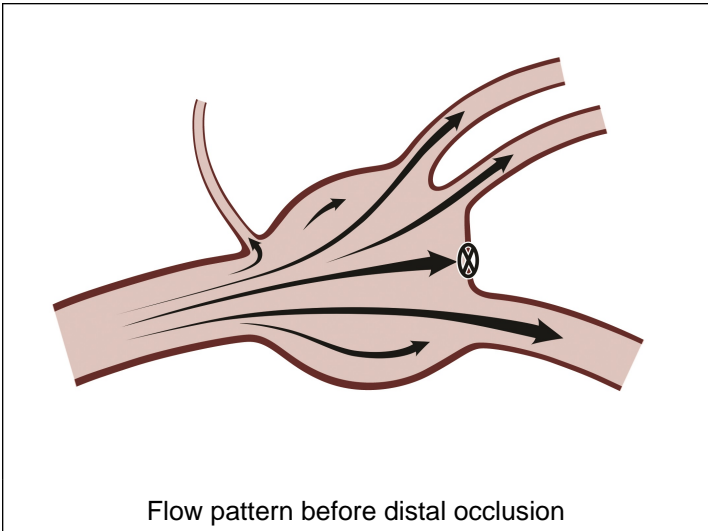
- 1. Understand surgical treatment strategies of giant anterior circulation aneurysms.
- 2. Describe potential complications of these surgical treatments.
- 3. Identify mechanisms underlying aneurysm rupture after distal occlusion and bypass of giant aneurysms.

Introduction

Only a few series have been published describing the treatment strategies and outcomes for giant cerebral aneurysms, and even fewer cases of postoperative aneurysm rupture have been reported. Here, we report two cases of giant anterior circulation aneurysm rupture after bypass and distal occlusion and discuss the underlying mechanisms, in the hopes of averting such complications in the future.

Methods

Report of 2 cases and review of the literature.



Results

Two patients successfully underwent surgical treatment of a giant anterior circulation aneurysm using bypass and distal occlusion. In each case, sudden thrombosis of the aneurysm was seen intraoperatively immediately following distal occlusion. Postoperative rupture occurred and in both cases the thrombosed portion of the aneurysm was found to be the rupture site. Both patients had devastating clinical consequences. Rupture has been hypothesized to be due to altered flow dynamics. Based on our observations, though, we suggest another mechanism – rapid formation of a large thrombus, leading to aneurysm wall degradation and rupture – that has already been implicated in aneurysm rupture after flow diversion treatment.

Conclusions

Aneurysm rupture can occur after bypass and distal occlusion, and may be due to rapid thrombosis with subsequent aneurysm wall destabilization. Consequently, this potential complication should be recognized and measures to avoid it should be taken, such as immediate, complete occlusion of the aneurysm, especially if rapid thrombosis of the aneurysm is seen.

References

1. Kivipelto L, Niemela M, Meling T, Lehecka M, Lehto H, Hernesniemi J. Bypass surgery for complex middle cerebral artery aneurysms: impact of the exact location in the MCA tree. J Neurosurg. 2014;120(2):398-408.
2. Scott RM, Liu H-C, Yuan R, Adelman L. Rupture of a previously unruptured giant middle cerebral artery aneurysm after extracranial-intracranial bypass surgery. Neurosurgery. 1982;10(5):600-603.
3. van Doormaal TPC, van der Zwan A, Verweij BH, Han KS, Langer DJ, Tulleken CAF. Treatment of giant middle cerebral artery aneurysms with a flow replacement bypass using the excimer laser-assisted nonocclusive anastomosis technique. Neurosurgery. 2008;63(1):12-22.
4. Kulcsar Z, Houdart E, Bonafe A, et al. Intra-aneurysmal thrombosis as a possible cause of delayed aneurysm rupture after flow-diversion treatment. AJNR. 2011;32(1):20-25.