

# Pediatric cerebral arteriovenous malformation

Although [brain arteriovenous malformations](#) (bAVMs) account for a very small proportion of cerebral pathologies in the pediatric population, they are the cause of roughly 50% of spontaneous [intracranial hemorrhages](#). Pediatric bAVMs tend to rupture more frequently and seem to have higher [recurrence](#) rates than bAVMs in adults <sup>1) 2) 3) 4) 5) 6) 7)</sup>.

## Natural History

The natural history of untreated cerebral AVMs in children is worse than in adults, in relation to a longer life expectation, a higher annual risk of AVM bleeding (3.2% vs. 2.2%) and a higher incidence of posterior fossa and basal ganglia AVMs, most of which present with massive haemorrhages <sup>8)</sup>.

## Treatment

[Pediatric cerebral arteriovenous malformation treatment.](#)

## Outcome

Intracranial haemorrhage is the presenting clinical manifestation in 75-80% of paediatric patients and is associated with a high morbidity and mortality <sup>9)</sup>.

## Case series

A prospectively maintained database of children between January 1997 and October 2012 for bAVMs was retrospectively queried to identify all consecutive ruptured bAVMs treated by surgery, embolization, and radiosurgery. The impact of baseline clinical and bAVM characteristics on clinical outcome, rebleeding rate, annual bleeding rate, and bAVM obliteration was studied using univariate and multivariate Cox regression analysis.

One hundred six children with ruptured bAVMs were followed up for a total of 480.5 patient-years (mean, 4.5 years). Thirteen rebleeding events occurred, corresponding to an annual bleeding rate of  $2.71 \pm 1.32\%$ , significantly higher in the first year ( $3.88 \pm 1.39\%$ ) than thereafter ( $2.22 \pm 1.38\%$ ;  $P < 0.001$ ) and in the case of associated aneurysms (relative risk, 2.68;  $P = 0.004$ ) or any deep venous drainage (relative risk, 2.97;  $P = 0.002$ ), in univariate and multivariate analysis. Partial embolization was associated with a higher annual bleeding rate, whereas initial surgery for intracerebral hemorrhage evacuation was associated with a lower risk of rebleeding.

Associated aneurysms and any deep venous drainage are independent risk factors for rebleeding in pediatric ruptured bAVMs. Immediate surgery or total embolization might be advantageous for

children harboring such characteristics, whereas radiosurgery might be targeted at patients without such characteristics <sup>10)</sup>.

## References

<sup>1)</sup>, <sup>8)</sup>, <sup>9)</sup>

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