Demographic distribution of hospital admissions for brain arteriovenous malformations in Germany--estimation of the natural course with the big-data approach.

Estimation of the natural history of arteriovenous malformations based on short-term observation is potentially biased by multiple factors. Retrieval of demographic information of all AVM patients of national data pools and comparison with the national demographic profile might be another way to approach the natural history. Upon request, the German Federal Statistical Office provided the numbers of patients admitted in Germany from 2009 through 2013 with ICD Q28.2 (brain AVM) as primary discharge diagnosis, and the corresponding age distribution. Age-related admission rates of AVM were calculated by comparison with the German demographic distribution. A total of 6527 patients were hospitalized from 2009-2013 with brain AVM (Q28.2) as the principal diagnosis. Age-specific admission rate during the first year of life was high with 19.0/100,000 during the 5-year study period, corresponding to a yearly admission rate of 3.8 per 100,000 babies. Apart from the high admission rate during the first year of life, the admission rate was low, but steadily increasing during first decades of life reaching a plateau with 11.1/100,000 in the age group 30-34 years, corresponding to an annual admission rate of 2.2/100,000. After the age of 30-34 years, admission rates decreased continuously,
reaching 0 in the age group 90-95 years. The lifetime risk of admission in terms of admission per 100,000 age-matched people was calculated by retrograde integration of the admission rates. At the age of 1 year, the cumulative number of future admissions for AVM during lifetime amounted to 131.3/100,000 children. For the older age groups, the chance of future admission for AVM decreased as expected, reaching 43.8/100,000 by the age of 50 and 0 by the age of 90. Despite some open issues, the current data suggests that achieving old age with an untreated brain AVM is unlikely. Furthermore, the data support the concept that most brain AVMs are not necessarily a congenital entity but develop during the first decades of life.