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Round table: Giant intracranial aneurysms

French collaborative group series on giant intracranial aneurysms: Current management

Prise en charge des anévrismes intracrâniens géants : série du Groupe d'étude français

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ABSTRACT

Objectives. – Giant intracranial aneurysms represent a major therapeutic challenge for each surgical team. The aim of our study was to extensively review the French contemporary experience in treating giant intracranial aneurysms in order to assess the current management.
Patients and methods. – This retrospective multicenter study concerned consecutive patients treated for giant intracranial aneurysms (2004–2008) in different French university hospitals (Bordeaux, Caen, Clermont-Ferrand, Lille, Lyon, Nice, Paris-Lariboisière, Rouen et Toulouse). Different variables were analyzed: the diagnostic circumstances, the initial clinical status based on the WFNS scale, aneurysmal features and exclusion procedure. At 6 months, the outcome was evaluated according to the modified Rankin Scale (mRS): favorable (mRS 0-2) and unfavorable (mRS 3-6). A multivariate logistic regression model included all the independent variables with $P < 0.25$ in the univariate analysis ($P < 0.05$).
Results. – A total of 79 patients with a mean age of 51.5 ± 1.6 years (median: 52 years; range: 16–79) were divided into two groups, with the ruptured group ($n = 26$, 32.9%) significantly younger ($P < 0.05$, Student's-*t*-test) than the unruptured group ($n = 53$, 67.1%). After SAH, the initial clinical status was good in 12 patients (46.2%), and in the unruptured group, the predominant diagnosis circumstance was a pseudo-tumor syndrome occurring in 22 (41.5%). The first procedure of aneurysm treatment in the global population was endovascular in 42 patients (53.1%), microsurgical in 29 (36.7%) and conservative in 8 (10.2). An immediate neurological deterioration was reported in 38 patients (48.1%) after endovascular treatment in 19 (45.2% of endovascular procedures), after miscrosurgical in 15 (51.7% of microsurgical procedures) and after conservative in 4 (the half). At 6 months, the outcome was favorable in 45 patients (57%) and after multivariate analysis, the predictive factors of favorable outcome after management of giant cerebral aneurysm were the initial good clinical status in cases of SAH ($P < 0.002$), the endovascular treatment ($P < 0.005$), and the absence of neurological deterioration ($P < 0.006$). The endovascular procedure was obtained as a predictive factor because of the low risk efficacy of indirect procedures, in particular a parent vessel occlusion.
Conclusion. – The overall favorable outcome rate concerned 57% of patients at 6 months despite 53.8% of poor initial clinical status in cases of rupture. The predictive factors for favorable outcome were good clinical status, endovascular treatment and the absence of postoperative neurological deterioration. Endovascular treatment should be integrated into the therapeutic armenmatarium against giant cerebral aneurysms but the durability of exclusion should be taken into account during the multidisciplinary discussion by the neurovascular team.

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RÉSUMÉ

Objectif. – Le traitement des anévrismes géants est un challenge auquel est confronté toute équipe de neurochirurgie dont l'arsenal thérapeutique s'est considérablement modifié durant les 20 dernières années. L'objectif de notre travail était d'analyser rétrospectivement, sur une cohorte multicentrique collaborative, l'évolution clinique post-procédurale de patients pris en charge selon les options multidisciplinaires actuelles.

Patients et méthode. – Cette étude multicentrique, rétrospective, concernait les patients consécutifs pris en charge pour anévrisme géant supra-clinoidien entre 2004–2008 dans les services de neurochirurgie de Bordeaux, Caen, Clermont-Ferrand, Lille, Lyon, Nice, Paris-Lariboisière, Rouen et Toulouse. Les différentes variables étudiées étaient : la circonstance diagnostique, l'état clinique initial à l'admission selon les critères WFNS, les caractéristiques anévrismales et les procédures d'exclusion. À 6 mois, l'évolution était analysée selon les critères de l'échelle modifiée de Rankin. Une analyse multivariée, utilisant une régression logistique ordinale pour déterminer des variables indépendantes parmi celles dont le $p < 0{,}25$ lors de l'analyse univariée d'impact.

Résultats. – Cette cohorte, composée de 79 patients (âge moyen : $51{,}5 \pm 1{,}6$ ans, médiane : 52 ans, extrêmes : 16–79 ans), était divisée en un sous-groupe de patients avec anévrisme rompu ($n = 26$, 32,9 %), significativement plus jeune que le groupe de patients avec anévrisme non rompu ($n = 53$, 67,1 %). Les caractéristiques cliniques étaient un état initial sévère (grade III-IV du WFNS) chez 12 patients (46,2 %) après rupture, et, la circonstance de découverte prédominante de l'anévrisme non rompu était un syndrome pseudo-tumoral chez 22 (41,5 %). La procédure d'exclusion de première intention était une approche endovasculaire chez 42 patients (53,1 %), puis microchirurgicale chez 29 (36,7 %) et conservateur chez 8 (10,2 %). Une détérioration neurologique immédiate était observée chez 38 patients (48,1 %) répartis après traitement endovasculaire chez 19 (45,2 %), après traitement microchirurgical chez 15 (51,7 %) et chez la moitié des patients avec abstention. À 6 mois, l'évolution était favorable chez 45 patients (57 %). Les facteurs pronostics indépendants en faveur d'une évolution favorable étaient un état clinique initial correct, le traitement endovasculaire et l'absence de détérioration neurologique immédiate post-procédurale. Cependant, le traitement endovasculaire consistait en un traitement indirect non sélectif chez 19 patients.

Conclusion. – L'évolution favorable concernait 57 % des patients à 6 mois malgré une proportion de 53,8 % des patients en sévère état clinique à l'admission. Les facteurs prédictifs de l'évolution favorable était un bon état clinique initial, la possibilité d'une procédure endovasculaire et l'absence de détérioration neurologique post-procédurale. Le traitement endovasculaire apparaît actuellement comme une des propositions thérapeutiques dans la prise en charge multidisciplinaire des anévrismes géants, mais son caractère prédictif favorable doit être pondéré en raison de la haute proportion de traitement indirect.

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Mots clés :
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1. Introduction

The giant cerebral aneurysm, defined by a diameter larger than 25 mm, represents 1.9% to 5.1% of all aneurysms [1–5]. The natural history of this giant intracranial aneurysm is considered detrimental as the rupture rate has been estimated to be around 50% at 2 years and the mortality rate approximately 60% in absence of treatment [3,5]. These malformations represent a therapeutic challenge because of the treatment risk and their pathological anatomy i.e. intraluminal thrombus, large neck, complex arterial branches and adherent perforating arteries [6–8].

The combination of a persistent post-surgical morbidity approximately 30% despite the recent microsurgical technique refinement and the steady advances in endovascular treatment has considerably modified the management of these malformations [9–12]. The range of endovascular procedures extend from the indirect treatment by parent vessel occlusion to the direct exclusion using selective coiling or flow diversion and endoluminal reconstruction [4,13–17]. The most significant surgical series [1,2,18–21] predates the interactions between these 2 approaches, with new therapeutic strategies which have appeared in the last decade.

The aim of our study was to review the French contemporary experience in treating giant intracranial aneurysms in order to assess current management relative to earlier reported studies and better establish the role of the microsurgical exclusion, to determine the clinical outcome and post-procedure complications, as well as to identify predictive factors of favorable outcome.

2. Patients and method

2.1. Study design

This retrospective and multicenter study concerned all consecutive patients treated for a giant intracranial aneurysm between January 2004 and January 2009. The patients were identified from the prospective neurovascular surgery database in different reference university hospitals: Bordeaux, Caen, Lille, Nice, Paris Kremlin Bicêtre, Poitiers, Rouen, and Toulouse. The primary objective was to evaluate the functional outcome at 6 months. The secondary objectives were to describe the clinical and iconographic characteristics, the therapeutic alternatives and to determine predictive factors for favorable outcome.

2.2. Population

The inclusion criteria were:

- aneurysm diameter superior to 25 mm by cerebral angiography or non-invasive imaging (CT scan or magnetic resonance imaging) for thrombotic aneurysms;
- intracranial location;
- ruptured or not.

The exclusion criteria were:

- the cavernous location;
- complex aneurysm of a size inferior to 25 mm.

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