



ARTICLE ORIGINAL

Immediate intracranial aneurysm occlusion after embolization with detachable coils: a comparison between MR angiography and intra-arterial digital subtraction angiography

Occlusion immédiate des anévrismes intracrâniens traités par embolisation à l'aide de *coils* détachables : comparaison entre l'ARM et l'angiographie conventionnelle

B. Lubicz*, M. Levivier, N. Sadeghi, P. Emonts, D. Balériaux

Department of Neuroradiology (BL, NS, PE, DB) and Department of Neurosurgery (ML), Erasme University Hospital, Brussels, Belgium

KEYWORDS

Intracranial aneurysm;
Endovascular
treatment;
Detachables coils;
MR angiography

Abstract

Background and purpose. — To prospectively compare the effectiveness of time-of-flight (TOF) and contrast-enhanced (CE) MR angiography (MRA) with that of digital subtraction angiography (DSA) to assess immediate intracranial aneurysm occlusion after selective embolization.

Methods. — From August 2006 to March 2007, 33 consecutive patients with 40 aneurysms were included. Thirty aneurysms were treated by endosaccular coils (group 1). Ten aneurysms were treated by stent placement and subsequent endosaccular coils (group 2). All patients underwent MRA within 24 h after treatment. One senior and one fellow radiologist independently reviewed the MR images, and another senior radiologist reviewed the DSA images.

Results. — DSA showed 22 complete occlusions, ten residual necks, and eight residual aneurysms. For residual neck detection, there was no difference between TOF-MRA (sensitivity, 80%-80%; specificity, 93.8%-100%, according to both readers) and CE-MRA (sensitivity, 80%-80%; specificity, 100%). For residual aneurysm detection, there was a significant difference between TOF-MRA (sensitivity, 50%-62.5%; specificity, 100%) and CE-MRA (sensitivity and specificity, 100%, according to both readers). In group 2, a residual aneurysm was missed by both readers with TOF-MRA in the same 3 aneurysms. Moreover, both readers judged CE-MRA better

* Corresponding author. Service de radiologie (EA 2691), hôpital Erasme, 808, route de Lennik, 1070 Bruxelles, Belgium.
E-mail address: blubicz@ulb.ac.be (B. Lubicz).

MOTS CLÉS

Anévrisme intracrânien ;
 Traitement endovasculaire ;
 Coils détachables ;
 ARM

than TOF-MRA to assess parent-artery patency in group 2. Interobserver agreement was excellent for TOF-MRA and CE-MRA ($\kappa = 0.9$ and 1 , respectively).

Conclusions. — In our study, both TOF-MRA and CE-MRA had high and comparable sensitivity and specificity for the assessment of immediate aneurysm occlusion after selective embolization, except when a stent-assisted technique was used. In such cases, CE-MRA was superior to TOF-MRA to evaluate aneurysm occlusion and parent-artery patency.

© 2007 Elsevier Masson SAS. All rights reserved.

Résumé

Objectif. — Comparer l'efficacité de l'ARM time-of-flight (TOF) et de l'ARM avec injection de gadolinium (ARMc) avec celle de l'angiographie conventionnelle afin d'évaluer l'occlusion des anévrismes intracrâniens immédiatement après embolisation sélective.

Méthode. — Entre août 2006 et mars 2007, 33 patients consécutifs avec 40 anévrismes ont été inclus. Trente anévrismes ont été traités par embolisation à l'aide de *coils* (Groupe 1). Dix anévrismes ont été traités par mise en place d'un *stent* et embolisation à l'aide de *coils* (Groupe 2). L'ARM a été réalisée dans les 24 heures suivant l'embolisation chez tous les patients. Un senior et un interne radiologue ont analysé indépendamment les images ARM et un autre senior radiologue a interprété les angiogrammes conventionnels.

Resultats. — L'angiographie conventionnelle a montré 22 occlusions complètes, dix collets résiduels et huit anévrismes résiduels. Pour la détection d'un collet résiduel, il n'y avait pas de différence entre l'ARM-TOF (sensibilité, 80-80 % ; spécificité, 93,8-100 %, selon les lecteurs) et l'ARMc (sensibilité, 80-80 % ; spécificité, 100 %). Pour la détection d'un anévrisme résiduel, il existait une différence significative entre l'ARM-TOF (sensibilité, 50-62,5 % ; spécificité, 100 %) et l'ARMc (sensibilité et spécificité de 100 % pour les deux lecteurs). Dans le groupe 2, un sac résiduel n'a pas été détecté par les lecteurs en ARM-TOF pour les trois mêmes anévrismes. Les lecteurs ont jugé l'ARMc plus performante pour évaluer la perméabilité de l'artère porteuse dans le groupe 2. La concordance interobservateurs était excellente pour les deux techniques d'ARM ($\kappa = 0,9$ et 1 respectivement).

Conclusion. — Dans notre étude, la sensibilité et la spécificité des l'ARM-TOF et de l'ARMc étaient comparables pour l'évaluation de l'occlusion immédiate des anévrismes traités par embolisation sélective excepté lorsqu'un *stent* est utilisé. Dans ce cas, l'ARMc était supérieure pour évaluer l'occlusion de l'anévrisme et la perméabilité de l'artère porteuse.

© 2007 Elsevier Masson SAS. All rights reserved.

Introduction

Selective endovascular treatment (EVT) by means of detachable coils is widely used and accepted as an alternative to surgical clipping for patients with unruptured and ruptured intracranial aneurysms [15,16]. Furthermore, EVT is associated with lower rates of morbidity and mortality in selected cases. However, over the long term, neurointerventionalists face a major problem: aneurysm recanalization due to coil compaction. These recurrences occur in 8% to 33.6% of patients [4,27].

To evaluate the stability of aneurysm occlusion, patients must regularly be followed-up. Digital subtraction angiography (DSA) is currently the standard method for the detection and evaluation of intracranial aneurysms [22]. However, the method is invasive, time-consuming, relatively expensive and associated with a 0.5% risk of permanent neurological complications [7]. Magnetic resonance angiography (MRA), including three-dimensional time-of-flight (TOF) MRA and contrast-enhanced (CE) MRA, has increasingly been recognized as an efficient non-invasive imaging method for the detection and evaluation of intracranial aneurysms [2,3,5,6,8-11,17,18,23,24,26,30-33]. Moreover,

these authors have shown that TOF-MRA and CE-MRA are useful for the follow-up of coiled aneurysms. Therefore, MRA might be used in the future as the only imaging examination for the follow-up of patients with aneurysms treated by endosaccular coils.

Nevertheless, to precisely follow-up coiled aneurysms with only the use of MRA, it is mandatory to know how MRA correlates with DSA findings immediately after treatment. The aim of our study was to prospectively compare the effectiveness of both TOF-MRA and CE-MRA with that of conventional DSA in the assessment of aneurysm occlusion immediately after EVT.

Patients and methods**Population**

All adult patients (≥ 18 years of age) undergoing EVT for unruptured or ruptured intracranial aneurysms were considered eligible. In the case of subarachnoid hemorrhage (SAH), patients were classified according to the Hunt and Hess scale [14]; those who presented with grade III-V were excluded because of the discomfort and difficulty in per-

Download English Version:

<https://daneshyari.com/en/article/4234721>

Download Persian Version:

<https://daneshyari.com/article/4234721>

[Daneshyari.com](https://daneshyari.com)