



Follow-up of Brain Abscess Volume by Magnetic Resonance Imaging: a Pilot Study

Aline Carsin-Vu MBBS¹, Matthieu Revest MD PhD^{2,3}, Pierre-Jean Le Reste MD⁴, Caroline Piau MD⁵, Pierre Fillâtre MD^{2,3}, Jean-Yves Gauvrit MD PhD^{1,6}, Pierre Tattevin MD PhD^{2,7}

1. Visages Unit (U746)/Irisa, Univ. of Rennes 1, Rennes, France 2. Infectious Diseases and Intensive Care Unit, Pontchaillou Univ. Hosp., Rennes, France 3. CIC Inserm 0203-IFR140, Univ. of Rennes 1, Rennes, France 4. Department of Neurosurgery, Pontchaillou Univ. Hosp., Rennes, France 5. Laboratory of Bacteriology and Virology, Pontchaillou Univ. Hosp., Rennes, France 6. Department of Neuroradiology, Pontchaillou Univ. Hosp., Rennes, France 7. Inserm U835-Upres, Pharmaceutical Biochemistry Lab, Univ. of Rennes 1, Rennes, France

Infectious Diseases and Intensive Care Unit

Pontchaillou Univ. Hosp.

rue Le guilloux, Rennes, France

Tel: +33 2 99289564

Fax: +33 2 99282452

Email: pierre.tattevin@chu-rennes.fr

1 Introduction

The management of brain abscess (BA), including follow-up of BA by neuro-imaging studies, is poorly standardized (1-4).

We aimed to estimate volume changes as a function of time under appropriate medical treatment in adult patients with bacterial BA.

2 Methods

We retrospectively reviewed all cases of bacterial BA followed-up in Rennes University Hospital (Western France), from January 2011 to February 2016. Cases were identified through computerized database.

We excluded patients who underwent abscess excision. Only cases for whom magnetic resonance imaging (MRI) studies were available at baseline, and after 4-12 weeks of adequate antibacterial treatment were analyzed.

The BA volume was automatically calculated after manually delineation in each slice of contrast-enhanced T1-weighted sequence with itk-SNAP 3.2.0 (www.itksnap.org) by the same radiologist.

Evolution of BA volume was defined by the volume difference between the 2 MRI (expressed in %), divided by number of weeks

3 Results

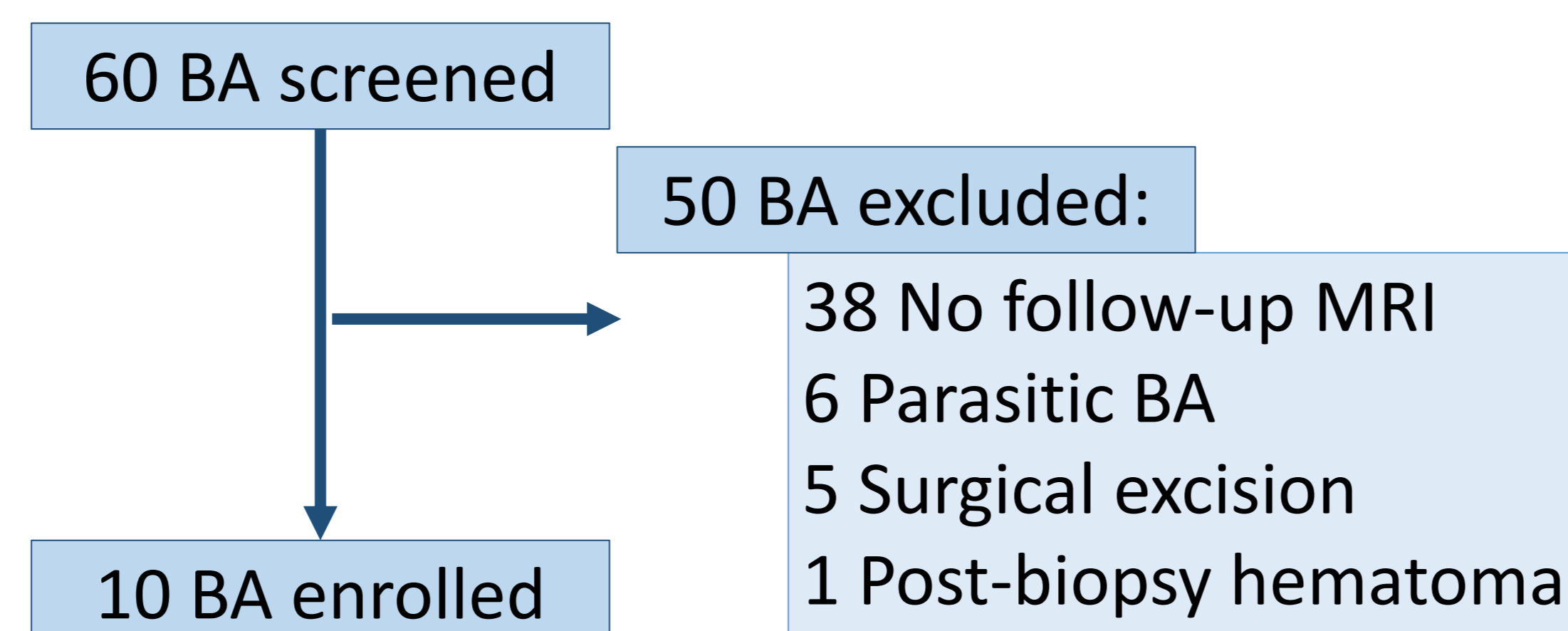


Figure 1. Population flow chart

Ten patients were analyzed (mean age 47 years, sex ratio 1/1).

Patients were treated in agreement with institutional guidelines for neuromeningeal tuberculosis (9 month-regimen) or bacterial BA (6 week-combination of ceftriaxone/metronidazole).

Microbiology *	N
Not documented	3
<i>Fusobacterium</i> sp.	2
<i>Mycobacterium tuberculosis</i>	2
<i>Streptococcus constellatus</i>	2
<i>Eikenella corrodens</i>	1
<i>Peptoniphilus harei</i>	1
<i>Aggregatibacter aphrophilus</i>	1
<i>Porphyromonas gingivalis</i>	1

Table 1. Microbiology. *Three patients had polymicrobial BA

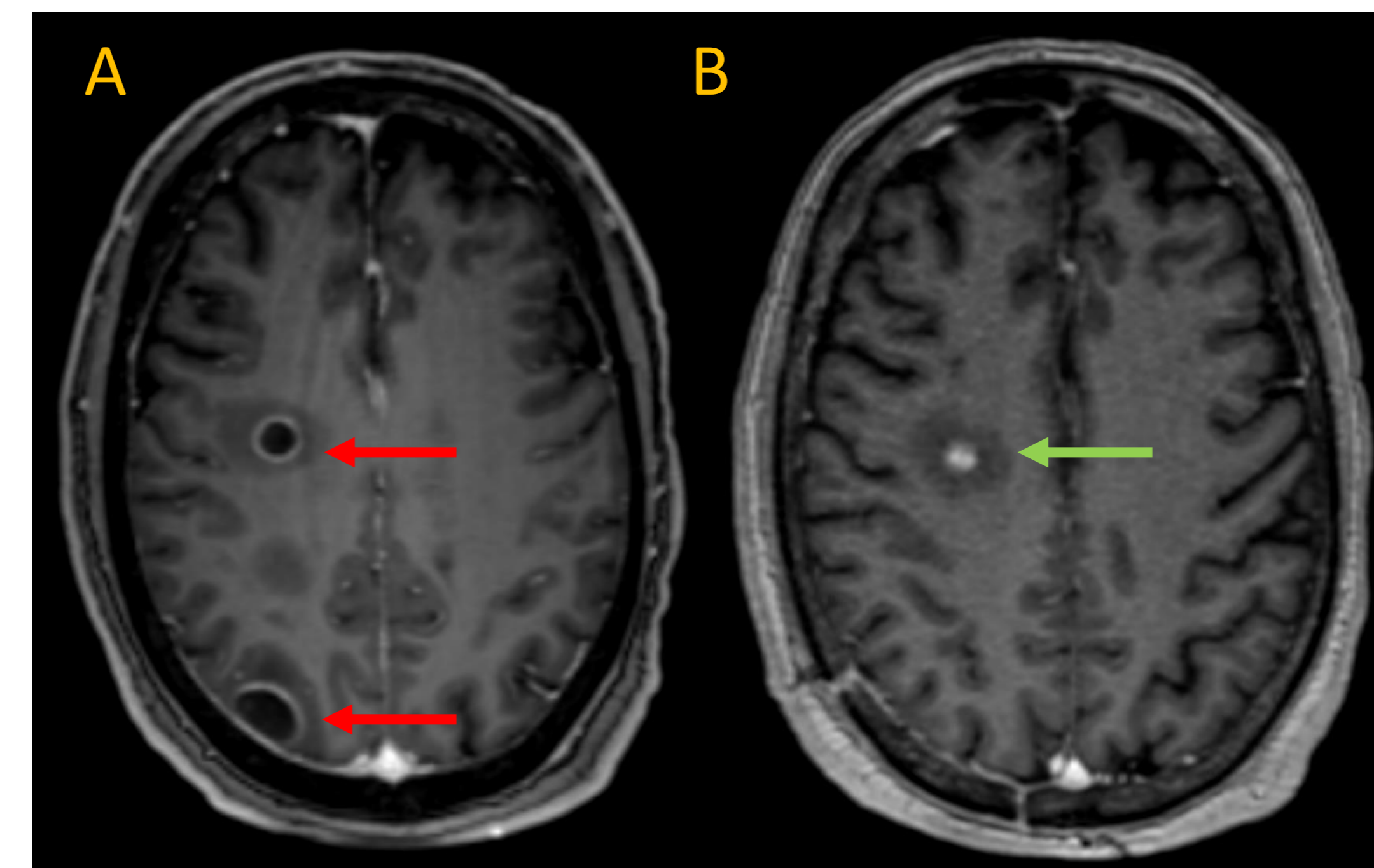


Figure 2. Brain MRI (contrast-enhanced T1-weighted sequence) at diagnosis (A) and after 8 weeks (B). Two brain abscesses were initially found (red arrows). The control MRI showed a slight contrast enhancement of one BA (green arrow), and disappearance of the second BA.

Initial mean size of BA as evaluated by MRI was 12.2 cm³. Four patients had multiple BA.

The mean decrease of BA volume was - 10.4 ± 6.9% per week.

There was a striking difference between tuberculosis BA evolution (+ 0.6 ± 1.1% per week), and non-tuberculous bacterial BA evolution (- 13.2 ± 4.3% per week).

Mean decrease of BA volume was similar in the 5 patients initially managed with stereotactic aspiration/biopsy (- 11.7 ± 3.9%). All patients had favorable outcome.

4 Discussion

This pilot study suggests that follow-up of BA by MRI could be standardized. Non-tuberculous BA should be followed by MRI at earlier time points, and closer than tuberculosis BA (e.g. week 2 and 6).

This may allow earlier awareness of sub-optimal response, that may led to changes in medical treatment or surgical treatment.

However, a larger prospective study with standardized follow-up would be required to confirm these preliminary findings.

5 Conclusion

Under appropriate antibacterial treatment, non-tuberculous BA volume decreases by 10-15% per week, as assessed by MRI, during the first 3 months.

This result may be used for systematic follow-up of BA by MRI.

6 References

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