Incidental findings on brain MRI in the general middle-aged and elderly population

M. W. Vernooij[1,2], M. A. Ikram[2], H. Tanghe[1], A. J. Vincent[3], A. Hofman[2], M. M. Breteler[2], and A. van der Lugt[1]

[1]Radiology, Erasmus MC, Rotterdam, Netherlands, [2]Epidemiology & Biostatistics, Erasmus MC, Rotterdam, Netherlands, [3]Neurosurgery, Erasmus MC, Rotterdam, Netherlands

Background

Incidental findings in neuroimaging are observations of potential clinical significance that are unexpectedly discovered, previously undetected, and that are unrelated to the purpose of the examination. The detection of incidental findings poses serious ethical issues, particularly when volunteers participating in a research study are involved [1]. Little is known on the prevalence of incidental findings in an unselected aging population, information that would be important to consider when designing a research study.

Purpose

To study the prevalence of incidental findings on brain MRI in the Rotterdam Scan Study II, an ongoing population-based MR study conducted in middle-aged and elderly persons.

Method and materials

All brain MRI scans that were reviewed were part of the Rotterdam Scan Study II (RSS II), a population-based MRI study among participants aged 45 years and older of the Rotterdam Study [2]. Imaging was performed on a 1.5T scanner (GE). The study was approved by the institutional review board. All participants signed an informed consent form, including whether they wanted to be informed on clinically significant incidental findings. The assessment of incidental findings was performed on high-resolution PDw, T1w, FLAIR and T2* GRE sequences. All imaging was performed without administration of contrast material. All scans were assessed within 1 week of acquisition by two experienced physicians. Incidental findings were recorded according to a predefined protocol. Only findings classified as clinically significant were recorded. Among findings that were not recorded were sinusitis, variants of the norm and age-related changes such as atrophy, infarcts and white matter hyperintensities. Afterwards, all recorded incidental findings were reviewed with an experienced neuroradiologist.

Results

Imaging was performed in 1,688 persons, mean age was 64.7 years (age range 45.7-96.7), with 883 females (52.3%). Overall, 56 clinically significant findings were recorded in 54 individuals (prevalence of 3.2%) (figure 1). Of these, meningiomas (0.9%) and aneurysms (1.7%) were most frequent. Pituitary macroadenoma or pituitary enlargement was present in 5 persons (0.3%). Vestibular schwannomas were also quite common with an overall prevalence of 0.2%. All findings were clinically silent. Overall, the prevalence of incidental findings was lowest in the youngest age category, but was still 2.6%. The prevalence of meningiomas increased from 0.4% in 40 to 65 year-olds to 1.6% in persons 75 years and older. Aneurysms showed no increase in prevalence with age.

Conclusion

In the general middle-aged and elderly population, clinically significant incidental findings are present 3.2% of brain MR scans. This frequency is much higher than was previously reported [3]. Meningiomas and small aneurysms were most prevalent. The prevalence of meningiomas increased with age. Information on the natural course of incidental findings is needed to define adequate clinical management.

References

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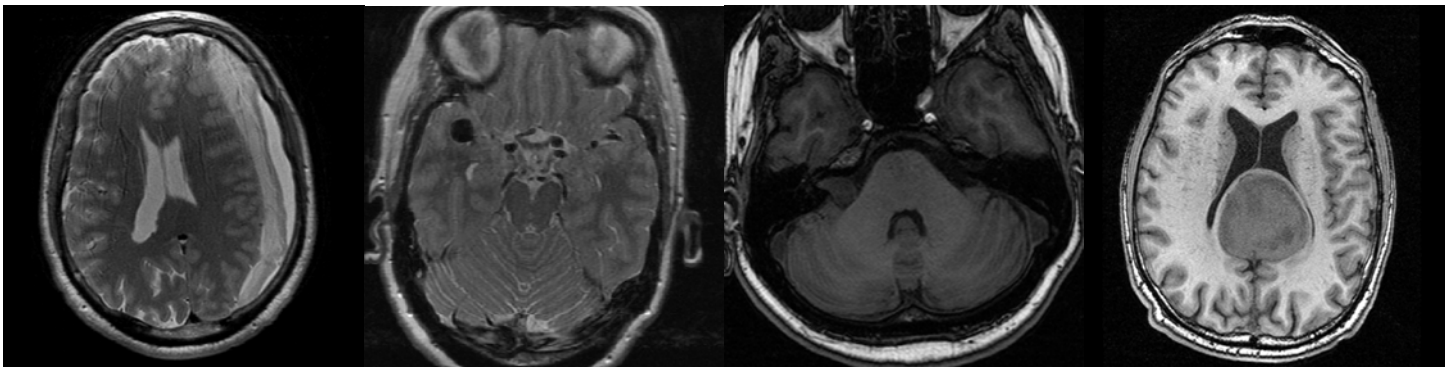
3. Katzman, G.L., A.P. Dagher, and N.J. Patronas, Jama, 1999. **282**(1): p. 36-9.

Figure 1. Pictorial essay of incidental findings.



a **b** **c** **d**

Caption figure 1. Axial MR images depicting incidental findings in the study population: in figure a, a chronic subdural hematoma on the left side. In figure b, a large aneurysm (12 mm) of the right medial cerebral artery. In figure c, a vestibular schwannoma (left) and in figure d a large tentorial meningioma of 6 cm.