



Incidental findings in brain imaging research: spotlight on ethical considerations

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Abstract

Brain imaging has revolutionized our ability to characterize brain structure and function. Since the first use of magnetic resonance imaging in a live human subject in 1977, the use of brain imaging in research and clinical medicine has seen exponential growth. Incidental findings (IFs) in brain imaging research have been a subject of contentious debate regarding the disclosure of IFs to human participants of research. In this paper, ethical considerations, as they apply, to IFs in brain imaging research have been discussed.

Key Points

- *Ethical considerations merit discussion vis a vis disclosure of incidental findings in brain imaging research.*

Keywords Neuroimaging · Incidental findings · Neuroscience · Ethics · Health equity

Incidental findings (IFs) in brain imaging research, and how IFs should be handled, have been a subject of ongoing debate among researchers and bioethicists [1]. Central to this debate is what ethical considerations may apply when IFs of potential clinical significance are discovered in a healthy subject participating in the study or an anomaly in a patient unrelated to the pre-specified goals of the study [2]. One stream of thought, justifying an obligation to look for and disclose to research participants, invokes auxiliary care obligations of researchers to participants, the participants' right to control information concerning themselves,

and perhaps broader issues of beneficence and patient autonomy [3]. Opponents of disclosure of IFs, on the other hand, have hinged their argument around the burden it imposes on researchers and the health-care system, as well as the potential for unwarranted harm due to disclosure to research participants [4]. Notably, huge variations in knowledge of IFs exist among researchers [5]. Besides, variations also exist in the handling and reporting of IFs in brain imaging research across institutions and research studies [2, 6]. A recent descriptive/qualitative study by Oerlemans et al from The Netherlands published in *European Radiology* investigated the experiences with, and preferences regarding, the disclosure of IFs in brain imaging research among young adult research participants [7].

Meta-analysis on the prevalence of IFs in brain MRI research has revealed that IFs are common, with prevalence estimates in the range of 5–20% [8]. Morris et al reported that the rate of detection of clinically significant IFs using high-resolution MRI was significantly higher than that using the standard MRI sequence (4.3% vs 2.7%, $p < 0.001$) [9]. Concerning young healthy volunteers, a prospective single-center study by Hartwigsen et al reported IFs in 19% of the study population [10]. Therefore, experiences of disclosure of IFs in young adult research volunteers are relevant and of ethical and research interest. The Oerlemans et al study revealed that participants were mostly impacted by the ambiguity in the period

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immediately after the disclosure of IFs suggesting that such disclosures should be carefully considered in healthy young adult research participants [7]. This study highlights an important aspect concerning pathways or ethical frameworks applicable to brain imaging studies recruiting young adult research subjects. Given the qualitative nature of the study by Oerlemans et al, no definitive recommendations can be made based on these findings; however, this study underscores the need for comprehensive, large-scale follow-up studies to investigate the risks and benefits of such disclosure for various segments of the population, including young adults [7] and other vulnerable populations, who participate in research studies.

In conclusion, IFs in brain imaging research are an important ethical, research, and clinical consideration that merits ethical inquiry, debate, and future research. Large-scale prospective studies on the impact of IFs on research participants are needed, especially concerning participants from vulnerable backgrounds including ethnic minorities and young adults [7].

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Informed consent Written informed consent was not required for this study because this is an editorial/commentary without any study subjects.

Ethical approval Institutional Review Board approval was not required because this is an editorial/commentary without any study subjects.

Methodology

• Editorial comment

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