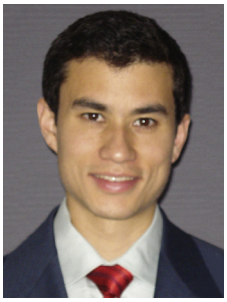
Preface
Evolving Medical Imaging Techniques



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Editors

Thanks to the recent entrance of hybrid PET/MR imaging systems into clinical practice, a new dimension in multimodality and multiparametric anato-molecular imaging has become available. PET/MR imaging provides unprecedented possibilities to study and improve the treatment of various diseases. The ultimate goal is to improve quality of life and outcome of patients, and this should always be kept in mind when using any new technology in the health sector. On another level, the beauty of PET/MR imaging will also enchant medical imaging specialists and clinicians from other specialties; if one image is worth more than a thousand words, one PET/MR image can be worth more than a million words. The introduction of PET/MR imaging will also bring nuclear medicine physicians and radiologists closer and work together with imaging scientists, technologists, and biomedical engineers as one powerful interdisciplinary team.

There is no doubt that the combination of both techniques provides more information than either one of them alone. However, to achieve the full potential of PET/MR imaging, the technique should be used wisely, and this requires detailed knowledge of both PET and MR imaging. The capabilities of PET as a molecular imaging modality are well established, while MR imaging in the setting of PET/MR imaging is often appreciated as a radiation-free modality that provides high soft tissue resolution. However, it would be unjustified and incorrect to regard MR imaging as a mere anatomical imaging modality. With MR imaging, both exquisite anatomical details and quantitative information on a variety of physiologic and metabolic processes can be obtained. The versatility of MR imaging is expected to be one of the key factors that can lead to the successful clinical implementation of PET/MR imaging. The basic knowledge of some important advanced functional MR imaging techniques that are already in clinical use or that will likely be in clinical use in the near future is therefore essential. In the first 7 articles of this issue, a selection of promising advanced MR imaging techniques (MR spectroscopy, chemical exchange saturation transfer MR imaging, diffusion-weighted MR imaging, diffusion tensor imaging, arterial spin labeling perfusion MR imaging, ultra-high-field MR imaging, and fMRI/BOLD) are reviewed by world leaders in these fields. The next article is dedicated to optical imaging, a topic that cannot be ignored when

PET Clin 8 (2013) xi–xii
http://dx.doi.org/10.1016/j.cpet.2013.04.005
1556-8598/13/$ – see front matter

reviewing evolving imaging technologies. In the last article, potential clinical applications of PET/MR imaging will be reviewed.

We would like to thank the contributing authors for their excellent articles that provide an invaluable source of frontline information for medical imaging specialists who are or will be using PET/MR imaging and related evolving technologies. We hope the readers will enjoy this issue, learn from it, and get inspired to apply the newly acquired knowledge to their clinical practice and research activities.

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