

## Foreword

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Fetal magnetic resonance imaging (MRI) is not a new development within the field of advanced prenatal diagnosis. In the early nineties, despite the fact that most diagnostic fetal MRI sequences were time consuming and consequently susceptible for fetal motion, highly diagnostic images were achieved by aggressively immobilizing the fetus. Suppression of fetal motion was achieved by injecting curare into the umbilical cord. This invasive approach limited fetal MRI to fetuses in which an umbilical cord puncture was indicated. With the progressive development of MRI hard- and software, ultra-fast sequences became available that allowed to image the fetus in utero without the need for sedation. Nowadays high-resolution anatomical and functional MRI images can be collected of the developing fetus without risks for the fetus and mother. Fetal MRI consequently evolved into an important second line-imaging tool next to prenatal ultrasonography to confirm, correct or complete prenatal ultrasound diagnosis. In the past decade, fetal MRI became especially helpful for the high-end evaluation of pathologies of the fetal central nervous system. Similar to "postnatal" neuroimaging, ongoing developments have allowed to shift our imaging approach from an initially purely anatomical imaging (T1 and T2-weighted MRI sequences) towards a more functional data collection. Functional MRI nowadays includes diffusion weighted and diffusion tensor imaging, <sup>1</sup>H magnetic resonance spectroscopy, dynamic MRI, and

resting state functional MRI. All these new developments have expanded our understanding of the normal and abnormal development of the central nervous system significantly. Finally, the high anatomical and functional details of fetal MRI have supported the development and management of complex intrauterine, fetal interventions.

For the current issue of the Journal of Pediatric Neuroradiology, multiple well known experts in the field of fetal neuroimaging have been invited to summarize their expertise and knowledge, also in the light of the ongoing developments of fetal MRI. Multiple aspects of fetal neuroimaging are covered including; "How to do it, including techniques and protocols"; "safety aspects"; "advanced fetal techniques"; fetal interventions". In addition, a review of the various pathologies that can be encountered covering multiple anatomical regions of the central nervous system (orbits, brain, spine and spinal cord) is included.

I hope that you will enjoy the collection of articles as much as I enjoyed inviting and working with all the contributing experts in this fascinating field of fetal neuroradiology. I also would like to thank all authors again for their contributions and the time that they invested in preparing these manuscripts. I am aware that in order to prepare and write these important reviews, the authors usually have "to steal" many hours from their family life. Thanks again!

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