Reduced Field-of-View Diffusion-Weighted MRI: A Systematic Review of Its Technical Advantages and Clinical Applications

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Diffusion-weighted imaging (DWI) is a widely recognized MRI technique that enables the non-invasive characterization of tissues and microstructures. However, conventional DWI faces limitations such as low spatial resolution and susceptibility to artifacts. This review evaluates the effectiveness and reliability of Reduced field-of-view MRI for detecting structural abnormalities and staging, highlighting its advantages over conventional DWI techniques across various applications. Relevant studies were identified through systematic searches in databases such as ScienceDirect, Springer, Elsevier, PubMed/Medline, Wiley Online Library, and Scopus. Methodologies adhered to the PRISMA guidelines to ensure a comprehensive review. Eleven studies meeting the selection criteria were analyzed for imaging efficacy, diagnostic criteria, and radiological outcomes. The review reveals that Reduced field-of-view MRI offers superior imaging capabilities compared to conventional DWI. It enhances diagnostic performance by improving image quality, reducing artifacts, and facilitating reliable differentiation of pathologies. Reduced Field of view MRI minimizes motion, susceptibility, and other distortions, enabling clear visualization of small and intricate anatomical structures. These advancements support its critical role in clinical practice, including accurate disease detection, effective treatment planning, and detailed postoperative evaluation. Reduced Field of view MRI represents a significant advancement in MRI technology, broadening its applications in clinical and research settings. Its ability to produce high-quality images with real-time monitoring holds the potential for revolutionizing the assessment of microstructural tissues and driving future innovations in diagnostic imaging.