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Transforming neonatal care through artificial intelligence-enhanced imaging: a new era in diagnostics

Statement: Despite significant advancements in neonatal imaging, timely diagnosis of subtle neurological and structural abnormalities remains challenging. Traditional interpretation of neonatal scans can be subjective and limited by resolution and timing. Integrating artificial intelligence (AI) with imaging offers a new frontier in diagnostic precision and clinical decision-making. A multi-center study was conducted involving 150 neonates across five tertiary NICUs. Advanced MRI sequence including susceptibility-weighted imaging (SWI), DTI, and resting-state functional MR were processed using AI algorithms trained on over 10,000 neonatal brain scans. The AI system was validated against expert radiologist interpretations and clinical outcomes at 12 months of age. AI-enhanced interpretation demonstrated a 35% increase in diagnostic accuracy compared to conventional methods, with a sensitivity of 92% and specificity of 89%. The technology also reduced interpretation time by 50%. Early identification of subtle cortical malformations and perfusion deficits allowed for timely therapeutic interventions in 70% of high-risk cases. AI-driven neonatal imaging represents a paradigm shift in neonatal diagnostics. By increasing diagnostic accuracy, reducing interpretation time, and enabling predictive modeling, AI technologies can dramatically improve clinical outcomes. Widespread implementation of AI tools in neonatal imaging holds promise for more personalized and effective neonatal care worldwide.

Biography

Michael L. Bennett is a renowned expert in neonatal imaging and biomedical AI, serving as the Director of the Neonatal Imaging Innovation Center at Stanford University School of Medicine. He completed his medical degree at Harvard Medical School and his radiology residency at UCSF, followed by a fellowship in pediatric neuroradiology. Over the past two decades, Bennett has pioneered research at the intersection of artificial intelligence and neonatal brain imaging, authoring over 80 publications and leading numerous NIH-funded projects. His work has earned international recognition for advancing the use of machine learning in early diagnostics and neurodevelopmental prognostication. Bennett's mission is to create integrative imaging technologies that bridge the gap between data science and clinical care, aiming to optimize the outcomes of high-risk neonates. As a passionate educator and innovator, he is committed to transforming neonatal radiology through cutting-edge, ethical, and accessible innovations.

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