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Evaluating Bone Health in Neonatal Osteopenia: A Scoping Review of Diagnostic Approaches

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ABSTRACT

Osteopenia of prematurity is a debilitating condition characterised by reduced bone mineral content. It is often observed in very-low-birth-weight infants because of a lack of foetal mineralisation during the last trimester and neonates with concomitant diseases such as necrotising enterocolitis, pregnancy related conditions (chorioamnionitis, gestational diabetes mellitus and preeclampsia), longer duration of total parenteral nutrition and lack of vitamin-D among mothers. High-risk neonates with prolonged use of diuretics/corticosteroids are at increased risk of low bone mineral density, resulting in osteopenia. A search strategy was performed for past five year with original researches published in English between 2020 and 2024. PubMed, Scopus, and PEDro databases were searched for full-text articles, resulting in six articles. Six out of 13 papers revealed that dual-energy x-ray absorptiometry was considered as the gold standard for measuring bone mineral density and had low radiation exposure for neonates and quantitative ultrasound, digital x-ray radiogrammetry, radiographic evaluations, peripheral quantitative computed tomography and biochemical markers such as: serum alkaline phosphatase, osteocalcin, C-terminal telopeptide serum calcium, and serum phosphorus were available as other diagnostic measures for assessing osteopenia. While selecting a reliable method for assessment of osteopenia, certain factors such as equipment availability, radiation exposure, cost and specific clinical needs of the neonate should be considered. A combination of techniques may provide a more thorough assessment of bone health in premature infants with osteopenia.

Keywords: Alkaline phosphatase, Bone mineral density, Infant, Premature, Very low birth weight