7 A SYSTEMATIC REVIEW ON VITAMIN D AND ANGIOGENESIS

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Background and aims: Angiogenesis is the process of new blood vessel sprouting from the existing vasculature. It is physiologically present during wound healing, development of placenta, tissue growth and adipogenesis as well as playing role in pathological processes such as tumor growth, metastasis, obesity and non-alcoholic fatty liver disease (NAFLD). Angiogenesis therapy is as a Strategy for treatment of some diseases. The angiogenic process is regulated by numerous factors e.g. dietary factors. In this paper, we reviewed available documents and research relevant to vitamin D and angiogenesis.

Methods: A systematic review of recent literature was conducted using the PRISMA guidelines. The sources of the data were PubMed, Google Scholar, Cochrane, Web of Science and Scopus. Key search terms were "*Angiogenesis*", "Angiogenesis factor", "vitamin D", "1,25 $(OH)_2$ D_3" and "Calciteriol". Articles included in the review were original research articles in peer-reviewed journals which thoroughly examined and compared on the basis of study design, outcomes, and results.

Results: The effect of vitamin D on angiogenesis was first reported in 1990. Evidence from current studies supports anti-angiogenesis and pro-angiogenesis effects of the 1, 25 $(OH)_2$ D_3 in several in *vivo* and *in vitro* studies. Results from recent studies implies that different effects of 1, 25 $(OH)_2$ D_3 on angiogenesis depends on the cellular types, cellular condition and type of chemokines released from the tissue. In cells with excessive angiogenesis, vitamin D addition results in decreased angiogenesis through reducing the activation, proliferation, migration, germination of endothelial cells whereas in the absence of vascular injury, vitamin D increases hypoxia-inducible factor 1-α (HIF1-α) and promoted Stromal

Cell–Derived Factor 1 (SDF1) expression subsequently mediated vascular repair.

Conclusion: Current literature suggests that Vitamin D has anti-angiogenic and pro- angiogenic effects. There is currently insufficient evidence about main and direct effect of vitamin D on angiogenesis. Further studies are needed to investigate the dominant role and different doses of vitamin D on Angiogenesis.