Section: BASIC EXPERIMENTAL
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Oral Vitamin D supplementation in animals as prevention of structural changes in experimental Peyronie's Disease

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INTRODUCTION: Despite the diversity of proposed treatments, the underlying molecular mechanisms of fibrosis and potential modulatory therapies for Peyronie's Disease (PD) remain uncertain. Recent evidence suggests that vitamin D (vitD) plays a crucial regulatory role in extracellular matrix remodeling, inflammation, and fibrosis, offering a promising therapeutic pathway for this pathology. Therefore, this study aimed to evaluate the effects of oral vitD supplementation on structural changes in an experimental model of PD. **METHODS**: Thirty-six male Wistar rats were divided into three groups: control (G1), induced PD with placebo (G2), and induced PD with oral vitD supplementation (G3). PD was induced by autologous plasma injection into the tunica albuginea (TA), according to a validated model. VitD was administered orally for 4 or 9 weeks, corresponding to the acute and chronic phases, respectively. Types I and III collagen were quantified by Picrosirius Red staining, while vitamin D receptor (VDR) expression was evaluated by immunohistochemistry. **RESULTS**: There was no difference in VDR expression among groups in the acute and chronic phases ($p=0.4\pm0.07$), as assessed by the mean H-score and the percentage of stained area. In the acute phase, G2 showed lower type III collagen production than G1 and G3 ($p=0.015\pm0.008$), with no distinction in the chronic phase ($p=0.45$). Type I collagen remained stable in both periods ($p<0.5$). Fibrosis was significantly higher in the PD groups ($p<0.01$), with no variation between the phases of the same group. **DISCUSSION**: In the acute phase, G2 exhibited a higher type I/III collagen ratio than G3, suggesting a more fibrotic TA pattern. The stability in VDR expression indicates that the observed histological effects do not result from receptor density, but possibly from changes in downstream signaling or systemic vitamin D status. **CONCLUSION**: In this PD model, vitD did not attenuate tissue fibrosis. However, it influenced the early remodeling of the extracellular matrix in the acute phase, as evidenced by the modulation of the ratio between collagen subtypes.

KEYWORDS: Peyronie's Disease; Experimental model; Vitamin D; Histopathological analysis.

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