The histopathologic evaluation of soft tissue changes in rabbit extremity after different dose-fractionation schemes of interstitial high dose rate (HDR) brachytherapy
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A B S T R A C T
Background: The use of HDR in the treatment of soft tissue sarcoma had been on the rise. However, there was limited study to evaluate the effect of different fractionation schemes on soft tissue and the optimal HDR scheme.
Aims: We aimed to assess the histopathologic changes on soft tissue after different HDR brachytherapy doses.
Methods: The subjects were divided into three groups. Each group included 10 limbs. Group A had only an applicator without radiation, group B received a total of 24 Gy at 6 Gy per fraction, twice a day, and group C received a total of 13.5 Gy in a single fraction. The histopathologic findings were grouped into soft tissue pathology-1 (edema, inflammation, endothelial proliferation, necrosis) and soft tissue pathology-2 (atrophy, calcification, vascular hyalinization, fibrosis) (STP-1–2).
Results: The highest mean grade values of STP-1 and STP-2 were observed in group C (0.95 and 1.45) in comparison to group A (0.45 and 0.85) and group B (0.65 and 0.9). The difference in STP-1 was found significant only between groups A and C and the difference in STP-2 was found both between groups A and C and groups B and C.
Conclusion: In our experimental study it was shown that the fractionated interstitial HDR had both lower rate and severity of toxicity in comparison to a single high dose fraction. Before using a single fractionated regimen in the clinic, the increased morbidity related to the irreversible early toxicities or progressive late toxicities should be kept in mind.
Keywords: Interstitial HDR brachytherapy, Dose and fractionation, Soft tissue