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The effects of cannabinoids on glioblastoma growth: A systematic review with meta-analysis of animal model studies

Ângelo Luís [a, b], Helena Marcelino [a, c], Carolina Rosa [a], Fernanda Domingues [a, c], Luísa Pereira [b, d], José Francisco Cascalheira [a, c]

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Abstract

Glioblastoma multiforme (GBM) is the most frequent and aggressive malignant brain tumour, with a poor prognosis despite available surgical and radio-chemotherapy, rising the necessity for searching alternative therapies. Several preclinical studies evaluating the efficacy of cannabinoids in animal models of GBM have been described, but the diversity of experimental conditions and of outcomes hindered definitive conclusions about cannabinoids efficacy.

A search in different databases (Pubmed, Web of Science, Scopus and SciELO) was conducted during June 2019 to systematically identify publications evaluating the effects of cannabinoids in murine xenografts models of GBM. The tumour volume and number of animals were extracted, and a random effects meta-analysis of these results was performed to estimate the efficacy of cannabinoids. The impact of different experimental factors and publication bias on the efficacy of cannabinoids was also assessed.

Nine publications, which satisfied the inclusion criteria, were identified and subdivided in 22 studies involving 301 animals. Overall, cannabinoid therapy reduced the fold of increase in

tumour volume in animal models of GBM, when compared with untreated controls. The overall weighted standardized difference in means (WSDM) for the effect of cannabinoids was -1.399 (95% CI: -1.900 to -0.898; P-value<0.0001). Furthermore, treatment efficacy was observed for different types of cannabinoids, alone or in combination, and for different treatment durations. Cannabinoid therapy was still effective after correcting for publication bias.

The results indicate that cannabinoids reduce the tumour growth in animal models of GBM, even after accounting for publication bias.

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Keywords

Cannabinoids; Glioblastoma multiforme; Animal model studies; Systematic review; Meta-Analysis

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