

Anticancer Effect of Doxorubicin Using Injectable Hydrogel

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Abstract : Introduction: Among the many anticancer drugs used clinically, doxorubicin (Dox), was one of widely used drugs to treat many types of solid tumors such as liver, colon, breast, or lung. Intratumoral injection of chemotherapeutic agents is a potentially more effective alternative to systemic administration because direct delivery of the anticancer drug to the target may improve both the stability and efficacy of anticancer drugs. Injectable in situ-forming gels have attracted considerable attention because they can achieve site specific drug delivery, long term action periods, and improved patient compliance. Objective: Objective of present study is to confirm clinical benefit of intratumoral chemotherapy using injectable in situ-forming poly(ethylene glycol)-b-polycaprolactone diblock copolymer (MP) and Dox with increase in efficacy and reducing the toxicity in patients with cancer diseases. Methods and methodology: We prepared biodegradable MP hydrogel and measured viscosity for the evaluation of thermo-sensitive property. In vivo antitumor activity was performed with normal saline, MP only, single free Dox, repeat free Dox, and Dox-loaded MP gel. The remaining amount of Dox drug was measured using HPLC after the mouse was sacrificed. For cytotoxicity studies WST-1 assay was performed. Histological analysis was done with H&E and TUNEL processes respectively. Results: The works in this experiment showed that Dox-loaded MP have biodegradable drug depot property. Dox-loaded MP gels showed remarkable in vitro cytotoxicity activities against cancer cells. Finally, this work indicates that injection of Dox-loaded MP allowed Dox to act effectively in the tumor and induced long-lasting suppression of tumor growth. Conclusion: This work has examined the potential clinical utility of intratumorally injected Dox-loaded MP gel, which shows significant effect of higher local Dox retention compared with systemically administered Dox.

Keywords : injectable in-situ forming hydrogel, anticancer, doxorubicin, intratumoral injection

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