Poly(2-hydroxyethyl methacrylate) wound dressing containing ciprofloxacin and its drug release studies

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摘要

Abstract

An improved wound dressing with a long-term drug diffusion-efficacy has been developed by UV-radiation technique. It involves incorporation of ciprofloxacin (CIP), at the concentration of 0.5–2.0% (w/v), into a water mixture of 2-hydroxymethacrylate (HEMA) monomer, benzoin isobutyl ether (BIE) initiator and different content of ethylene glycol dimethacrylate (EGDMA) cross-linker. Increasing the concentration of EGDMA would reduce the releasing ratio of CIP from pHEMA. T1/2 is increased from 2.64 to 45.67 h when the EGDMA is added from 1 to 8%. In the ranges of , the n value of 1%CIP-pHEMA membranes is increased from 0.48 to 0.81. It indicates that the mechanism of drug release falls between the Fickian and Case II diffusion model. The antibacterial activity of the drug impregnated into the membrane was evaluated by in vitro drug kinetic agar plate method. Higher concentration of EGDMA, up to 8% of the cross-linker, extends the drug release. Comparison with the drug-soaked membranes, the newly synthesized 1% CIP-pHEMA membrane (cross-linked with 4% EGDMA) sustains the release of the entrapped drug and maintains the antibacterial activity up to 12 days.

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