

DISTRIBUTED MODELING OF OSMOTIC FLUID FLOW DURING SINGLE EXCHANGE WITH HYPERTONIC GLUCOSE SOLUTION

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Abstract

The aim of the study was to model fluid and solute peritoneal transport inside the tissue together with the kinetics in peritoneal cavity during single exchange with hypertonic glucose 3.86% solution. The distributed model of osmotic flow and glucose transport was formulated and applied for computer simulations assuming 1 cm width of tissue layer. The simulated kinetics of intraperitoneal volume and glucose concentration were in good agreement with clinical data. The predicted intratissue profiles of glucose concentration and hydrostatic pressure of the interstitial fluid demonstrated a restricted penetration of glucose (0.1 cm) and water (0.25 cm) into the interstitium at the end of dwell time, in agreement with animal data. The proposed model was able to describe correctly the basic kinetics of peritoneal dialysis as investigated in clinical studies and intratissue profiles known from animal studies.

Keywords: peritoneal dialysis, distributed model, osmotic flow