Formalin fixation alters water diffusion coefficient magnitude but not

許重義
Sun SW;Neil JJ;Liang HF;He YY;Schmidt RE;Hsu CY;Song SK.

Abstract

This study was designed to determine whether formalin fixation alters diffusion parameters in the infarcted brain. Diffusion tensor images were obtained from anesthetized mice 1 hr after middle cerebral artery occlusion and repeated after formalin fixation of brains. In live animals, there was a significant decrease in the trace of the diffusion tensor (Tr(D)) in infarcted cortex and external capsule compared with contralateral brain areas, with no change in relative anisotropy (RA). After formalin fixation, Tr(D) was reduced 30-80%. However, the Tr(D) differential present in vivo between injured and healthy tissues was lost, with Tr(D) reduced to similar values in all tissues except for the edge of the cortical infarction, where it was lower than in surrounding tissues. RA values were unchanged after fixation. This study supports the preservation of diffusion anisotropy for both healthy and injured white matter in fixed mouse brain. However, the sensitivity of water diffusion in detecting tissue injury in vivo is not preserved in fixed tissues.