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Titel des Beitrags: Indocyanine green-enhanced imaging of antigen-induced arthritis with an integrated optical imaging/radiography system.

Abstract: OBJECTIVE: To evaluate a combined indocyanine green-enhanced optical imaging/radiography system for the detection of arthritic joints in a rat model of antigen-induced arthritis. METHODS: Arthritis of the knee and ankle joints was induced in 6 Harlan rats, using peptidoglycan-polysaccharide polymers. Three rats served as untreated controls. Optical imaging of the knee and ankle joints was done with an integrated optical imaging/radiography system before and up to 24 hours following intravenous injection of 10 mg/kg indocyanine green. The fluorescence signal intensities of arthritic and normal joints were compared for significant differences, using generalized estimating equation models. Specimens of knee and ankle joints were further processed and evaluated by histology. RESULTS: Immediately after administration, indocyanine green provided a significant increase in the fluorescence signal of arthritic joints compared with baseline values (P< 0.05). The fluorescence signal of arthritic joints was significantly higher compared with that of nonarthritic control joints at 1-720 minutes after intravenous injection (P< 0.05). Fusion of indocyanine green-enhanced optical imaging and radiography allowed for anatomic coregistration of the inflamed tissue with the associated joint.
Hematoxylin and eosin staining confirmed marked synovial inflammation of arthritic joints and the absence of inflammation in control joints. CONCLUSION: Indocyanine green-enhanced optical imaging is a clinically applicable tool for detection of arthritic tissue. Using relatively high doses of indocyanine green, long-term enhanced fluorescence of arthritic joints can be achieved. This may facilitate simultaneous evaluations of multiple joints in a clinical setting. Fusion of indocyanine green-enhanced optical imaging scans with radiography increases anatomic resolution.