

GRADING OF CHRONIC SYNOVITIS - PROPOSAL FOR A HISTOPATHOLOGICAL GRADING SYSTEM

A score evaluating the degree of inflammatory alterations in synovial tissue in its basic histopathologic features ("synovitis score") is missing. We therefore propose a simple classification system for the degree of inflammation, which is based on morphological evaluation of routine stained tissue sections excluding tumorlike alterations of the synovial tissue, severe cases of detritic synovitis and crystal induced synovitis (calcium pyrophosphate arthropathy and gout). In this histopathological scoring systems the following parameters are included: Hyperplasia / enlargement of synovial lining (intima), activation of fibroblastic cells (pannus formation) and degree of inflammatory infiltration. All parameters are graded from 0 (absent), 1 (slight), 2 (moderate) to 3 (strong positive) and are defined as following:

Hyperplasia/enlargement of synovial lining: *Slight enlargement (1):* The synovial intima is slightly enlarged (two to three cell layers thick; image **a**). *Moderate enlargement (2):* The synovial intima is moderately enlarged (four to five cell layers thick, image **b**). *Strong enlargement (3):* The synovial intima is strongly enlarged (six and more cell layers thick, image **c**).

Activation of fibroblasts / pannus formation: *Slight fibroblastic activation (1):* The subsynovial region exhibits a slight cellularity with chronic edema, slight fibrosis and slight activation of fibroblasts (image **d**). *Moderate activation (2):* There is a moderate cellularity of the subsynovial region with activated fibroblast regions with chronic granulations as well giant cells may be observed (image **e**). *Strong activation (3):* The subsynovial region exhibits a high cellularity (image **f**), giant cells are abundant, granulomas and hemigranulomas may be present.

Inflammatory infiltration: *Slight inflammatory infiltration (1):* The degree of inflammatory infiltration is low exhibiting a diffuse pattern of single cells or a focal accumulation in the perivascular region of plasma cells and lymphocytes (image **g**). *Moderate inflammatory infiltration (2):* The degree of infiltration is moderate with small lymphatic aggregates near to blood vessels and in the subsynovial region (image **h**). *Strong inflammatory infiltration (3):*

The inflammatory infiltrate consists of lymphatic follicles with the occurrence of germinal centres (image i) or shows a confluent inflammatory infiltration.

This evaluation is carried out in paraffin sections, treated by standard methods and stained with HE and/or GIEMSA. In order to exclude a crystal induced synovitis, polariscopy is performed with an interposed polarizer and a compensator. Hence synovitis is known to be heterogenous the *predominating character* of the inflammatory alteration should be defined and grading should be carried out at this site as an “average area” scoring system. The values of all parameters are added, ranging from 0 to 9: 0-1 no synovitis, 2-3 slight synovitis = inflammatory grade (IG) 1, 4-6 moderate synovitis = IG2 and 7-9 strong synovitis = IG3.

This histopathological inflammatory score may help to use synovial tissue especially of degenerative and autoimmune joint diseases for genomic analyses under standardized conditions and could give a basic, diagnostic information concerning the inflammatory character and the degree of inflammation in synovial tissue.