Proliferation of the synovial lining cell layer in suggested metal hypersensitivity

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Synovial tissues in joints with prostheses display characteristic morphological changes in cases with aseptic failure, particularly macrophage infiltration. Since proliferation of the synovial lining cell layer represents a feature characteristic of autoimmune joint diseases, the possibility of morphological changes of the synovial lining cell layer in periprosthetic tissues was investigated. Synovial biopsies from five groups of morphologically well-defined lesions (osteoarthritis, rheumatoid arthritis, aseptic loosened metal-on-polyethylene and metal-on-metal arthroplasty and suggested metal hypersensitivity) were compared using a conventional staining method and immunohistochemistry. The synovial lining cell layer was substantially enlarged in both rheumatoid arthritis and cases suggestive of metal hypersensitivity. Macrophage infiltrates were apparent in rheumatoid arthritis and all specimens from retrieved hip arthroplasties. Although both synovial and subsynovial macrophages were positive for CD163 (indicating synovial M2 macrophages), the remaining fibroblast-like synoviocytes and scattered stromal fibroblasts showed a positive reaction with the D2-40 antibody (indicating fibroblast-like synoviocytes). Furthermore, in contrast to CD163-positive macrophages, the enlarged D2-40-positive fibroblast-like synoviocytes displayed cytoplasmatic tubular projections. Proliferation of the periprosthetic synovial lining cell layer occurred in cases with unexplained groin pain following metal-on-metal hip resurfacing arthroplasty, suggestive of hypersensitivity. Despite some important study limitations, the present observation adds to the evidence that metal hypersensitivity shares characteristic morphological features with autoimmune diseases of the joints.