

Microstructural comparative analysis of calcification patterns in calciphylaxis versus arteriolosclerotic ulcer of Martorell

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Abstract

Background: Calciphylaxis and the arteriolosclerotic ulcer of Martorell (ASUM) represent two entities of cutaneous calcific arteriopathies. Their differential diagnosis can be challenging, given similarities in their clinical and histological presentation. Calcification patterns have been proposed as a possible discriminative histological criterion, however, a systematic microstructural comparative analysis is lacking.

Objectives: The study aimed at a systematic comparative microstructural analysis of the calcification patterns in calciphylaxis versus ASUM.

Materials & methods: Skin biopsies of patients with leg ulcers due to calciphylaxis (20) and ASUM (69) diagnosed at three European wound care centres (Vienna, Bern, Zurich) were included. The extent of calcification, arteriolar calcification pattern and presence of extra-arteriolar calcification were assessed.

Results: All calciphylaxis and most ASUM patients (77%) presented with arteriolar calcification. Although the mean number of calcified vessels and the proportion of calcified area were significantly higher in calciphylaxis specimens ($p = 0.003$ and $p = 0.0171$), there was no significant difference in the pattern of arteriolar calcification ($p = 0.177$). Interestingly, extra-arteriolar calcification was detected in the majority of both calciphylaxis (93.3%) and ASUM samples (85.2%, $p = 0.639$). Notably, Alizarin Red S staining was superior to H&E for the detection of calcifications of both entities ($p = 0.014$ and $p < 0.0001$), and to von Kossa staining for ASUM samples ($p = 0.0001$). However, no differences could be observed between cases with uraemic and non-uraemic calciphylaxis or ulcerations located on the upper and lower leg.

Conclusion: Our results indicate that extra-arteriolar calcification is not only present in calciphylaxis, but can also be detected in ASUM suggesting a lack of specificity for this finding. However, more specific calcification stains, such as Alizarin Red S, should be used in suspected cases, as calcifications may be overlooked using conventional H&E staining.

Keywords: arteriopathy; arteriolosclerosis; calciphylaxis; leg ulcer; vascular calcification.