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Can Tissue Elemental Analysis be Used to Differentiate Sarcoidosis and Tuberculous Lymphadenitis?

Ömer Araz[1], Aslı Araz[2], Elif Yılmazel Uçar[1], Fatma Akdemir[2], Elif Demirci[3], Yener Yılmaz[4], Bugra Kerget[1], Metin Akgün[1]

[1]Department of Pulmonary Diseases, Atatürk University School of Medicine, Erzurum, Turkey
[2]Department of Physics, Atatürk University School of Medicine, Erzurum, Turkey
[3]Department of Pathology, Atatürk University School of Medicine, Erzurum, Turkey
[4]Department of Thoracic Surgery, Atatürk University School of Medicine, Erzurum, Turkey

Objectives: Sarcoidosis and tuberculous lymphadenitis are granulomatous inflammatory diseases. Differentiating lymph node involvement in these two diseases can be challenging. This study evaluated whether elemental analysis of tissue samples could facilitate the differentiation of these histopathologically and clinically similar diseases.

Methods: A total of 152 tissue samples were included: 57 caseating granulomatous inflammation, 58 non-caseating granulomatous inflammation, and 37 reactive lymph node specimens. The tissue samples were analyzed for Ca, Mg, Fe, Cu, Zn, Cr, Mo, Ni, and Se with inductively coupled plasma-optical emission spectroscopy (ICP-OES).

Results: Comparison of element levels in the three groups revealed that caseating granulomatous inflammation had higher calcium content (662.6±4.6 ppm, $p<0.000$) and lower iron content (48.7±83 ppm, $p<0.000$) compared to non-caseating granulomatous inflammation. Compared to reactive lymph tissue, caseating granulomatous inflammation had higher calcium and lower iron and magnesium content while non-caseating granulomatous inflammation had higher levels of iron and lower magnesium; however, these differences were not statistically significant. In caseating granulomatous inflammation, a calcium cut-off value of 207 ppm yielded 85% specificity and 63% sensitivity. For iron, a cut-off value of 51 ppm had 74% specificity and 58% sensitivity.

Conclusion: High calcium and low iron levels in lymph tissue may be suggestive of caseating granulomatous inflammation and tuberculosis. In cases where differentiating between sarcoidosis and tuberculous lymphadenitis is difficult, performing tissue elemental analysis may provide additional supportive evidence for differential diagnosis.

Keywords: Sarcoidosis, tuberculosis, element, calcium, iron