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Radicular cyst with deposition of brown particles: Hemosiderin or metal particles?



KEYWORDS

Amalgam particle;
Endodontic sealer
particle;
Polarized light
microscopy;
Radicular cyst

Brown particles are relatively frequently found in the tissues of periapical lesions.¹ In this study, we used polarized light microscopy to study the brown particles deposited in a radicular cyst.

A 43-year-old female patient came to our clinic for treatment of pain and pus discharge at the periapical area of tooth 22 for 5 weeks. Periapical radiography showed a well-defined radiolucent lesion of 5 × 7 mm with some radiopaque materials deposited in the periapical area of tooth 22. The patient had an endodontic retreatment two weeks ago, but the pain and pus discharge did not subside. The clinical diagnosis was a radicular cyst with extruded endodontic sealer materials deposited in the periapical lesion. After discussing with the patient and obtaining the signed informed consent, we decided to perform the periapical surgery. Thus, the periapical lesion was removed under the local anesthesia. During the operation, some brown endodontic sealer particles were found by the operator. Histopathological examination of the enucleated soft tissue specimen showed a radicular cyst lined by stratified squamous epithelium. A lot of cholesterol clefts and a moderate lymphoplasmic cell infiltrate were discovered in the fibrous cystic wall. In addition, depositions of small brown particles were found in the cystic lumen and in some areas of the fibrous cystic walls (Fig. 1A, B, C and D).

By polarized light microscopy, the brown particles showed birefringence and the collagen bundles also exhibited thin band birefringence with marked cross striations (Fig. 1E and F). Because the periapical radiography showed overfilling of endodontic sealers and the clinician observed some brown endodontic sealer particles during the periapical surgery, the brown particles were finally confirmed as endodontic sealer particles.

Brown particles in the periapical lesions could be either endogenous hemosiderin particles or exogenous foreign metal particles (such as amalgam particles or extruded endodontic sealers).^{2,3} Hemosiderin deposits are usually associated with chronic bleeding in the periapical lesions, and they appear as granular golden brown particles in the macrophage cytoplasm.² These hemosiderin particles stain dark blue in the Prussian blue reaction, but they are non-reactive by polarized light microscopy.^{4,5} Exogenous foreign metal particles (such as amalgam particles or extruded endodontic sealers) are less frequently discovered in the periapical lesions. If the clinicians describe that retrograde amalgam filling have been performed before or the root canal of the treated tooth is overfilled with extruded filling materials noted on the periapical radiographs, then it may be easier to identify the exogenous foreign metal particles in the periapical tissues. The metal particles like amalgam or other metal particles contained in the endodontic sealers show birefringence by polarized light microscopy and this may help the oral pathologists to

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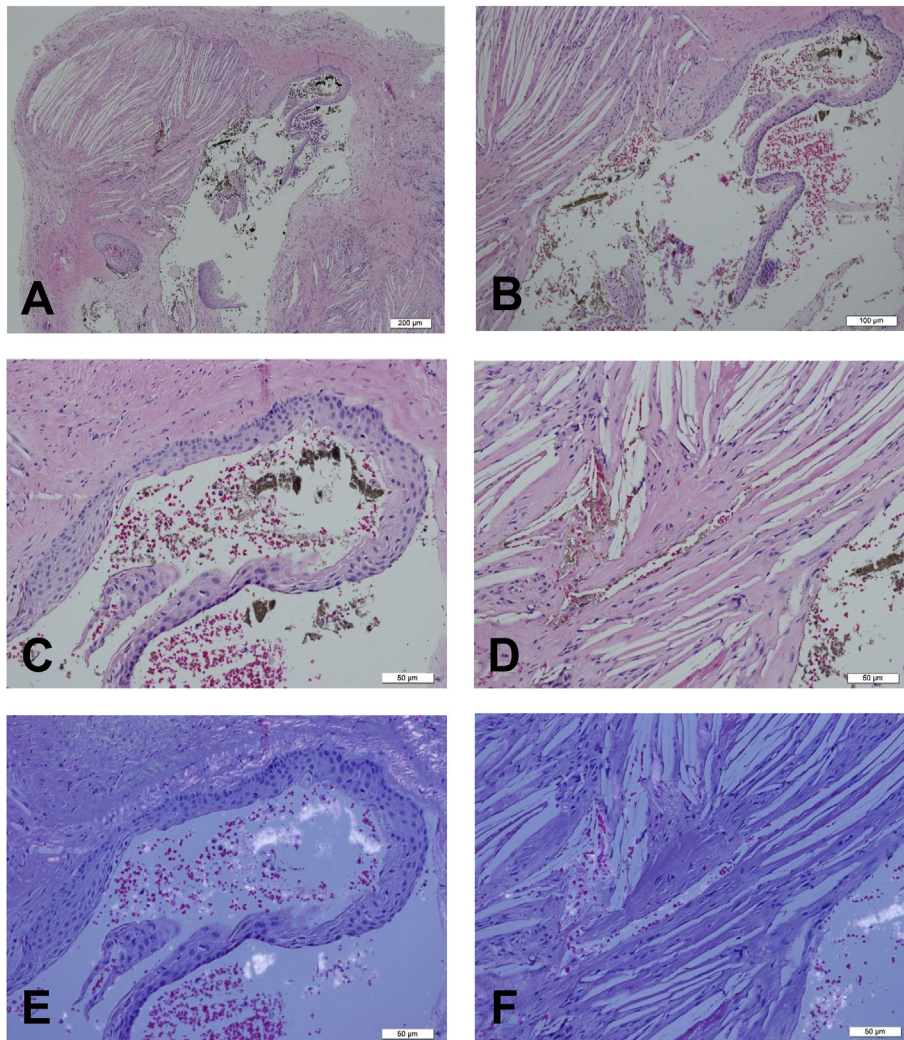


Figure 1 Hematoxylin and eosin-stained histological sections of our radicular cyst studied by conventional (white light) and polarized light microscopies. (A, B, C and D) Low-, medium-, and high-power microphotographs exhibiting a radicular cyst lined by stratified squamous epithelium. A lot of cholesterol clefts and a moderate lymphoplasmic cell infiltrate were discovered in the fibrous cystic wall. In addition, depositions of small brown particles were found in the cystic lumen and in some areas of the fibrous cystic walls. (E and F) By polarized light microscopy, the brown particles showed birefringence and the collagen bundles also exhibited thin band birefringence with marked cross striations (Hematoxylin and eosin stain; original magnification; A, 4 \times ; B, 10 \times ; C, D, E, and F, 20 \times).

confirm the origin of the exogenous foreign metal particles.^{4,5} However, the polarized light microscopy cannot distinguish amalgam particles from other metal particles contained in the endodontic sealers. In contrast, the energy dispersive X-ray analysis can be used to identify the exact metal elements contained in the foreign particles.^{4,5} By energy dispersive X-ray analysis, the black/brownish fragments and yellow/brown granules containing Au, Ag, Cu, Hg, Sn and Zn are compatible with amalgam, and the

fine black/brown/yellow granules containing Ag, Ba, Bi, Cu, S, Ti and Zn are compatible with endodontic sealer components.^{4,5}

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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