Case 421

1. Cholesteatoma

【Progress】

He was under way of watchful observation. If soft tissue mass in the middle ear, enlarged, he would be given surgical service.

【Discussion】

Keratin is produced from amino acids containing many cystines with S-S linkages that are capable of being water-insoluble. Keratin is used to make cellular micro-organ murals such as nucleus membrane, Golgi bodies and mitochondria. Probably, keratin is essential to cell birth that might be the first protein for life emergency. Actually, skin surface is almost covered with keratin protein. Keratin is divided into two types: soft keratin and hard keratin. The representatives of hard keratin are nail, hair, corn and beak, while those of soft keratin are skin and tongues.

The lesions full of keratin are listed: epidermoid cyst, epidermal cyst, lymphoepithelial tumor, and cholesteatoma. These lesions interrupt diffusion of water molecules accompanied with fresh infarction, abscess, indicative of high signal intensity on MRI Diffusion WI with lowering ADC values (1-5). Based on our experiences, ADC values of pure keratin are around 0.6 but possibly vary dependent on density proportion of Keratin. The CT values of pure keratin are around zero, the same as those of water 0 or greater dependent on density proportions of keratin.

The usefulness of differentiation epidermoid cyst from arachnoid cyst is clearly possible on MRI with Diffusion WI & ADC values although both lesions with epidermoid cyst and arachnoid cyst are the similar cystic lesion whose CT values are almost same, around zero, but epidermoid cyst is depicted high signal intensity on Diffusion WI whose CT values are less than 1.0 while arachnoid cyst is depicted low signal intensity whose CT values are more than 2.0 (1-3). The usefulness of differentiation of pancreas cancer from lymphoepithelial tumors is also clear. Although they depict high signal intensity on Diffusion WI and low attenuation on CT, ADC values of pancreas cancer are 0.9 to less than 1.3, while those of pancreas lymphoepithelial tumors are less than 0.9 (4). The usefulness of differentiating epidermal cyst from other skin tumors are also clear although most skin tumors including epidermal cyst are soft tissue attenuation on CT, ADC values of epidermal cysts are lower, 0.9 or less, while those of benign skin tumors are 1.2 or greater and those of malignant skin tumors are 0.9-1.2 (5).

Further, the usefulness of differentiating Cholesteatoma from inflammatory granuloma or otitis media is clearly possible although both possess the soft tissue attenuation on CT, ADC values of cholesteatoma are less than 0.8 and those of otitis media granuloma are 1.2 or greater (6-11). Cholesteatoma does not contain cholesterol but keratin, its configuration is similar with jewelry, pearl. Cholesteatoma is reported to be formed by that persistent negative pressure from auditory canal injures, inducing proliferation of desquamative squamous cells that contain much keratin protein inside auditory membrane, namely in the middle ear (12).

【Summary】

We presented a seventy-one-year-old male with otitis media, discharge once a month. Soft tissue attenuation nodules in left upper, middle, lower auditory cavities, compatible with cholesteatoma. It is borne in mind that cholesteatoma do not contain cholesterol but keratin that can be useful to differentiate from inflammatory granuloma of otitis media because keratin induces disorder of water molecules diffusion that be depicted high signals on Diffusion WI with lowering ADC values of less than 0.9, while those of otitis media, 1.2 or greater. Cholesteatoma, epidermoid cyst, epidermal cyst, and pancreas lymphoepithelial tumors contain keratin, implying those lesions are depicted as high signal intensity on Diffusion MRI associated with low ADC values of 0.9 or less.

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2026.1.30