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Cysts of the ligamentum flavum are often linked to ischemic conditions: A morphological study Ayano Matsunaga¹ | Mariko Saito² | Kaya Ijiri² | Motohiro Tsuchiya¹ | Akimasa Yasuda³ | Kazuya Kitamura⁴ | Sho Ogata^{1,2} | Kazuhiro Chiba⁴ | Susumu Matsukuma¹,
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「黄色靭帯嚢胞 (cysts-LF)」とは、黄色靭帯に生じる非腫瘍性の嚢胞性病変の総称である。本研究では、黄色靭帯嚢胞を変性黄色靭帯を含む脊髄嚢胞と定義し、「黄色靭帯嚢胞の病理組織学的特徴と病態について検討した。

過去の症例から、手術で摘出された 18 例の黄色靭帯嚢胞について解析した。症例の内訳は男性 13 人、女性 5 人；年齢中央値 68.5、42-86 歳。黄色靭帯嚢胞壁内の黄色靭帯成分の弾性線維は分離および／または断裂しており、嚢胞壁には軟骨化、軟骨異形成 (17 例)、粘液様変化 (13 例)、骨化 (11 例)、アミロイド沈着 (14 例) を伴っていた。またアミロイド沈着 (14 例)、ヘモシデロシス (6 例)、粒状/泥状石灰化 (4 例)、滑膜細胞ライニンゲ (3 例)、重度の炎症性浸潤 (1 例) を認めた。

これらの組織学的特徴は、過去に報告された黄色靭帯嚢胞と共通していた。

さらに 14 例の黄色靭帯嚢胞では血管狭窄／閉塞を示し、8 例では血管壁に硝子化が生じており、脂肪膜性脂肪壊死もみられ局所の循環不全の存在が示唆された。

黄色靭帯嚢胞の形成の原因の一つとして局所の循環不全が考えられ、これにより黄色靭帯の変性と嚢胞性変化が起こり、黄色靭帯嚢胞の形成の要因の一つとなることが推測された。

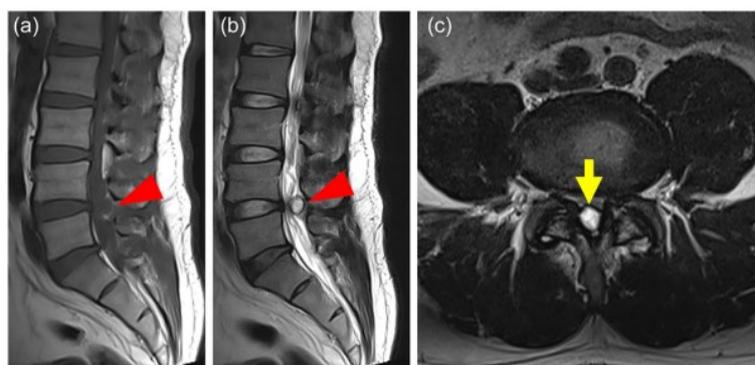


FIGURE 1 (a and b) Sagittal magnetic resonance (MR) images demonstrated a 10 mm extradural cystic lesion at L4/5 level (arrowheads). Images show T1-weighted hypointense signal (a) and T2-weighted hyperintense signal (b). (c) Axial T2-weighted MR image shows the cystic lesion (arrow) to be in the mid-posterior spinal canal, but to be not contiguous with the facet joints.

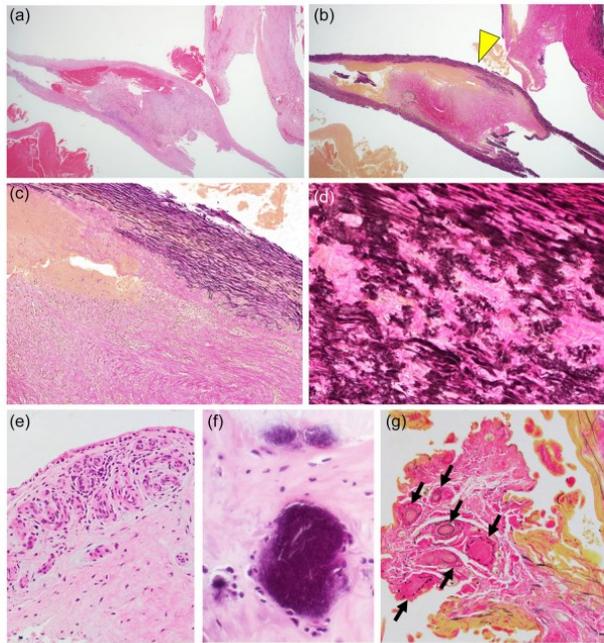


FIGURE 2 Histological findings of cysts of the ligamentum flavum (LF). (a–c) Fragmented specimen containing separated LF-related elastic fibers. Separated site exhibited replacement by granulation-fibrosis with hemorrhage (a, hematoxylin and eosin (H&E) stain; b, Elastica van Gieson (EVG) stain; and c, area indicated by arrowhead in (b), EVG stain). (d) Denatured or ruptured elastic fibers (EVG stain). (e) Cystic surface lined by synovial cells (H&E stain). (f) Granular/smudgy calcification in cyst wall (H&E stain). (g) Lambli's excrescences-like structures containing ring-like elastic fibers (arrows) in cystic spaces (EVG stain).

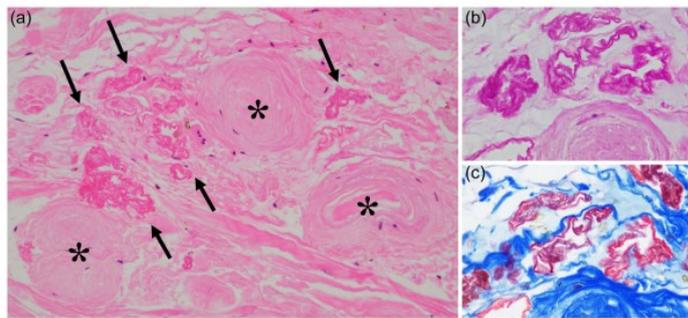


FIGURE 3 (a–c) Lipomembranous fat necrosis (LMFN) in the vicinity of hyalinized, thickened vessels (asterisks). LMFN showing typical eosinophilic, crenulated membranous features with hematoxylin and eosin (H&E) stain (a) and red staining with Masson trichrome stain (b) and periodic acid-Schiff (PAS) stain (c) (a, H&E stain; b, PAS stain; and c, Masson trichrome stain).

TABLE 1 Histopathological findings of 18 cysts of the LF.

Histopathological findings	n
Elastic fiber degeneration	18 (100%)
Chondroid metaplasia	17 (94%)
Stenotic/occlusive vascular changes	14 (78%)
Hyalinized changes of stenotic/occlusive vessels	8 (44%)
Amyloid deposits	14 (78%)
Myxoid changes	13 (72%)
Ossification	11 (61%)
Viable fat cells in the cyst wall	11 (61%)
Lipomembranous fat necrosis	8 (44%)
Hemosiderosis	6 (33%)
Granular/smudgy calcification	4 (22%)
Lamb's excrescences-like structures	3 (17%)
Synovial cell linings	3 (17%)

Abbreviation: LF, ligamentum flavum.

TABLE 2 Association of lipomembranous fat necrosis with other clinicopathological variables.

Clinicopathological variables	Lipomembranous fat necrosis + (n = 8)	Lipomembranous fat necrosis - (n = 10)	p^a
Age, <65/≥65	1/7	5/5	0.152
Sex, male/female	7/1	6/4	0.314
Location, cervical/lumbar and interlumbosacral regions	0/8	1/9	>0.99
Elastic fiber degeneration, +/-	8/0	10/0	>0.99
Chondroid metaplasia, +/-	8/0	9/1	>0.99
Vascular occlusive/stenotic changes, +/-	8/0	6/4	0.092
Hyalinized vascular, +/-	7/1	1/9	0.003*
Amyloid deposits, +/-	7/1	7/3	0.588
Myxoid changes, +/-	5/3	8/2	0.608
Ossification, +/-	7/1	4/6	0.066
Hemosiderosis, +/-	4/4	2/8	0.321
Granular/smudgy calcification, +/-	2/6	2/8	>0.99
Lamb's excrescences-like structures, +/-	2/6	1/9	0.559
Synovial cell linings, +/-	1/7	2/8	>0.99

^aComparison using Fisher exact test.

*Statistically significant with Bonferroni correction.