

Clinicopathological features of sclerosing angiomatoid nodular transformation of the spleen

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要旨

sclerosin angiomatoid nodular transformation (SANT)は従来過誤腫の一亜型として分類されていたが、2004年 Martel らにより過誤腫とは異なる独立した疾患単位として提唱された。良性疾患であるが、その病因についてはいまだ不明である。特徴的な臨床所見、画像所見に乏しいことに加え、その多様な組織像から診断困難な場合がある。本研究では、26例の SANT 症例の画像所見臨床病理学像、免疫組織学的特徴について検討した。症例の内訳は男性 15 例、女性 11 例、年齢分布は 23~62 才、平均年齢は 43 才であった。20 例は無症状であったが、6 例では腹部症状(腹痛、腹部膨満感)を認めた。画像上、単発性境界明瞭な結節がみられ、一部の症例では、spoke-wheel 様の構造を呈していた。術前、SANT が考慮された症例は 5 例であった。摘出された脾臓では、単発性の境界明瞭な腫瘤がみられ、腫瘤内には、線維性結合組織で境された亜赤色調の小結節が多数認められた。組織学的には、線維性結合組織で取り囲まれた結節は angiomatoid な構造がみられ、静脈洞様血管に加えて、毛細血管様、静脈様の血管より構成されていた。周囲非病変部脾臓に、出血を伴ううっ血や静脈洞の拡張を 23 例で認めた。また 3 例で血管腫を、1 例でリンパ管腫がみられた。免疫組織学的には、angiomatoid な構造内には CD31+CD34-CD8+, CD31+CD34+CD8-, CD31+CD34-CD8- の血管が識別された。線維性結合組織では出血やヘモジデリンが沈着しており、 $\alpha$ -SMA+ の線維芽細胞を認めた。術後の経過観察が可能であった 23 例(1-78 カ月)では、全例で再発、転移は認められなかった。SANT の病因は不明であるが、今回の検討からは、血管腫や、うっ血に伴う出血の器質化を契機として SANT が形成された可能性がある。

Take home message

SANT の病因についてはさらに検討が必要であるが、良性病変として認識することは、脾臓の腫瘍性疾患の鑑別診断に重要である。

担当 佐藤 孝

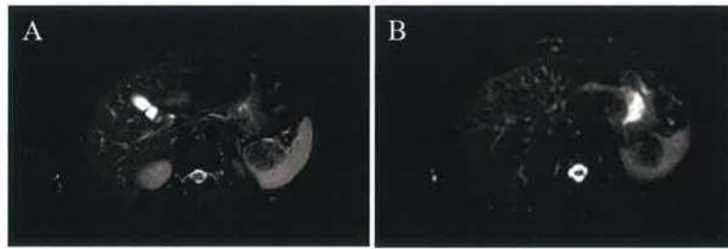
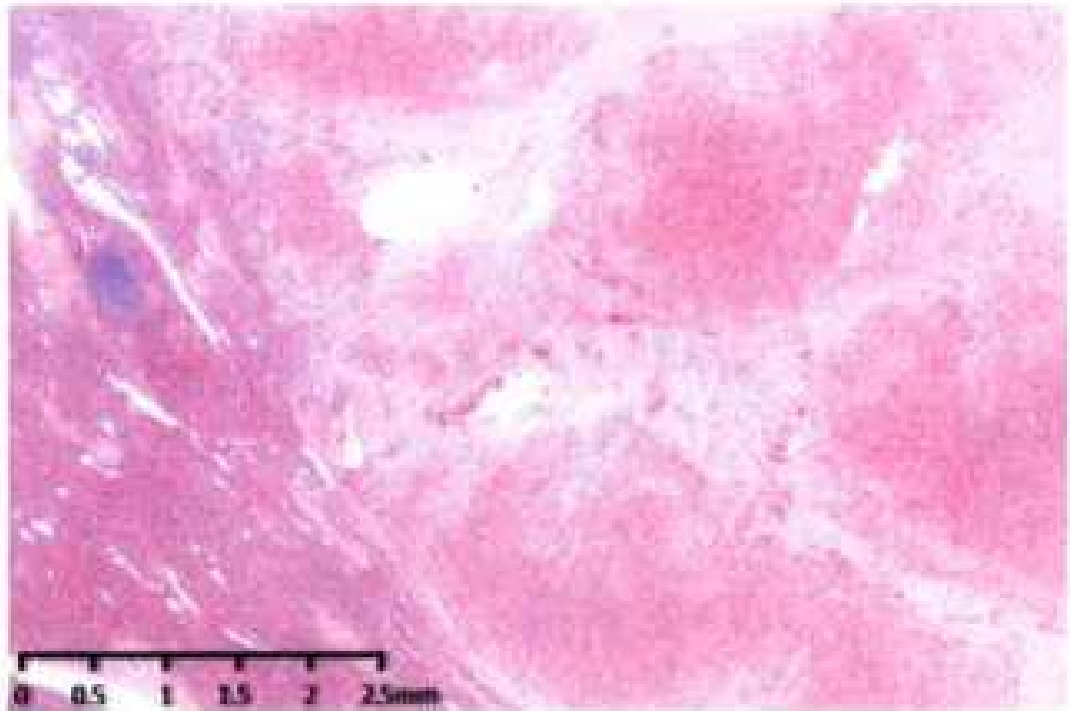


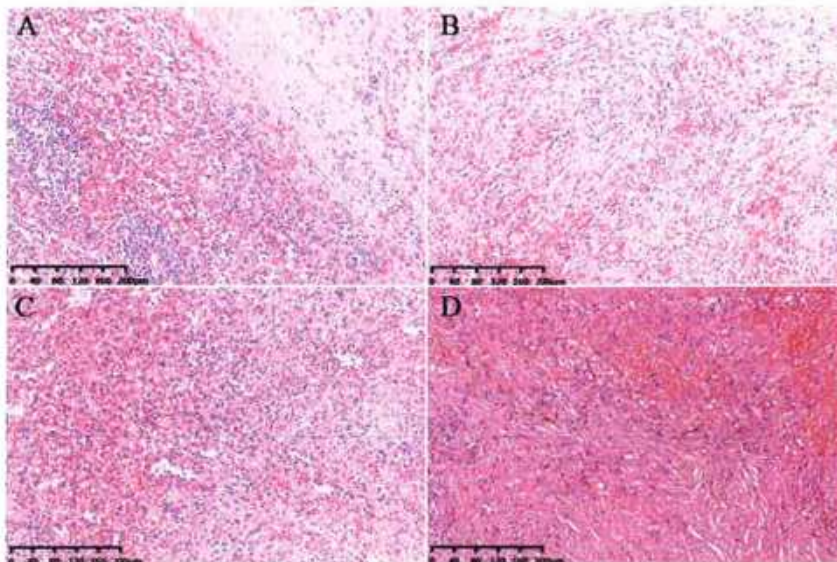
Fig. 1. Magnetic resonance imaging findings. A. Soft tissue mass with inadequate blood supply in the splenic parenchyma. B. The mass was slightly hypodense on diffusion-weighted imaging.



Fig. 2. The tumor was located in the splenic parenchyma and appeared as a well-demarcated lobulated mass. Hemorrhage was seen in the peripheral spleen.



**Fig. 3.** Low-power microscopy shows hyperplastic fibrous tissue enveloping hemangioma-like structures (10 $\times$ ).



**Fig. 4.** A. Splenic sinus-like blood vessels were slit-like, in which the lining cells were spillo-like and the cytoplasm was abundant. B. Capillary-like blood vessels had irregular lumens, and their lining cells were flat. C. Small vein-like blood vessels had blocked or crack-like lumens, and their dense lining cells were fat or flat. D. Stroma was interspersed with exudated red blood cells and fibroblasts, along with infiltration with lymphocytes, plasma cells, and hemosiderin-containing macrophages.

Table 1

Pathological features in each case.

Cases	Size (cm)	Morphological images under microscopy	Peripheral spleen
1	4.0 × 3.5 × 2.5	1; 2, 2a (many cleft-like sinusoids and a few were branch like), 2c; 3; 4, 4a (10-30 / HPF); 6 <sup>a</sup>	Peripheral splenic sinus congestion with hemorrhage; some areas showed hemangiomatous changes
2	3.5 × 3.0 × 2.0	1; 2, 2b (sinusoids are long and fissured), 2c; 3, 3a, 3b; 4 (fewer plasma cells), 4a; 5, 5a; 7a	Peripheral splenic sinus congestion with hemorrhage, splenic sinus dilatation, with more vessels. Lymphoproliferation in the white pulp of the spleen
3	4.0 × 3.7 × 3.5	1; 2, 2a; 2, 4, 4a; 5, 5a; 7b with hyalinization and abundant small vessels	The splenic sinusoids were dilated in the peripheral spleen and a few were markedly dilated with congestion.
4	9.0 × 8.5 × 6.5	1; 2, 2b (1/HPF); 3, 3a, 3b; 4, 4a; 5, 5a, 5b	Splenic sinus dilatation with congestion, a small amount of bleeding, slightly more blood vessels with dilatation, the vessel wall thickness was uneven, the sinusoid dilatation, some vessels were narrow and long.
5	5.0 × 5.0 × 4.5	1; 2, 2a, 2c, 2d; 3, 3a; 4, 4a; 5, 5a, 5b; 7a; 9a	The peripheral splenic sinusoids were congested and dilated, and a few were markedly dilated
6	6.5 × 6.0 × 5.0	1; 2, 2b (slightly longer fissured sinusoids); 3, 3a; 4, 4a; 5, 7a; 8	Peripheral splenic congestion with hemorrhage, vasodilation with congestion
7	6.0 × 5.0 × 5.0	1; 2; 3, 3a; 4, 4a; 7a, 7b, 7c; 9	Peripheral splenic congestion with scattered patchy hemorrhage, some sinusoids were markedly dilated.
8	7.5 × 5.5 × 5.0	1; 2, 2a; 3, 3b; 4, 4a; 5 (few), 5a; 6; 7a, 7b, 7c, few dilated sinusoids; 8	There was peripheral splenic sinus congestion with hemorrhage, and some splenic sinuses were significantly dilated.
9	5.5 × 4.5 × 4.5	1, more hemosiderin; 2, 2a, 2b, 2c, signet ring like CAP; 3; 4 (slightly more cells), 4a (20-80 cells / HPF); 9	Peripheral splenic sinus congestion with hemorrhage.
10	6.0 × 4.0 × 4.0	1; 2, 2a; 3; 4, 4a; 7a, a few dilated sinusoids; 8	Peripheral splenic sinuses were dilated, congested with hemorrhage, the sinusoids were dilated, a few were significantly dilated, and individual sinusoids were thrombosed.
11	5.0 × 5.0 × 3.0	1; 2, 2a, 2b; 3, 3a, 3b; 4, 4a; 7a, 7b; 8	Peripheral splenic sinus congestion with partial hemorrhage
12	4.0 × 3.5 × 3.0	1, there was more hemosiderin; 2, 2a; 3; 4, 4a; 9a	Peripheral splenic sinusoidal congestion with partial hemorrhage, and organized small nodule. Local hemangioma.
13	6.0 × 5.0 × 4.5	1; 2, 2a, 2d; 3, 3a; 4, 4a; 5, 5a; 7a; 9	Peripheral splenic congestion, some splenic sinusoids dilated, a few significantly dilated, small foci of hemorrhage. There are a few long, markedly dilated sinusoids around the trabeculae at the junction of the SANT lesion and normal spleen.
14	Not clear	1; 2, 2a, some nodule fusion; 3; 4	Not clear
15	30.0 × 30.0 × 20.0 cm	1, some were organized; 2, 2a; 3; 4, 4a, individual mast cell	There was partial congestion of the peripheral splenic sinuses with hemorrhage and

Table 1 (continued)

Cases	Size (cm)	Morphological images under microscopy	Peripheral spleen
16	Not clear	1; 2; 3; 4	dilated blood vessels. Some areas showed lymphangioma, nodularity, and dilatation of the splenic sinuses. White pulp hyperplasia.
17	7.5 × 6.8 × 6.5	1; 2, 2a, 2c; 3, 3a, 3b; 4, 4a, 4b; 7b with vitreous degeneration	Not clear The peripheral splenic sinus was congested, and the blood vessels were dilated and congested, with scattered small patchy hemorrhages.
18	3.0 × 3.0 × 1.5	1, 2, 2c; 3; 4, 4a, 4b	There was hemangioma, dilation of peripheral splenic sinuses with congestion, and local hemangioma like with hemorrhage.
19	4.0 × 3.3 × 3.7, 4.4 × 4.1 × 4.0(2 stoves)	1; 2, 2a; 3, 3a; 4, 4a, 4b	No peripheral tissue was seen
20	5.2 × 5.0 × 4.5	1; 2, 2a, 2d; 3, 3a; 4 (more plasma cells); 4a; 5, 5a; 7a, 7b (small vessels) with hyalinization; 9a with elongated sinusoids	Peripheral splenic tissue congestion, splenic sinusoids dilatation, splenic vessels dilatation and congestion, small patchy hemorrhages.
21	6.0 × 4.5 × 3.0	1; 2, 2a; 3, 3a, 3b; 4, 4a, 4b; 7b (small vessels)	There was peripheral splenic sinus congestion with scattered focal hemorrhages, blending from the splenic sinus at the junction with the lesion.
22	3.5 × 3.0 × 3.0	1; 2, 2a, 2d; 3, 3a; 4 (slightly more cells), 4a (slightly more cells); 7a, 7b (microvessels) with hyalinization of partial vessel walls	There was partial congestion around splenic sinus with scattered small foci of hemorrhages and increased trabeculation. Lymphoproliferation in the white pulp of the spleen
23	5.5 × 5.0 × 5.0	1, more hemosiderin; 2, 2a; 3, 3a; 4, 4a; 5, 7a, 7b; 9	There was congestion, focal hemorrhage and hemosiderosis in some of the surrounding splenic sinuses.
24	3.0 × 3.0 × 2.5	1; 2, 2a; 3; 4, 4a	Peripheral splenic tissue congestion, lymphoproliferation of local splenic white pulp
25	6.2 × 5.0 × 3.0	1; 2 (partial small nodes), 2a, 2b; 3, 3a; 4, 4a, 4b; 5 with more; 7a	Peripheral splenic congestion with hemorrhage
26	6.0 × 6.0 × 3.7	1; 2, 2a; 3, 3a; 4, 4a; 10	Peripheral splenic congestion with hemorrhage

\*1. There were fresh and old hemorrhages, which showed patchy and nodular hemorrhages with hemosiderin deposits, significant erythrocyte exudation, and a small amount of cellulose exudation.

2. Multinodular, abundant small sinusoids within the nodule, some nodules vary in size, 2a. a few dilated sinusoids within the nodule, 2b. a few long sinusoids. 2c. vascular endothelial cells hyperplasia. 2d. some nodules are concentric.

3. Perinodular fibrous tissue proliferation with fibroblastic proliferation. 3a. with hyalinization. 3b. focal loose edema.

4. A few lymphocytes and plasma cell infiltration. 4a. with a few eosinophils, 4b. with a few neutrophils.

5. Small concentric vessels within the fibrous tissue. 5a. with partial hyalinization. 5b. with thick wall.

6. A few dilated sinusoids within fibrous tissue.

7. Fibrous tissue showed: 7a. scattered pseudosinusoidal clefts; 7b. a few thick-walled vessels; 7c. a few large dilated vessels.

8. In close proximity to the tunica.

9. A small amount of remnant splenic tissue. 9a. A small amount of remnant narrow and long (line like) splenic tissue partition.

10. Focal calcification.

<sup>a</sup>The information of consulted case in our hospital was incomplete.

Table 2

Clinical manifestations and coexistent diseases in each case.

Case	Gender	Age (yr)	Clinical manifestations	Coexistent diseases
1	Male	58	Left upper abdominal pain and discomfort; slightly lower red blood cell counts: $4.25 \times 10^{12}/L$ ; platelets: $730 \times 10^9$	A cyst in the left hepatic lobe; multiple cysts in the left kidney; double knee ligament reconstruction 3 years ago
2	Male	59	None; platelets: $316 \times 10^9/L$	Multiple cysts in the liver; mild fatty liver
3	Male	58	None	Multiple cavernous hemangiomas in the liver; glaucoma
4	Female	39	None; hemoglobin 100 g/L	Gonorrheal mastitis 4 years ago
5	Female	39	Found in hospital due to cervical cancer, with back discomfort after intermittent	Cervical cancer
6	Male	53	None	Liver cysts; multiple gallstones with cholesterol polyps; postoperative bilateral nodular goiter
7	Male	37	None	Mild fatty liver; small cyst in left kidney
8	Female	23	None	None
9	Male	23	None	Congenital absence of right kidney
10	Female	48	None; decreased hemoglobin 105 g/L	Multiple cavernous hemangiomas in the liver; uterine fibroids
11	Male	38	None	Hepatic hemangioma
12	Male	27	None	Small cysts in the right lobe of the liver
13	Male	57	Occasionally hidden dull periumbilical pain; mild high blood pressure	Chronic cholecystitis with gallbladder cholesterol polyps
14	Male	39	None	Pituitary adenoma; intestinal polyps (high grade)
15	Female	39	Abdominal distention; significantly decreased platelet count; recurrent nose bleeding for >2 months	Postoperative benign thyroid nodules
16	Female	62	None	Renal cysts
17	Female	38	Occasional left upper abdominal dull pain	Small liver cyst, left adrenal nodule, and accessory spleen
18	Male	54	Occasional nausea, slight acid reflux, and intermittent hiccups	CT reveals focal nodular hyperplasia of the liver or inflammatory pseudotumor; cysts in double kidneys
19	Male	36	None	None
20	Female	48	None	None
21	Male	44	None	Anal fistula; fatty liver; diabetes; hypertension level 2; urethral dilation 21 years ago; external hemorrhoidectomy 20 years ago
22	Female	51	None	Adrenocortical adenoma; chronic cholecystitis with gallbladder stones; diabetes
23	Male	50	Dull pain in the upper abdomen and fatigue for >1 year; lost weight	Accessory spleen
24	Female	42	None	Chronic cholecystitis with adenomyomatosis of the gallbladder
25	Male	35	None	None
26	Female	45	None	History of hypertension and left ear hearing loss for >1 year.



**Table 3**  
Immunohistochemical results.

	VHL	CD31	CD34	CD8	SMA	Ki-67	CE	CD3	CD20	S100	CD68
Positive cases/total cases	23/23	21/23	23/23	7/7	19/19	19/19	0/12	4/4	4/4	11/11	10/10
Positive rate (%)	100.0	95.5	100.0	100.0	100.0	8.4*	0.0	100.0	100.0	100.0	100.0

\* Ki-67 mean proliferation index.

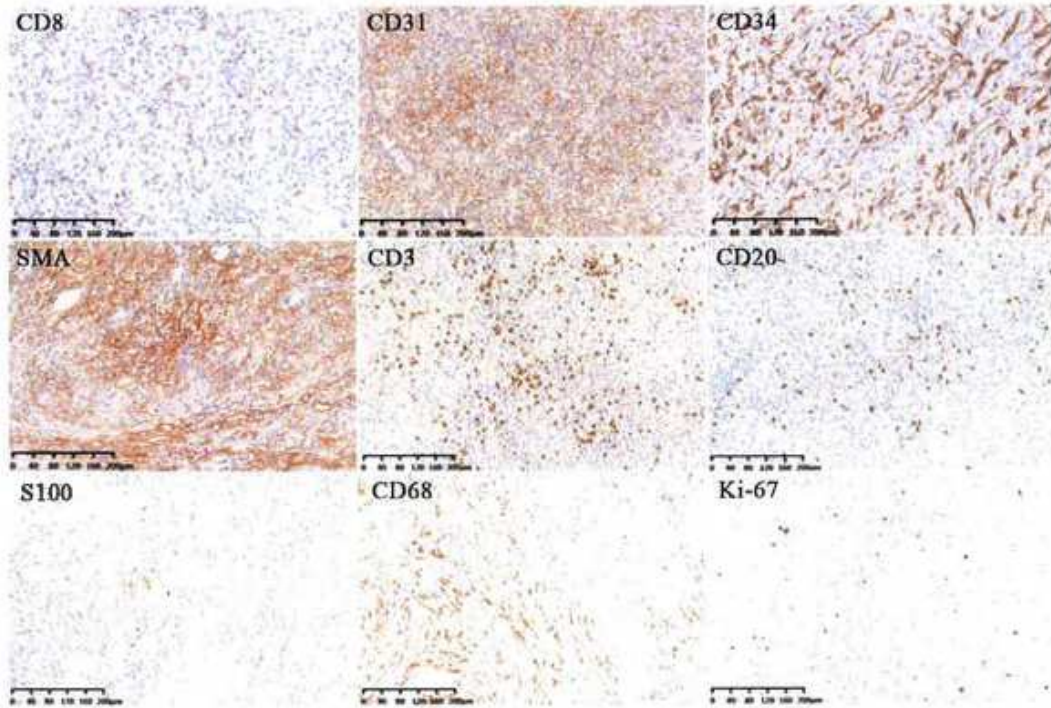


Fig. 5. Immunohistochemical staining.

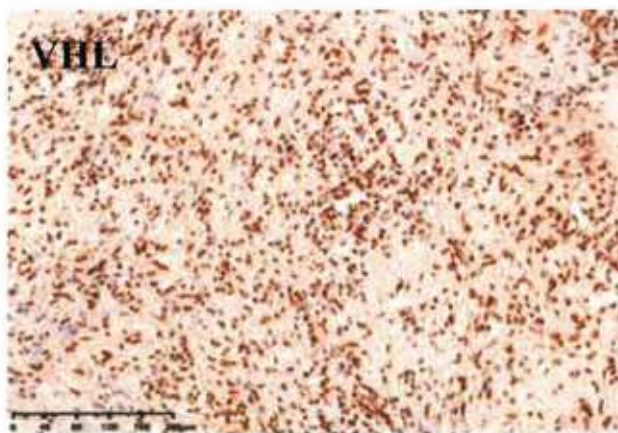


Fig. 6. Immunohistochemical positive expression of von Hippel-Lindau protein.