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Computer-aided analysis of gland-like subsurface hyposcattering structures in Barrett's esophagus using optical coherence tomography – Supplementary Materials

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Table S1. Subgroup analysis for LGD patients (N = 18): Comparison of SHS characteristics over the 4 cm longitudinal segments in BE.

Metrics	Segment 1	Segment 2	Segment 3	Segment 4	P-value (all)	P-value (1 vs. 2)	P-value (2 vs. 3)	P-value (3 vs. 4)
2D Number	0.80 ± 0.44	1.02 ± 0.57	1.22 ± 0.61	1.11 ± 0.77	0.224			
Volume (mm ³)	1.76 ± 1.37	2.38 ± 1.41	2.13 ± 1.13	1.98 ± 1.36	0.676			
3D Cluster	7.22 ± 5.53	11.28 ± 7.61	13.33 ± 7.09	10.33 ± 8.32	0.092			
Size (mm ²)	0.21 ± 0.06	0.26 ± 0.20	0.18 ± 0.04	0.18 ± 0.03	0.094			
Depth (mm)	0.80 ± 0.15	0.98 ± 0.26	0.94 ± 0.12	0.91 ± 0.15	0.025*	0.015*	0.506	0.600
Intensity	0.84 ± 0.14	0.87 ± 0.08	0.69 ± 0.07	0.70 ± 0.08	0.246			
STD	0.08 ± 0.02	0.08 ± 0.02	0.08 ± 0.01	0.08 ± 0.02	0.774			
Orientation (degrees)	8.65 ± 4.08	8.5 ± 6.2	5.6 ± 1.3	6.5 ± 2.2	0.058	0.937	0.069	0.160
Eccentricity (0-1)	0.84 ± 0.08	0.90 ± 0.03	0.91 ± 0.02	0.89 ± 0.06	<0.001** *	0.003**	0.734	0.553
Extent (0-1)	0.57 ± 0.05	0.53 ± 0.04	0.53 ± 0.04	0.53 ± 0.03	0.003**	0.006**	0.841	0.964
Perimeter (mm)	2.00 ± 0.20	2.19 ± 0.52	1.98 ± 0.21	1.99 ± 0.22	0.157			
Solidity (0-1)	0.90 ± 0.01	0.89 ± 0.01	0.89 ± 0.01	0.89 ± 0.01	0.013*			

Table S2. Subgroup analysis for HGD/IMC patients (N = 14): Comparison of SHS characteristics over the 4 cm longitudinal segments in BE.

Metrics	Segment 1	Segment 2	Segment 3	Segment 4	P-value (all)	P-value (1 vs. 2)	P-value (2 vs. 3)	P-value (3 vs. 4)
2D Number	1.28 ± 0.94	1.07 ± 0.65	1.12 ± 0.73	1.16 ± 1.06	0.930			
Volume (mm ³)	3.00 ± 2.31	2.40 ± 1.62	2.61 ± 2.25	2.69 ± 2.60	0.912			

3D Cluster	11.21 ± 9.23	10.93 ± 8.69	11.36 ± 9.09	12.00 ± 12.23	0.993			
Size (mm ²)	0.23 ± 0.09	0.23 ± 0.06	0.22 ± 0.09	0.21 ± 0.11	0.926			
Depth (mm)	0.88 ± 0.16	0.97 ± 0.11	0.97 ± 0.10	0.80 ± 0.35	0.087			
Intensity	0.64 ± 0.08	0.64 ± 0.08	0.64 ± 0.08	0.57 ± 0.25	0.516			
STD	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.03	0.329			
Orientation (degrees)	16.5 ± 8.3	10.0 ± 2.7	10.4 ± 3.6	11.2 ± 7.7	0.053			
Eccentricity (0-1)	0.81 ± 0.07	0.89 ± 0.03	0.89 ± 0.02	0.75 ± 0.32	0.080			
Extent (0-1)	0.59 ± 0.05	0.51 ± 0.05	0.50 ± 0.04	0.42 ± 0.18	0.019*	0.016*	0.786	0.145
Perimeter (mm)	2.03 ± 0.25	2.17 ± 0.23	2.12 ± 0.39	1.89 ± 0.84	0.446			
Solidity (0-1)	0.90 ± 0.01	0.89 ± 0.01	0.89 ± 0.01	0.76 ± 0.32	0.093			

Table S3. Comparison of SHS characteristics over the 4 cm longitudinal segments between LGD and HGD/IMC.

Metrics	Segment 1 P-value	Segment 2 P-value	Segment 3 P-value	Segment 4 P-value
D Number	0.095	0.796	0.688	0.880
Volume (mm ³)	0.091	0.981	0.436	0.362
3D Cluster	0.169	0.904	0.494	0.650
Size (mm ²)	0.302	0.588	0.091	0.290
Depth (mm)	0.163	0.925	0.447	0.227
Intensity	0.972	0.315	0.130	0.089
STD	0.904	0.857	0.671	0.128
Orientation (degrees)	0.062	0.638	0.019*	0.316
Eccentricity (0-1)	0.363	0.203	0.103	0.108
Extent (0-1)	0.310	0.116	0.229	0.244
Perimeter (mm)	0.707	0.853	0.210	0.635
Solidity (0-1)	0.602	0.398	0.948	0.167

Table S4. Comparison of pre-RFA BE SHS between patients who did and did not have RFA treatment response on follow up for LGD patients.

Cumulative metrics	Neo-SE (n = 6)	BE (n = 4)	p-value	Neo-SE (n = 6)	BE (n = 4)	p-value
2D number	0.75 ± 0.55	0.91 ± 0.20	0.539			
3D number	5.33 ± 3.98	7.50 ± 2.65	0.371			
Volume (mm ³)	1.76 ± 1.46	1.73 ± 0.41	0.966			
Metrics on a per gland basis	Mean of all SHSs			Mean of cross-sectional extreme		
Size (mm ²)	0.21 ± 0.04	0.20 ± 0.02	0.344	0.24 ± 0.08	0.22 ± 0.03	0.605
Depth (mm)	0.82 ± 0.17	0.90 ± 0.14	0.441	0.89 ± 0.14	1.00 ± 0.14	0.257
Intensity	0.63 ± 0.08	0.68 ± 0.08	0.347	0.67 ± 0.10	0.72 ± 0.08	0.477
STD	0.08 ± 0.01	0.08 ± 0.02	0.939	0.09 ± 0.01	0.09 ± 0.02	0.883
Orientation (degrees)	10.5 ± 0.7	7.5 ± 2.8	0.120	13.1 ± 2.0	9.8 ± 3.8	0.108
Eccentricity (0-1)	0.85 ± 0.08	0.89 ± 0.03	0.357	0.88 ± 0.06	0.90 ± 0.04	0.582

Extent (0-1)	0.59 ± 0.04	0.54 ± 0.02	0.106	0.56 ± 0.03	0.51 ± 0.02	0.023*
Perimeter (mm)	2.04 ± 0.17	2.02 ± 0.13	0.882	2.20 ± 0.29	2.21 ± 0.14	0.957
Solidity (0-1)	0.90 ± 0.01	0.89 ± 0.00	0.280	0.89 ± 0.01	0.88 ± 0.00	0.096

Table S5. Comparison of pre-RFA BE SHS between patients who did and did not have RFA treatment response on follow up for HGD/IMC patients.

Cumulative metrics	Neo-SE (n = 6)	BE (n = 4)	p-value	Neo-SE (n = 6)	BE (n = 4)	p-value
2D number	1.38 ± 0.87	0.59 ± 0.17	0.076			
3D number	12.33 ± 9.05	4.25 ± 2.06	0.082			
Volume (mm ³)	3.46 ± 2.74	1.50 ± 1.18	0.221			
Metrics on a per gland basis	Mean of all SHSs			Mean of cross-sectional extreme		
Size (mm ²)	0.24 ± 0.08	0.24 ± 0.14	0.953	0.32 ± 0.15	0.30 ± 0.22	0.610
Depth (mm)	0.84 ± 0.11	1.02 ± 0.13	0.050	0.96 ± 0.13	1.07 ± 0.14	0.120
Intensity	0.62 ± 0.05	0.62 ± 0.14	0.610	0.70 ± 0.06	0.64 ± 0.15	0.914
STD	0.08 ± 0.01	0.08 ± 0.01	0.100	0.10 ± 0.01	0.08 ± 0.01	0.094
Orientation (degrees)	12.6 ± 5.6	10.3 ± 5.6	0.538	18.6 ± 10.6	12.0 ± 6.3	0.352
Eccentricity (0-1)	0.80 ± 0.08	0.84 ± 0.06	0.523	0.86 ± 0.06	0.84 ± 0.06	0.725
Extent (0-1)	0.61 ± 0.04	0.59 ± 0.03	0.399	0.56 ± 0.07	0.57 ± 0.03	0.794
Perimeter (mm)	2.02 ± 0.28	1.97 ± 0.35	0.762	2.37 ± 0.53	2.13 ± 0.50	0.497
Solidity (0-1)	0.90 ± 0.01	0.90 ± 0.01	0.194	0.89 ± 0.01	0.89 ± 0.01	0.932

Table S6. Correlation between pre-ablation squamous SHS metrics and the relative change of maximum BE length after RFA in different pathology groups.

Cumulative Metrics	LGD (n = 10)		HGD/IMC (n = 10)		LGD (n = 10)		HGD/IMC (n = 10)	
	R.	p-value	R.	p-value	R	p-value	R	p-value
2D number	-0.048	0.896	0.413	0.236				
3D number	0.009	0.980	0.533	0.113				
Volume (mm ³)	-0.081	0.823	0.294	0.410				
Metrics on a per gland basis	Mean of all SHSs				Mean of cross-sectional extreme			
Size (mm ²)	-0.307	0.388	-0.393	0.261	-0.309	0.385	-0.045	0.902
Depth (mm)	0.172	0.634	-0.354	0.316	0.198	0.584	-0.006	0.986
Intensity	-0.253	0.480	0.620	0.056	-0.105	-0.773	0.694	0.026*
STD	0.139	0.702	0.599	0.067	0.069	0.850	0.660	0.038*
Orientation (degrees)	0.408	0.241	-0.648	0.043*	0.325	0.359	-0.525	0.119
Eccentricity (0-1)	-0.829	0.003**	0.685	0.029*	-0.715	0.020*	0.605	0.064
Extent (0-1)	0.462	0.178	-0.319	0.369	0.412	0.237	-0.607	0.063
Perimeter (mm)	-0.550	0.099	-0.309	0.385	-0.670	0.034*	0.077	0.832
Solidity (0-1)	0.462	0.179	-0.171	0.637	0.574	0.083	-0.511	0.131