Table S1. Definition of geometric features from CT annotations.

Name	Definition
Mesh Volume	A 3D structure of aorta was generated from annotation on CT images. The structure was consisted of triangle meshes generated by a algorithm of PyRadiomics. The detail of algorithm is referred to PyRadiomics official documents.* The mesh volume is calculated from the triangle mesh of the structure.
Voxel Volume	The voxel volume of the structure is approximated by mulplying the number of voxels in the structure by the volume of a single voxel.
Surface Area	The surface area of each triangle in the mesh is calculated. And the total surface area of the structure. is then obtained by taking the sum of all calculated areas.
Surface Volume Ratio	A lower value of the surface area to mesh volume ratio indicates a more compact (sphere-like) shape.
Sphericity	Ity is a measure of the roundness of the shape of the structure relative to a sphere. If a value of the sphericity is 1, it indicates a perfect sphere.
Maximum 2D Diameter (Column)	It is defined as the largest pairwise Euclidean distance between surface mesh vertices of the structure in the row-slice (usually the coronal plane.
Maximum 2D Diameter (Row)	It is defined as the largest pairwise Euclidean distance between surface mesh vertices of the structure in the column-slice (usually the sagittal) plane.
Maximum 2D Diameter (Slice)	It is defined as the largest pairwise Euclidean distance between surface mesh vertices of the structure in the row-column (generally the axial) plane.
Maximum 3D Diameter	It is defined as the largest pairwise Euclidean distance between surface mesh vertices of the structure.
Major Axis Length	It is defined as the largest axis length of the structure-enclosing ellipsoid and is calculated using the largest principal component λ_{major} .
Minor Axis Length	It is defined as the second-largest axis length of the structure - enclosing ellipsoid and is calculated using the largest principal component λ_{minor} .
Least Axis Length	It is defined as the smallest axis length of the structure -enclosing ellipsoid and is calculated using the largest principal component λ_{least} .
Elongation	It is defined as the relationship between the two largest principal components in the structure shape. If a value of the elongationis 1, the cross section through the first and second largest principal components is circle-like (non-elongated).
Flatness	It is defined as the relationship between the largest and smallest principal components in the structure shape. If a value of the flatness 1, the cross section through the largest and smallest principal components is sphere-like.

* The contents of this table was a summary PyRadiomics official docmument
For more detail, please refer to PyRadiomics official documentation:
https://pyradiomics.readthedocs.io/en/latest/features.html#module-radiomics.shape

Table S2. Comparison of demographic and clinical features between groups in the dataset.

Rapid: Growth rate > 2.5mm/year	**BMC, n (%) (n = 236)**			**SNUH, n (%) (n = 325)**		
	Rapid (n = 81)	**Slow (n = 155)**	**P value**	**Rapid (n = 114)**	**Slow (n = 211)**	**P value**
Sex, male	59 (72.8)	117 (75.5)	0.775*	98 (86)	183 (86.7)	0.982*
Age, years (mean ± SD)	74.5 ± 8.62	72.3 ± 8.90	0.146**	69.4 ± 7.80	67.5 ± 8.14	0.079**
COPD	17 (21)	25 (16.1)	0.455*	31 (27.2)	50 (23.7)	0.575*
DM	13 (16)	38 (24.5)	0.182*	21 (18.4)	68 (32.2)	0.011*
Smoking status			0.830*			0.540*
Never	38 (46.9)	69 (44.5)		51 (44.7)	108 (51.2)	
Current	20 (24.7)	36 (23.2)		22 (19.3)	36 (17.1)	
Past	23 (28.4)	50 (32.3)		41 (36)	67 (31.8)	
Initial size of AAA, mm (mean ± SD)	38.4 ± 5.23	32.3 ± 4.98	< 0.001**	38.5 ± 5.47	33.7 ± 5.15	< 0.001**
Number of images	1732	3443		3306	5771	

Abbreviations: AAA: Abdominal aortic aneurysm; BMC: Boramae medical center; COPD: chronic obstructive pulmonary disease; DM: diabetes mellitus; SD: standard deviation; SNUH: Seoul national university hospital.

Notes:

* Pearson's chi-squared test between BMC and SNUH dataset.

** Wilcoxon rank-sum test between BMC and SNUH dataset.