

2023 대한심장혈관흉부외과학회

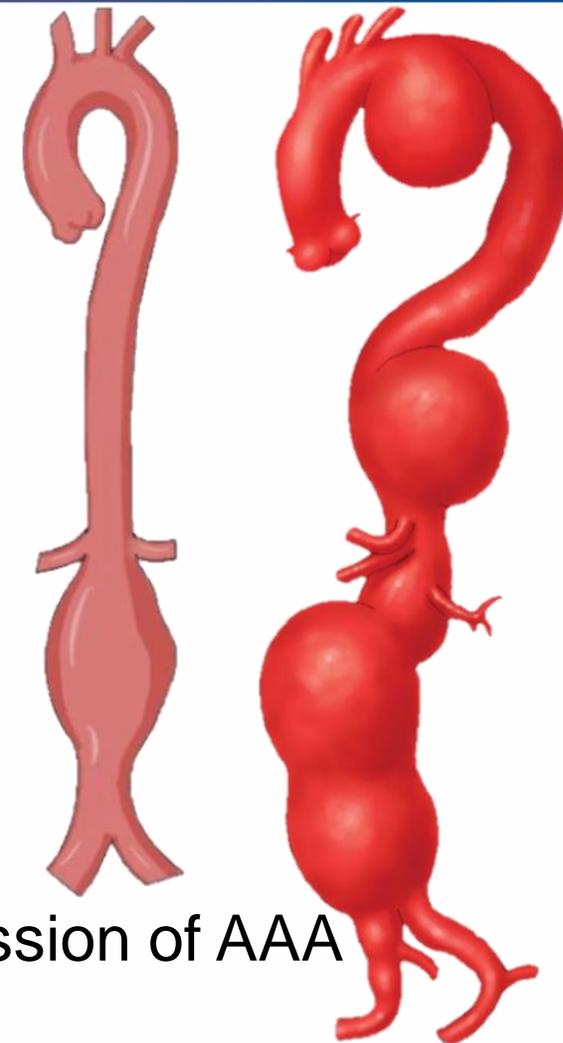
제55차 추계학술대회 & APELSO 2023

2023. 11. 02 (Thu) - 11. 04 (Sat), 그랜드 인터컨티넨탈 파르나스 서울

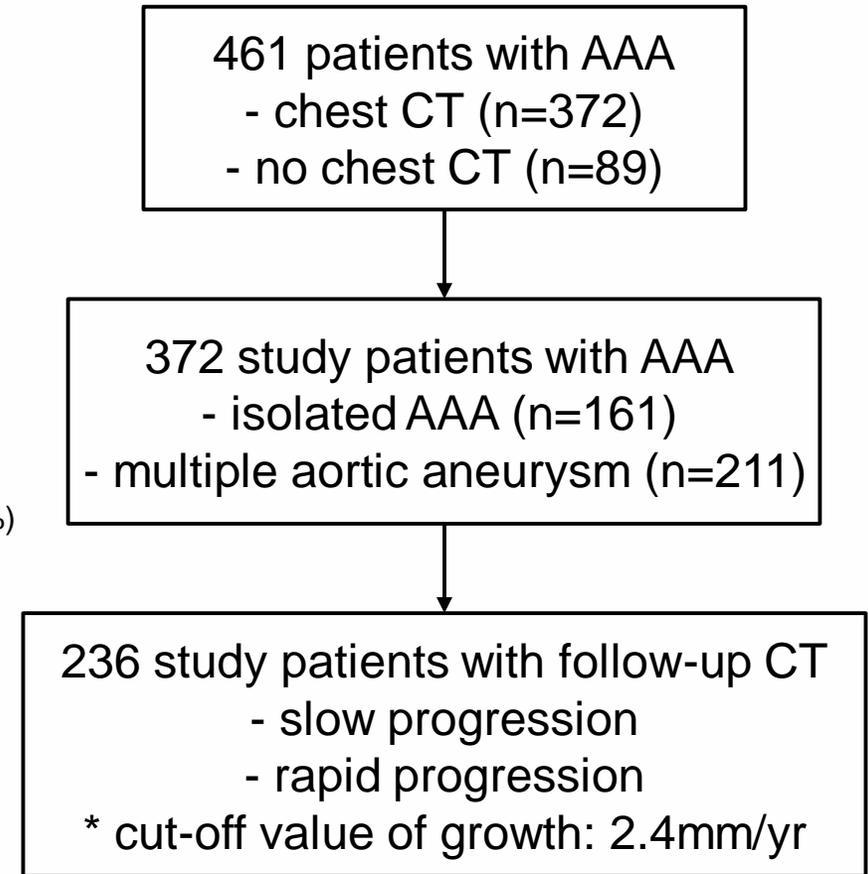
Multiple Aortic Aneurysms on the Progression of Abdominal Aortic Aneurysm : Clinical Implications and Histopathological Features



- Aortic aneurysm can develop in any parts of the aorta
 - Abdominal aorta aneurysm (AAA) >> Thoracic aorta aneurysm
 - Multiple aortic aneurysms in patients with AAA were observed frequently
- Clinical and histopathological characterization between **isolated AAA** & **AAA with multiple aortic aneurysm**:
Lack of current studies
- The present study aims to investigate
 - 1) Clinical significance of multiple aortic aneurysm on the progression of AAA
 - 2) Distinct histopathologic characteristics



- January 2003 - November 2022, Total 461 patients with AAA
- Different clinical characteristics
 - Isolated AAA vs. AAA with multiple aneurysm
 - 372 patients with concomitant chest CT
- Clinical impact of multiple aneurysms on AAA
 - 236 patients with follow-up abdomen CT
 - Rapid vs. Slow progression group as cut-off value
 - ✓ cut-off value of growth rate: **2.4mm/yr** (sensitivity 79%, specificity 81%)
 - Clinical data analysis:
clinical variables contributing rapid progression
- Histopathologic findings
 - AAA with multiple aneurysm (n= 9), Isolated AAA (n=8),
Normal aorta control (n=3, obtained from heart transplantation)

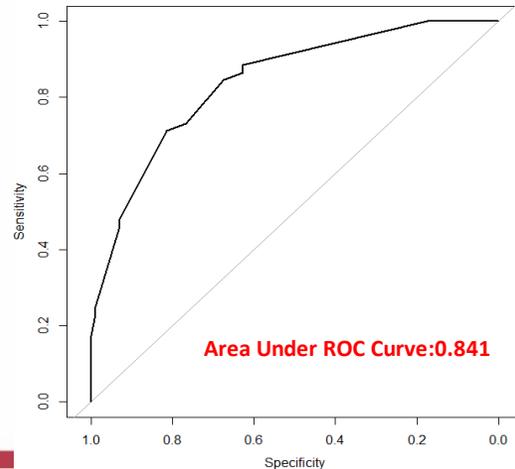


Results 1

- Variables with significance in rapid AAA progression
 - initial size of AAA, DM, unilateral iliac aneurysm
 - presence of arch aneurysm

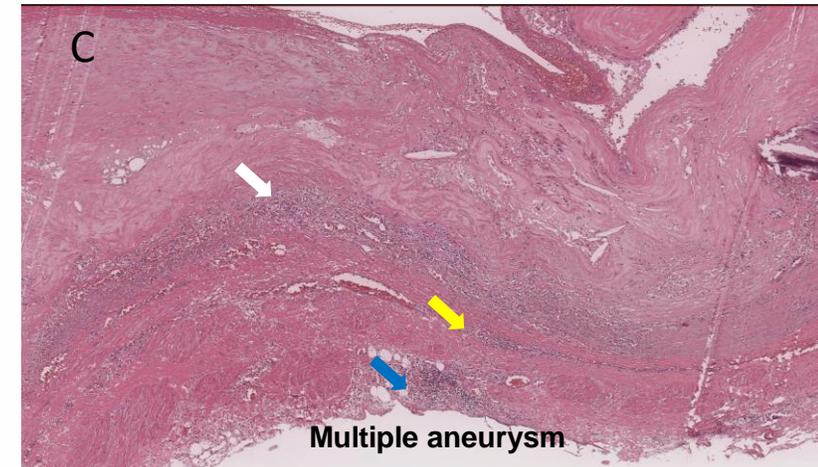
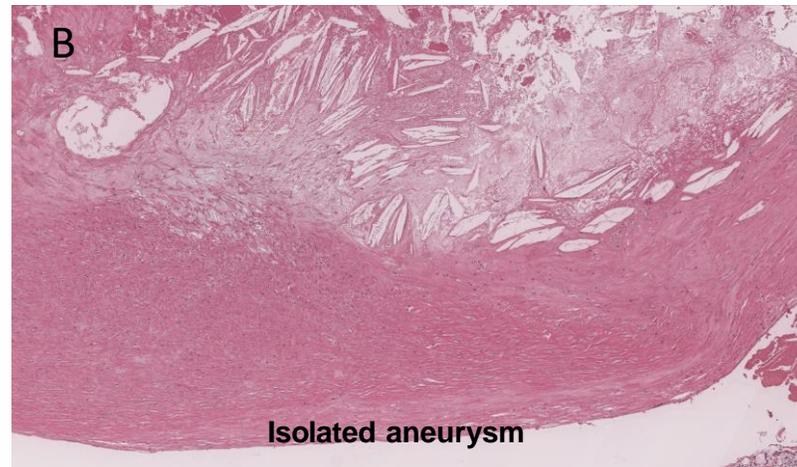
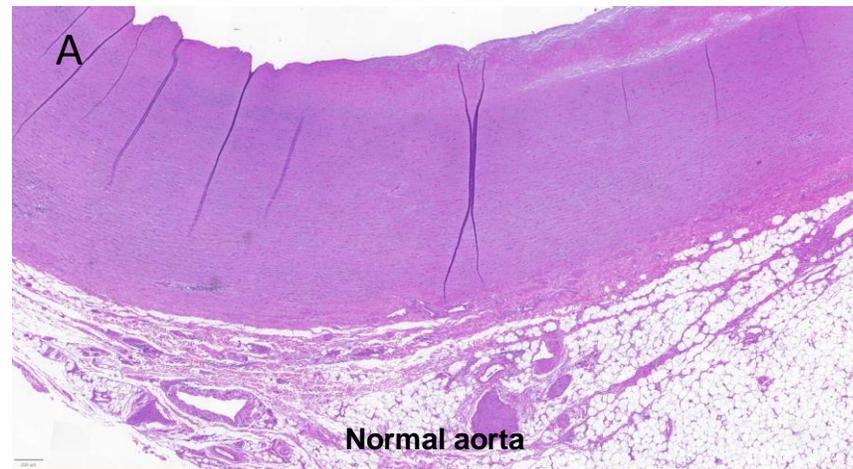
Multivariable logistic regression model

| variables | Multivariable analysis | | | | | | |
|----------------------------|------------------------|-----|----|--------|------------------|--------|--------|
| | N | E | OR | 95% CI | p-value | Type 3 | |
| Initial size | < 3.5cm | 133 | 25 | Ref | | | |
| | 3.5~4.5cm | 89 | 47 | 6.274 | (2.967, 13.266) | <.0001 | <.0001 |
| | > 4.5cm | 14 | 13 | 60.112 | (6.352, 568.890) | <.001 | |
| DM | No | 185 | 72 | Ref | | | |
| | Yes | 51 | 13 | 0.358 | (0.135, 0.948) | 0.039 | 0.039 |
| Iliac artery aneurysm site | No | 127 | 41 | Ref | | | |
| | Unilateral | 38 | 8 | 0.277 | (0.083, 0.924) | 0.037 | 0.005 |
| | Bilateral | 69 | 36 | 2.200 | (0.988, 4.900) | 0.054 | |
| Arch aneurysm | No | 168 | 59 | Ref | | | |
| | Yes | 22 | 16 | 5.565 | (1.701, 18.201) | 0.005 | 0.005 |



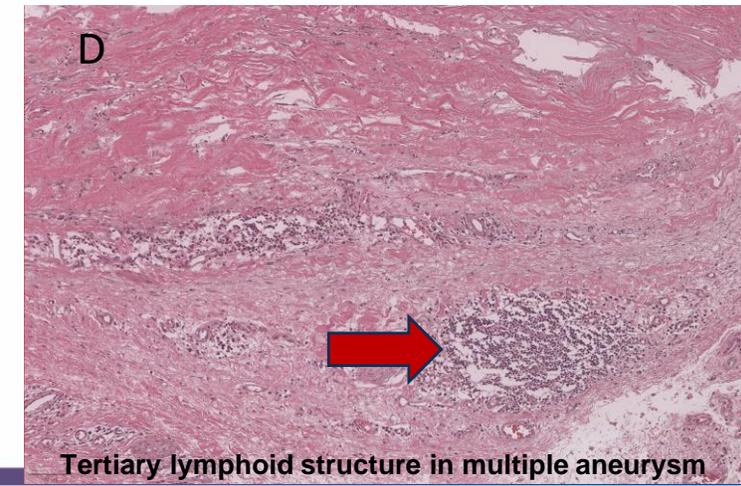
| Variables | Isolated abdominal aortic aneurysm (N = 161) | Multiple aortic aneurysm (N = 211) | p-value | |
|---|--|------------------------------------|------------------|--------|
| Initial size | size < 35mm | 68 (42.2) | 65 (30.8) | 0.048 |
| | 35mm ≤ size < 44mm | 53 (32.9) | 67 (31.8) | |
| | 44mm ≤ size < 48mm | 7 (4.3) | 14 (6.6) | |
| | size ≥ 48 mm | 33 (20.5) | 65 (30.8) | |
| Sex | Male | 123 (76.4) | 148 (70.1) | 0.179 |
| | Female | 38 (23.6) | 63 (29.9) | |
| Age | mean±sd | 73.8 ±9.0 | 75.8 ±8.9 | 0.032 |
| | median (IQR) | 75.0 (69-79) | 76.0 (71-81) | |
| BMI (missing 11 cases) | mean±sd | 22.1 ±3.9 | 22.7 ±4.0 | 0.149 |
| | median (IQR) | 22.4 (19.6-24.6) | 22.9 (20.2-25.7) | |
| HTN (missing 2 cases) | No | 45 (28.3) | 30 (14.2) | 0.001 |
| | Yes | 114 (71.7) | 181 (85.8) | |
| HTN-mx (missing 3 cases) | No | 53 (33.3) | 38 (18.1) | 0.003 |
| | Single drug | 49 (30.8) | 73 (34.8) | |
| | Multiple drugs (>2) | 57 (35.8) | 99 (47.1) | |
| DM (missing 3 cases) | No | 117 (73.6) | 173 (82.4) | 0.041 |
| | Yes | 42 (26.4) | 37 (17.6) | |
| CKD | No | 141 (87.6) | 173 (82.0) | 0.141 |
| | Yes | 20 (12.4) | 38 (18.0) | |
| PVD (missing 26 cases) | No | 122 (80.8) | 157 (83.5) | 0.515 |
| | Yes | 29 (19.2) | 31 (16.5) | |
| Iliac artery disease (missing 12 cases) | No | 89 (56.7) | 106 (52.2) | 0.399 |
| | Yes | 68 (43.3) | 97 (47.8) | |
| CRP (missing 18 cases) | mean±sd | 4.3 ±6.5 | 4.1 ±6.2 | 0.769 |
| | median (IQR) | 0.8 (0.2-6.1) | 1.1 (0.2-5.2) | |
| Site | No | 161 (100.0) | - | <.0001 |
| | ascending aorta or aortic arch | - | 144 (68.2) | |
| | descending aorta | - | 11 (5.2) | |
| | both | - | 56 (26.5) | |
| Sequential | No | 102 (63.4) | 63 (29.9) | <.0001 |
| | sequential development | - | 42 (19.9) | |
| | metachronous development | - | 8 (3.8) | |
| | Not determined | 59 (36.6) | 98 (46.4) | |
| Arch aneurysm | No | 161 (100.0) | 173 (82.0) | <.0001 |
| | Yes | - | 38 (18.0) | |

- We analyzed archived surgically resected AAA specimens
- In isolated AAA, only 2 patient (25%) showed infrequent tertiary lymphoid structure
- In AAA with multiple aneurysm, 6 patient (66.6%) showed frequent tertiary lymphoid structure, indicating persistent inflammatory stimulation



Representative H&E image of aorta wall

- Isolated AAA: sparse immune cell infiltration along aneurysm wall (B)
- AAA with multiple aneurysm: increased fibrosis of atheroma, dense immune cell infiltrations between atheroma and aorta wall (**white arrow**), within aorta smooth muscle (**yellow arrow**), tertiary lymphoid structure in adventitia (**blue arrow**)



- Considering different clinical characteristics between patients with isolated AAA and those with AAA accompanied by multiple aneurysms, an alternative clinical approach and early screenings for thoracic aortic aneurysm would be recommended
- Close monitoring for AAA is recommended in patients with multiple aortic aneurysms, especially those involving aortic arch, due to the observed rapid progression of AAA
- Histopathologic differences highlight distinct characteristics of isolated AAA versus AAA with multiple aneurysm