ABCResearch

Arch Basic Clin Res 2026;8(2):150-156
**DOI:** 10.4274/ABCR.2026.26450

Research Article

# Evaluation of Aortic and Pulmonary Artery Diameters Using Computed Tomography Angiography

Halime Kabalcı[1], Ali Osman Gülmez[2]

[1]Department of Anatomy, Kahramanmaraş Sütçü İmam University Faculty of Medicine, Kahramanmaraş, Türkiye
[2]Department of Radiology, Erzincan Binali Yıldırım University Faculty of Medicine, Erzincan, Türkiye

**Cite this article as:** Kabalcı H, Gülmez AO. Evaluation of aortic and pulmonary artery diameters using computed tomography angiography. *Arch Basic Clin Res*. 2026;8(2):150-156.

**ORCID IDs of the authors:** H.K. 0009-0009-2027-1653, A.O.G. 0000-0001-7050-1765.

## ABSTRACT

**Objective:** The truncus pulmonalis, the main pulmonary artery (MPA), originates from the right ventricle at the level of the upper edge of the left third rib cartilage and carries blood to both lungs. After a short course, it branches into two arteries beneath the aortic arch: the right pulmonary artery (RPA) and the left pulmonary artery (LPA). The aorta, the main artery that carries blood to the body, originates from the left ventricle. It is divided into three sections: the ascending aorta (AA), the aortic arch, and the descending aorta.

**Methods:** Between January and December 2023, the files of adult patients who were suspected of having pulmonary embolism and who underwent thoracic CT angiography (CTA) at the Erzincan Mengücek Gazi Training and Research Hospital Emergency Department were reviewed. The patients' DICOM-format images were exported. These images were uploaded to the 3D-Slicer (version 5.10.0 for Windows) and the MPA, RPA, LPA, and AA diameters were measured in the axial plane. The MPA-to-AA diameter ratio was calculated for each patient and designated PA:A.

**Results:** This study included 52 men and 50 women, for a total of 102 patients. The patients' average age was 67. No significant difference in vessel diameters was observed between genders. AA, MPA, RPA, and LPA diameters were higher in the >67 age group than in the ≤67 age group. There was no significant difference in the PA:A ratio between age groups. A positive, moderate, and statistically significant correlation was found between age and the diameters of AA, MPA, RPA, and LPA. No significant correlation was found between age and the pulmonary artery-to-aorta (PA:A) ratio. A strong, positive, and statistically significant correlation was found between MPA diameter and the diameters of RPA and LPA. A positive, moderately significant correlation was found between MPA diameter and AA diameter. A strong, significant positive correlation was found between RPA diameter and LPA diameter.

**Conclusion:** Aortic and pulmonary artery diameters have been evaluated using various methods in previous studies. To better understand the clinical importance of aortic and pulmonary artery diameters in cardiopulmonary diseases, it is necessary to know their normal reference values. The Framingham Heart Study reported an average MPA diameter of 25.1 mm and an average PA:A ratio of 0.77. In our study of the Turkish population, the mean AA, MPA, RPA, and LPA diameters were 34.1 mm, 25.9 mm, 21.1 mm, and 20.2 mm, respectively, and the PA:A ratio was 0.78. Further studies in larger populations are needed to establish reference values for aortic and pulmonary artery diameters in healthy individuals.

**Keywords:** Pulmonary artery, Pulmonary hypertension, Computed tomography angiography

**Corresponding author:** Ali Osman Gülmez, **E-mail:** aliosmangulmez.2@gmail.com

**Received:** June 2, 2026
**Revision Requested:** June 11, 2026 **Accepted:** June 22, 2026 **Publication Date:** July, 14, 2026

Copyright© 2026 The Author(s). Published by Galenos Publishing House on behalf of Erzincan Binali Yıldırım University.
This is an open access article under the Creative Commons AttributionNonCommercial 4.0 International (CC BY-NC 4.0) License.

## INTRODUCTION

The pulmonary trunk, or main pulmonary artery (MPA), originates from the right ventricle at the level of the upper edge of the left third rib cartilage and carries blood to both lungs. It is approximately 5 cm long and 3 cm.[1] After a short course, the pulmonary trunk divides, just below the aortic arch, into two branches: the right pulmonary artery (RPA) and the left pulmonary artery (LPA). The aorta is the main vessel that originates from the left ventricle and carries blood to the body. In adults, it has an average diameter of 3 cm and a wall thickness of approximately 1.5 mm.[1,2] The aorta is examined in three sections: the ascending aorta (AA), the aortic arch, and the descending aorta. The pars descendens aorta consists of two parts: the pars thoracica aorta and the pars abdominalis aorta.[2]

Pulmonary hypertension (PH) is characterized by increased mean pulmonary artery pressure and can result from various causes such as left heart failure, chronic lung disease, and chronic thromboembolic PH. Its prevalence is estimated at 1% worldwide across all age groups and 10% in the over-65 age group. Given the estimated non-transplant survival rate among all PH patients, widely available tools that enable early diagnosis and rapid initiation of treatment are needed.

Computed Tomography Angiography (CTA) is an imaging technique that uses X-rays and is performed after the intravenous administration of iodinated contrast medium. It is the primary diagnostic method of choice and widely used in the diagnosis of pulmonary embolism.[3] Although right heart catheterization is the gold-standard examination for the diagnosis of PH, this method is invasive and carries potential complications. Therefore, CTA has become an important imaging method in the diagnosis and prognosis of PH.[4] CTA provides valuable information for visualizing the heart, pulmonary vascular tree, and lung parenchyma. An Increased MPA diameter and an elevated PA:A ratio are the best-known CTA signs of PH. Traditionally, an MPA diameter greater than 29 mm is considered an important indicator in the diagnosis of PH, and this has been used as a threshold by most clinicians.[5] A recent study showed that an MPA diameter of ≥30 mm had 83.1% sensitivity and 90.4% specificity in predicting PH.[6] Some studies have suggested that the ratio of MPA diameter to AA diameter (PA:A) could be used as a more specific marker in PH diagnosis.[7] However, such measurements have limited sensitivity and specificity due to single-point assessment and inter-observer variability.

### MAIN POINTS

- Computed tomography angiography provides reliable measurements of thoracic arterial diameters.
- Ascending aortic and pulmonary artery diameters increase significantly with advancing age.
- No significant sex-related differences were observed in thoracic arterial diameters.
- The reported reference values may support the radiological assessment of pulmonary hypertension in the Turkish population.

The aim of this study is to determine the mean diameters of the pulmonary arteries (MPA, RPA, and LPA) and the AA diameter in healthy Turkish individuals and to prepare a database for future studies on pulmonary hypertension by calculating the PA:A ratio.

## MATERIAL AND METHODS

The Erzincan Binali Yıldırım University Clinical Research Ethics Committee unanimously decided, via its decision dated 21.04.2026 and numbered 541720, that the study complies with legal regulations regarding scientific research and publication ethics. Due to the retrospective nature of our study, the ethics committee waived the requirement of obtaining informed consent from patients.

In this study, the files of all adult patients who presented to the Emergency Department of Erzincan Binali Yıldırım University Mengücek Gazi Training and Research Hospital between January 2023 and December 2023 and who underwent thoracic CT scans due to suspected pulmonary embolism were reviewed in the e-archive. Patients without findings of pulmonary embolism on their CT scans and in their reports were identified. The images of these patients were retrospectively evaluated by a radiologist. Two patients were excluded from the study due to intrathoracic masses, two due to pleural effusion, one due to a combination of pleural effusion and intrathoracic mass, and one due to pneumothorax. In addition, the CT scans of 9 patients that could not be clearly evaluated due to movement or other technical artifacts were excluded. The images of the remaining 102 patients were exported in DICOM format. These images were loaded into 3D-Slicer (version 5.10.0 for Windows), open-source software, and converted into sections in the three planes—sagittal, coronal, and axial—using multiplanar reconstruction (MPR).

All thoracic CTA scans were performed on a 128-detector, multislice computed tomography scanner (Somatom Definition Flash, Siemens Healthcare, Forchheim, Germany) with patients in the supine position during breath holding. The scan coverage was adjusted from the apex to the base of the lungs. The imaging parameters were as follows: slice area, 256 × 0.625 mm; tube voltage, 80/140 kVp; auto-tube current, 60 mAs; return time, 0.28 s; slice thickness, 1 mm. During the examination, 60 to 90 mL of intravenous iodinated contrast medium was administered at a rate of 4 to 6 mL/s. This was followed by 50 mL of saline solution. Neither nitroglycerin nor beta-blockers were used. During imaging, the coronary arteries were primarily opacified, while homogeneous contrast enhancement occurred in the pulmonary arteries. To evaluate the maximum-density projection of the aorta, coronary, and pulmonary arteries, curved-planar and volumetric reconstructions were obtained; the findings were then translated into axial CT images.

Images in DICOM format were imported into 3D-Slicer software and examined in cross-sections. All measurements were taken in

the axial plane. The MPA diameter was measured perpendicular to the long axis of the vessel at the pulmonary artery bifurcation level, similar to previous studies ( Figure 1).[4] The diameters of the RPA and LPA were measured perpendicular to the long axis of each vessel, 1.5 cm distal to the bifurcation (Figure 2 and 3). The AA diameter was measured perpendicular to the long axis of the vessel at the pulmonary artery bifurcation level (Figure 4).[8] Findings were recorded in millimeters. Then, the ratio of MPA diameter to AA diameter was calculated for each patient; this ratio was designated PA:A and recorded.

### Statistical Analysis

Statistical analysis was performed using SPSS v.22.0 (Statistical Package For Social Sciences, IBM, Chicago, IL, USA). The normality of the data distribution was assessed using the Kolmogorov-Smirnov test and visual methods (histograms and probability plots). Categorical variables were summarized as frequencies and percentages. Quantitative variables were presented as mean ± standard deviation (SD), median (Q1-Q3), and min-max. For comparisons between two independent groups, the independent-samples t-test was used when the data were normally distributed, and the Mann-Whitney U test was used when they were not.

The relationship between two numerical variables was examined using Spearman correlation analysis. Correlation values were classified as follows: r = 0.00-0.05 (very low), r = 0.05-0.30 (low), r = 0.30-0.40 (low-moderate), r = 0.40-0.60 (moderate), r = 0.60-0.70 (good), r = 0.70-0.75 (very good), and r = 0.75-1.00 (excellent). All analyses were performed at a 95% confidence level; a p-value < 0.05 was considered statistically significant.

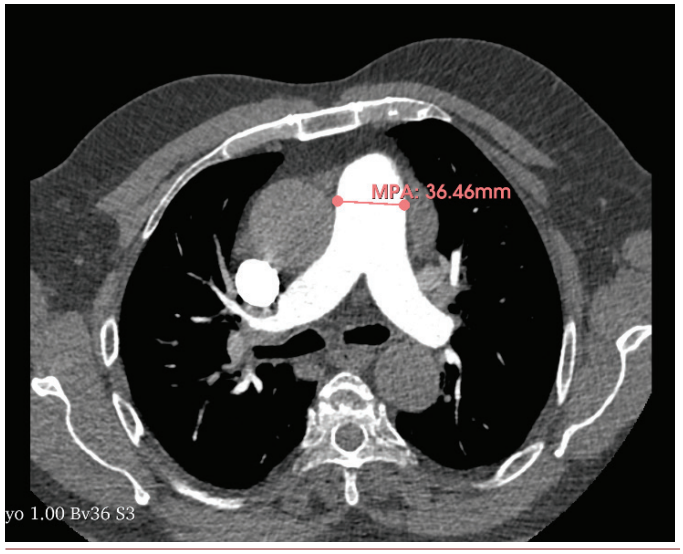



**Figure 1.** Measurement of the mean pulmonary artery branch on axial sections.

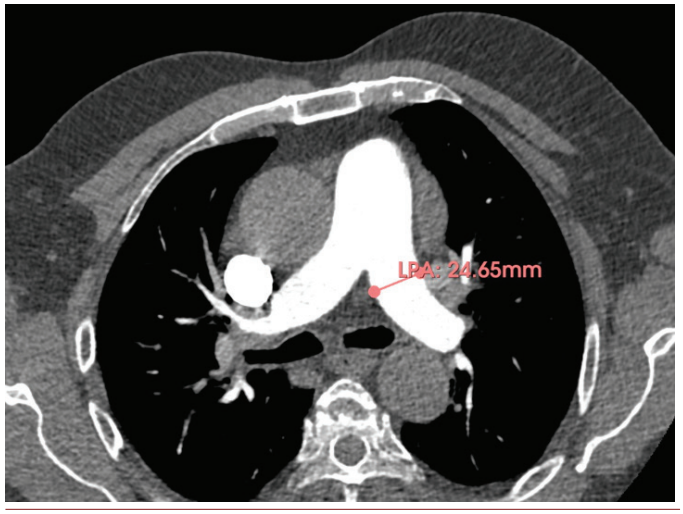



**Figure 2.** Measurement of the left pulmonary artery branch on axial sections.

## RESULTS

The study included 102 patients. Of the patients, 51% were male and 49% were female. The mean age of the patients was 67.67 ± 18.45 years. Demographic data and mean artery diameters of the patients are given in Table 1.

No statistically significant differences were found between genders in age and vascular parameters ($P > 0.05$). The findings are shown in Table 2.

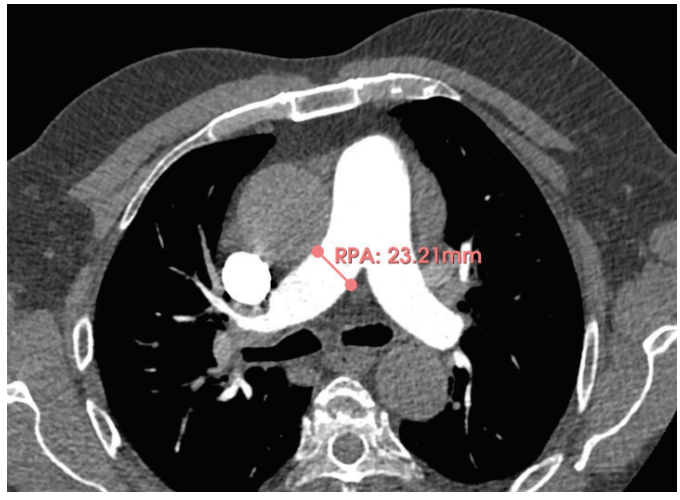



**Figure 3.** Measurement of the right pulmonary artery branch on axial sections.

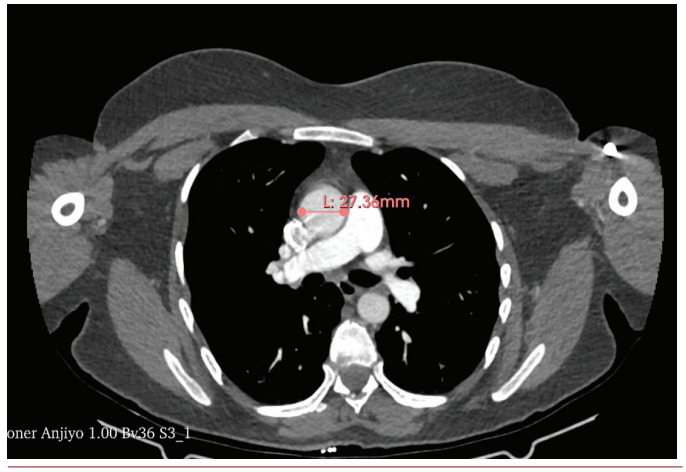



**Figure 4.** Measurement of the ascending aorta on axial sections.

The mean age of the patients was 67.67 ± 18.45, and statistical comparisons were made based on age, dividing them into two groups: those below and those above the mean age. When comparing age and vascular parameters between patients aged 67 and under (≤67 years) and those aged 67 and over (>67 years), a statistically significant difference was found between the two groups ($P > 0.001$).

Pulmonary artery measurements revealed that MPA, RPA, and LPA values were significantly higher in the >67 age group compared to the ≤67 age group ($P < 0.001$; $P < 0.001$; $P < 0.001$, respectively). This finding suggests that pulmonary artery diameters increase with age. The aortic diameter was also found to be significantly higher in the older age group ($P < 0.001$).

**Table 1.** Demographic Data and Mean Artery Diameters of Patients

| Variables | n/average ± SS | %/ hydrangea (Q1-Q3) | Min-max |
|---|---|---|---|
| Gender | | | |
| Female | 50 | 49 | |
| Male | 52 | 51 | |
| Age (years) | 67.67 ± 18.45 | 72.00 | 21.00-99,00 |
| MPA (mm) | 25.93 ± 5.13 | 25.97 | 17.36-46.44 |
| RPA (mm) | 21.07 ± 3.75 | 20.74 | 12.03-33.73 |
| LPA (mm) | 20.19 ± 3.70 | 19.68 | 12.79-28.35 |
| AA (mm) | 34.13 ± 5.22 | 33.82 | 21.57-47.67 |
| PA:A | 0.78 ± 0.11 | 0.78 | 0.58-1.13 |

MPA, main pulmonary artery; RPA, right pulmonary artery; LPA, left pulmonary artery; AA, ascending aorta; PA:A, pulmonary artery-to-aorta ratio.

There was no statistically significant difference in the PA:A ratio between the two groups ($P = 0.522$). The findings are shown in Table 3.

A moderate positive correlation was observed between age and MPA diameter ($P < 0.001$). A moderate, statistically significant positive correlation was found between age and RPA diameter ($P < 0.001$). A moderate, statistically significant positive correlation was found between age and LPA ($P<0.001$). A moderate positive correlation was found between age and AA diameter ($P < 0.001$). No statistically significant correlation was found between age and PA:A ratio ($P = 0.423$).

A highly significant positive correlation was found between MPA diameter and RPA diameter ($P < 0.001$). A highly significant positive correlation was found between MPA diameter and LPA diameter ($P < 0.001$). A moderately strong positive correlation was found between MPA diameter and AA diameter ($P < 0.001$). A statistically significant moderate positive correlation was found between MPA diameter and PA:A ratio ($P < 0.001$).

A highly significant positive correlation was found between RPA and LPA diameters ($P < 0.001$). A strong positive correlation was observed between RPA diameter and AA diameter ($P < 0.001$). A strong positive correlation was found between LPA diameter and AA diameter ($P < 0.001$). A negative, non-significant correlation was found between AA diameter and PA:A ratio ($P < 0.005$). The findings are shown in Table 4.

**Table 2.** Comparison of Age and Vascular Parameters by Gender

| Variables | Male (n=52) | Female (n=50) | *P* |
|---|---|---|---|
| Age (years) | 71.50 (55.25-82.00) | 7300 (56.00-82.00) | 0.846[2] |
| MPA (mm) | 25.85 (23.58-29.17) | 26.00 (23.20-29.55) | 0.920[2] |
| RPA (mm) | 21.18 (19.49-23.16) | 20.50 (17.69-22.39) | 0.078[2] |
| LPA (mm) | 20.56 (17.66-23.16) | 18.99 (16.90-23.05) | 0.119[2] |
| AA (mm) | 34.80 ± 5.42 | 33.42 ± 4.96 | 0.183[1] |
| PA:A | 0.77 ± 0.11 | 0.80 ± 0.11 | 0.186[1] |

MPA, main pulmonary artery; RPA, right pulmonary artery; LPA, left pulmonary artery; AA, ascending aorta; PA:A, pulmonary artery-to-aorta ratio.

**Table 3.** Comparison of Vascular Parameters by Age Groups

| Variables | ≤ 67 (n=43) | > 67 (n=59) | *P* |
|---|---|---|---|
| Age (years) | 55.00 (42.00-61.00) | 80.00 (75.00-84.00) | **< 0.001** |
| MPA (mm) | 24.69 (22.12-26.25) | 27.96 (23.99-32.31) | **< 0.001** |
| RPA (mm) | 18.65 (16.88-20.57) | 21.86 (20.57-24.65) | **< 0.001** |
| LPA (mm) | 17.63 (16.48-20.51) | 21.40 (18.99-24.39) | **< 0.001** |
| AA (mm) | 31.54 ± 4.97 | 36.01 ± 4.59 | **< 0.001** |
| PA:A | 0.78 ± 0.10 | 0.79 ± 0.12 | 0.522[1] |

MPA, main pulmonary artery; RPA, right pulmonary artery; LPA, left pulmonary artery; AA, ascending aorta; PA:A, pulmonary artery-to-aorta ratio.

**Table 4.** Correlation of Patients' Age and Vascular Parameters

| Variables | | Age | MPA | RPA | LPA | AA | PA:A |
|---|---|---|---|---|---|---|---|
| Age (years) | r | 1 | 0.426 | 0.592 | 0.533 | 0.438 | 0.080 |
| | p | . | **< 0.001** | **< 0.001** | **< 0.001** | **< 0.001** | 0.423 |
| MPA (mm) | r | | 1 | 0.730 | 0.717 | 0.581 | 0.550 |
| | p | | . | < 0.001 | < 0.001 | **< 0.001** | **< 0.001** |
| RPA (mm) | r | | | 1 | 0.829 | 0.700 | 0.158 |
| | p | | | . | < 0.001 | **< 0.001** | 0.112 |
| LPA (mm) | r | | | | 1 | 0.673 | 0.185 |
| | p | | | | . | **< 0.001** | 0.063 |
| AA (mm) | r | | | | | 1 | -0.279 |
| | p | | | | | . | **0.005** |
| PA:A | r | | | | | | 1 |
| | p | | | | | | . |

MPA, main pulmonary artery; RPA, right pulmonary artery; LPA, left pulmonary artery; AA, ascending aorta; PA:A, pulmonary artery-to-aorta ratio.

## DISCUSSION

Diameters of the pulmonary artery and the aorta have been evaluated using various methods in previous studies. Radiological examinations such as CT, CTA, multislice CT, echocardiography, and cardiac magnetic resonance imaging have been used for vessel diameter measurement.[9] Some of these studies were conducted in healthy individuals, while others were performed in patient groups with conditions such as PH, sarcoidosis, and COVID-19. The importance of MPA diameter and the PA:A ratio in the diagnosis of PH is particularly emphasized. The mean MPA determined by thoracic CT is a reliable predictor of PH, defined as a resting mean pulmonary artery pressure ≥ 25 mmHg measured by right heart catheterization.[10] Recently, Nakanishi et al.[11] in the study by 2013, it was reported that a PA:A ratio greater than 0.9, independent of coronary artery disease, was associated with a significant increase in the risk of all-cause mortality. Therefore, the PA:A ratio can provide clinicians with information about the risk and current status of various underlying diseases and patient prognosis. However, to better determine the clinical significance of these values in cardiopulmonary diseases, knowledge of normal reference values is necessary. Vessel diameters can vary with race, age, and gender. Therefore, it is essential to determine the normal ranges of pulmonary artery and aortic diameters in the Turkish population.

The average MPA diameter varies among studies conducted on healthy groups. Data from the Framingham Heart Study, which has the largest patient population in the literature (3171 patients), revealed an average MPA diameter of 25.1 mm.[12] In a study conducted with CT in the Turkish population, the average MPA diameter was reported as 23.3 mm, 22.4 mm in women and 24.1 mm in men.[13] In a study conducted with BTA, the average MPA diameter was reported as 32.0 mm; 31.2 mm in women and 32.2 mm in men.[14] In a study conducted with CT, the average MPA diameter was 25.9 mm, 26.5 mm in men and 25.8 mm in women.[9] A study using CT in the Turkish population reported an average MPA diameter of 26.6 mm, 25.9 mm in women and 27.0 mm in men.[15] Kuriyama et al.[16] measured the average MPA as 24.2 mm in their CT study. In this study, the average MPA diameter was 25.9 mm overall (25.9 mm in women and 26.0 mm in men). These findings are consistent with the literature.

A review of the literature reveals a limited number of studies measuring the diameters of the right and left pulmonary arteries. A recent study conducted in Türkiye reported an average RPA diameter of 17.3 mm (16.4 mm in women and 18.0 mm in men). In the same study, the average LPA diameter was reported as 17.6 mm; 16.9 mm in women and 18.2 mm in men.[13] Another study reported an average RPA diameter of 25.2 mm (24.9 mm in women and 25.2 mm in men). The same study reported an average LPA diameter of 24.9 mm; 24.8 mm in women and 25.0 mm in men.[14] In our study, the average RPA diameter was 21.1 mm overall (20.1 mm in women and 21.2 mm in men), and the average LPA diameter was 20.2 mm overall (19.0 mm in women). It has been calculated to be 20.6 mm in men.

Studies conducted in healthy populations show that the average AA diameter ranges from 28.5 to 34.0 mm. In the Turkish population, the average AA diameter has been reported as 28.5 mm, 26.9 mm in women, and 30.0 mm in men.[13] In the study by Berger et al.[14], the average AA diameter was reported as 34.0 mm; 32.8 mm in women and 34.3 mm in men. In one study, the average AA diameter was 30.0 mm.[9] In another study, the average AA diameter was reported as 34.1 mm in men and 31.9 mm in women.[17] In yet another study, the average AA diameter was reported as 33.6 mm in men and 31.1 mm in women.[18] In this study, the average AA diameter was 34.1 mm, similar to previous studies (33.4 mm in women and 34.8 mm in men). AA diameter is affected by diseases such as heart failure, valvular anomalies, and hypertension, as well as by the use of medications such as beta-blockers and digoxin.[19,20] However, previous studies have shown that AA diameter is associated with mortality in patients with heart failure.[21]

Studies in healthy individuals show that the average PA:A ratio is less than 0.9. This ratio (0.9) was accepted as the threshold

value for PH in the Framingham Heart Study. The average PA:A ratio reported in the Framingham Heart Study was 0.77.[12] In the study by Lee et al. [9], the PA/A ratio was 0.87. In this study, the average PA:A ratio was 0.78.

Many studies have shown that the average arterial diameters are larger in male patients than in female patients. In the study by Tekcan Şanlı et al.[13], it was found that all vessel diameters (AA, MPA, RPA, and LPA) were significantly higher in men than in women. Li et al. [22], reported that the AA and MPA diameters were significantly larger in men. Similarly, in the study by Karazincir et al.[15], it was stated that the MPA diameter was significantly higher in men than in women. However, no significant differences were found between genders in any of the measured parameters in this study.

While a significant relationship between age and AA diameter is generally found in the literature, the relationship between age and MPA is debatable.[15,12,21] In the study by Tekcan Şanlı et al.,[13] it was observed that the AA diameter was larger in individuals ≥ 40 compared to those < 40. In our study, it was determined that the MPA, RPA, LPA, and AA diameters increased with age, and these values were significantly higher in the > 67 age group than in the ≤67 age group.

This study had several limitations that should be acknowledged. First, the study was retrospective and single-center, which may limit the generalizability of the findings to the Turkish population. Regional demographic differences, environmental factors, and variations in imaging protocols between institutions may influence vascular measurements. Second, detailed clinical histories of the participants were unavailable. Therefore, potential confounding factors such as undiagnosed cardiovascular or pulmonary diseases, smoking history, body mass index, hypertension, diabetes mellitus, or medication use could not be evaluated. Although individuals with evident pulmonary pathology on CT were excluded, the presence of subclinical conditions that might affect vascular diameters could not be completely ruled out.

Another important limitation was the uneven age distribution of the study population, as most participants were middle-aged or elderly. Consequently, younger age groups were underrepresented, which may have affected the assessment of age-related vascular changes and normal reference values across all age categories. In addition, the cross-sectional design of the study precluded longitudinal evaluation of changes in vascular diameter. Therefore, causal relationships between age and vascular measurements could not be established.

Furthermore, pulmonary artery pressures were not confirmed by right heart catheterization or echocardiographic evaluation, which are considered standard methods for the diagnosis of pulmonary hypertension. The classification of participants as healthy was based primarily on CT findings and the absence of known pulmonary disease. Finally, measurements were performed using CT imaging, and despite standardized measurement techniques, interobserver and intraobserver variability may still have influenced the results.

Future multicenter studies including larger sample sizes, balanced age groups, comprehensive clinical data, and prospective follow-up are needed to establish more reliable reference values for pulmonary artery and aortic diameters in the Turkish population.

## CONCLUSION

This retrospective study evaluated the diameters of the ascending aorta (AA), main pulmonary artery (MPA), right pulmonary artery (RPA), left pulmonary artery (LPA), and the PA:A ratio in individuals with no known history of pulmonary hypertension and no pulmonary pathology detected on CT examinations who were therefore considered healthy. The mean diameters were 34.1 mm for the AA, 25.9 mm for the MPA, 21.1 mm for the RPA, and 20.2 mm for the LPA; the mean PA:A ratio was 0.78. No significant gender-related differences were observed in the vascular measurements. A positive correlation was identified between age and the diameters of the AA, MPA, RPA, and LPA. In contrast, no significant correlation was found between age and the PA:A ratio.

### Ethics

**Ethics Committee Approval:** The study was approved by the

Erzincan Binali Yıldırım University Clinical Research Ethics Committee (decision numbered:541720, date: 21.04.2026).

**Informed Consent:** Retrospective study.

### Footnotes

### Author Contributions

Concept Design – H.K., Data Collection or Processing – A.O.G., Analysis or Interpretation – H.K., Literature Review – A.O.G., Writing, Reviewing and Editing – H.K.

**Declaration of Interests:** The authors declare that they have no conflicts of interest.

**Funding:** The authors declare that this study has received no financial support.

## REFERENCES

1. Ozan H. Ozan Anatomi. 3rd ed. Ankara: Klinisyen Tıp Kitabevleri, 2014. [CrossRef]
2. Arıncı K, Elhan A. Anatomi. 7th, Ankara; Güneş Kitabevleri 2020. [CrossRef]
3. Karakuş H, Poyraz N. Pulmonary angiography with low dose contrast media in 64-Slice CT: a feasibility study. *Selcuk Med J*.2021;37(1): 64-69. [CrossRef]
4. Zhao W, Guo J, Dong N, Hei H, Duan X, Shen C. Diagnostic value of 3D volume measurement of central pulmonary artery based on CTPA images in the pulmonary hypertension. *BMC Med Imaging*. 2023;13; 23(1):211. [CrossRef]
5. Lewis G, Hoey ET, Reynolds JH, Ganeshan A, Ment J. Multi-detector CT assessment in pulmonary Hypertension: techniques, systematic approach to interpretation and key findings. *Quant Imaging Med Surg*. 2015;5(3):423-432. [CrossRef]

6. Liu A, Xu W, Xi L, Deng M, Yang H, Huang Q, et al. Cardiovascular metrics on CT pulmonary angiography in patients with pulmonary hypertension–re-evaluation under the updated guidelines of pulmonary hypertension. *Insights Imaging*. 2023;14:179. [CrossRef]
7. Shen Y, Wan C, Tian P, et al. CT-base pulmonary artery measurement in the detection of pulmonary hypertension: a meta-analysis and systematic review. *Medicine (Baltimore*). 2014; 93(27): e256. [CrossRef]
8. Couch TJ, Beck GJ, Berman-Rosenzweig E, Carr JJ, Erzurum SC, Frantz RP et al. Pulmonary artery size on computed tomography associates with mean pulmonary artery pressure and mortality. *Annals of the American Thoracic Society*. 2026; 23(4):494-505. [CrossRef]
9. Lee SH, Kim YJ, Lee HJ, Kim HY, Kang YA, Park MS, et al. Comparison of CT-Determined Pulmonary Artery Diameter, Aortic Diameter, and Their Ratio in Healthy and Diverse Clinical Conditions. *PLoS One*. 2015;10(5):e0126646. [CrossRef]
10. Lange TJ, Dornia C, Stiefel J, Stroszczynski C, Arzt M, Pfeifer M, et al. Increased pulmonary artery diameter on chest computed tomography can predict borderline pulmonary hypertension. *Pulm Circ* 2013; 3:363-368. [CrossRef]
11. Nakanishi R, Rana JS, Shalev A, et al. Mortality risk as a function of the ratio of pulmonary trunk to ascending aorta diameter in patients with suspected coronary artery disease. *Am J Cardiol*. 2013; 111:1259-1263. [CrossRef]
12. Truong QA, Massaro JM, Rogers IS, et al. Reference values for normal pulmonary artery dimensions by noncontrast cardiac computed tomography: the Framingham Heart Study. *Circ Cardiovasc Imaging*. 2012;5:147-154. [CrossRef]
13. Tekcan Sanli DE, Sanli AN, Yildirim O, Erginoz E, Yildirim D. Normative reference values of major thoracic arterial vasculature in Turkiye. *North Clin Istanb*. 2023;17;10(2):263-270. [CrossRef]
14. Berger T, Siepe M, Simon B, et al. Pulmonary artery diameter: means and normal limit-assessment by computed tomography angiography, *Interactive CardioVascular and Thorac Surg*. 2022;34:637-644.
15. Karazincir S, Balcı A, Seyfeli E, et al. CT assessment of main pulmonary artery diameter. *Diagn Interv Radiol*. 2008; 14:72-74. [CrossRef]
16. Kuriyama K, Gamsu G, Stern RG, Cann CE, Herfkens RJ, Brundage BH. CT-determined pulmonary artery diameters in predicting pulmonary hypertension. *Invest Radiol*. 1984; 19:16-22.
17. Rogers R. Digital Methods. Cambridge, MA: MIT Press;2013. [CrossRef]
18. Mao Y, Yuan J, Zhong J. Density functional calculation of transition metal adatom adsorption on graphene. *J Phys Condens Matter*. 2008;19;20(11):115209. [CrossRef]
19. Canadas V, Vilacosta I, Bruna I, Fuster V. Marfan syndrome. Part: 2. treatment and management of patients. *Nat Rev Cardiol*. 2010; 7:266-76. [CrossRef]
20. Srimannarayana I, Varma RS, Satheesh S, Anilkumar R, Balachander J. Supravalvular aortic stenosis and coronary ostial stenosis in homozygous familial hypercholesterolemia. *Indian Heart J*. 2004; 56:152-4. [CrossRef]
21. Kamimura D, Uchino K, Ogawa H, Shimizu M, Shigemasa T, Morita Y, et al. Small proximal aortic diameter is associated with higher central pulse pressure and poor outcome in patients with congestive heart failure. *Hypertens Res*. 2014;37:57-63. [CrossRef]
22. Li S, Zhuang B, Yin G, Yang X, Zhao S, Lu M. Reference values of thoracic aorta and pulmonary artery diameters by age and gender in healthy Chinese adults assessed by cardiac magnetic resonance imaging: data from national center for cardiovascular diseases of China. *Int J Cardiovasc Imaging*. 2021;37(4):1423-1431. [CrossRef]