

# Airway-artery quantitative assessment on chest CT in pediatric Primary Ciliary Dyskinesia

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## Appendix

Table A1: Indications for CT of control subjects

Clinical Diagnosis	Indication for CT	Findings	Number of subjects
<b>Asthma</b>	Assessment of trapped air, bronchiectasis, malacia	No trapped air, no bronchiectasis, no malacia	8
<b>Recurrent respiratory infections</b>	Assessment of trapped air, bronchiectasis, malacia	No trapped air, no bronchiectasis, no malacia	3
<b>Condition after esophageal atresia</b>	Assessment of tracheomalacia	No tracheomalacia	1

Table A2: Scan parameters used to obtain CTs. Values are given as median (interquartile range). Mann-Whitney test is used to test the differences between PCD and control patients. CTDI<sub>vol32cm</sub>= Computed Tomography Dose Index in a 32 cm body phantom, expressed in Grays (mGy). DLP=Dose Length Product, expressed in Grays per centimeters (mGy\*cm). --=not necessary because same data between PCD and controls

	PCD patients	Control patients	p-value
<b>Reconstruction increment (mm)</b>	0,8 (0,6-0,8)	0,8 (0,6-0,8)	--
<b>Tube Voltage (kV)</b>	110 (87,5-110)	100 (80-100)	0,074
<b>Pitch</b>	0,85 (0,85-0,85)	0,85 (0,85-0,85)	1,000
<b>Current-time product (mAs)</b>	25,5 (20,25-36,25)	28 (16,25-54,75)	0,906
<b>CTDI<sub>vol32cm</sub> (mGy)</b>	0,93 (0,70-1,08)	0,76 (0,48-0,93)	0,071
<b>DLP (mGy*cm)</b>	26 (18-31,3)	22,5 (10,75-33,25)	0,529

Table A3: Number of AA-pairs visible in the whole lung, per segmental generation and per lung lobes for PCD and control patients. Values are given as median (IQR). RUL=right upper lobe; RML=right middle lobe; RLL=right lower lobe; LUL=left upper lobe; LING=lingual; LLL=left lower lobe

	PCD patients	Control patients	p-value
<b>AA-pairs measured in total lung</b>	105,5 (83,5-140,50)	129 (121,25-149,75)	0,129
<b>AA-pairs in segm. generation 1</b>	13,5 (8,75-16,5)	15,5 (13-18)	0,235
<b>AA-pairs in segm. generation 2</b>	27 (24,75-34,25)	30 (28-34,75)	0,439
<b>AA-pairs in segm. generation 3</b>	33,5 (28-47,25)	32,5 (30,25-44,5)	0,959
<b>AA-pairs in segm. generation 4</b>	19,5 (11-26,5)	29 (19-34,75)	0,071
<b>AA-pairs in segm. generation 5</b>	6 (5,5-10)	11,5 (7-18,75)	0,056
<b>AA-pairs in segm. generation 6</b>	1 (0-3)	3 (1-6,5)	0,129
<b>AA-pairs in segm. generation 7</b>	0 (0-0)	0 (0-1,75)	0,086
<b>AA-pairs in segm. generation 8</b>	0 (0-0)	0 (0-0)	1,000
<b>AA-pairs in RUL</b>	21 (15,25-32)	25,50 (21-33,25)	0,341
<b>AA-pairs in RML</b>	6 (1,5-11,5)	10 (7,25-13,75)	0,115
<b>AA-pairs in RLL</b>	27,5 (19,75-36,25)	36,50 (33-45,5)	0,084
<b>AA-pairs in LUL</b>	19,50 (12,75-25)	19,50 (15,25-21,75)	0,680
<b>AA-pairs in LING</b>	5 (2,75-7,50)	5,50 (3,5-8,5)	0,468
<b>AA-pairs in LLL</b>	27,50 (18,50-32,50)	30 (25,25-35,50)	0,395

Table A4: Dimensions of inner airway diameters, outer airway diameters, wall thickness and artery diameter of PCD and control patients, divided according to different Segmental Generation. Values are expressed in mm and given as median (IQR), except for generation 7 in which data are given as minimum and maximum value (median value). \*=statistically significant; --=not available because only 2 measurements.

	PCD patients	Control patients	p-value
	Segmental Generation 1		
<b>Inner Airway Diameter (mm)</b>	3,37 (2,61-4,22)	2,74 (2,11-3,52)	<0,001*
<b>Outer Airway Diameter (mm)</b>	5,53 (4,65-6,41)	5,17 (4,22-6,08)	0,026*
<b>Wall Thickness (mm)</b>	2,06 (1,79-2,37)	2,38 (2,08-2,73)	<0,001*
<b>Artery Diameter (mm)</b>	4,71 (3,91-5,64)	4,79 (4,07-5,86)	0,181
	Segmental Generation 2		
<b>Inner Airway Diameter (mm)</b>	2,49 (1,96-3,24)	2,05 (1,57-2,68)	<0,001*
<b>Outer Airway Diameter (mm)</b>	4,37 (3,74-5,38)	4,07 (3,47-5,05)	0,010*
<b>Wall Thickness (mm)</b>	1,80 (1,55-2,13)	2,10 (1,8-2,48)	<0,001*
<b>Artery Diameter (mm)</b>	3,74 (2,87-4,65)	4,22 (3,52-5,05)	<0,001*
	Segmental Generation 3		
<b>Inner Airway Diameter (mm)</b>	2,11 (1,69-2,64)	1,74 (1,46-2,22)	<0,001*
<b>Outer Airway Diameter (mm)</b>	3,74 (3,32-4,51)	3,74 (3,27-4,37)	0,392
<b>Wall Thickness (mm)</b>	1,66 (1,43-1,93)	1,95 (1,71-2,29)	<0,001*
<b>Artery Diameter (mm)</b>	3,14 (2,58-3,91)	3,74 (3,18-4,37)	<0,001*
	Segmental Generation 4		
<b>Inner Airway Diameter (mm)</b>	1,94 (1,62-2,41)	1,64 (1,33-2,01)	<0,001*

<b>Outer Airway Diameter (mm)</b>	3,57 (3,12-4,07)	3,43 (3,03-3,91)	0,022
<b>Wall Thickness (mm)</b>	1,61 (1,35-1,88)	1,77 (1,56-2,06)	<0,001*
<b>Artery Diameter (mm)</b>	2,86 (2,3-3,57)	3,42 (2,94-3,91)	<0,001*
Segmental Generation 5			
<b>Inner Airway Diameter (mm)</b>	1,78 (1,51-2,12)	1,58 (1,35-1,83)	<0,001*
<b>Outer Airway Diameter (mm)</b>	3,29 (3,02-3,91)	3,36 (3,03-3,74)	0,893
<b>Wall Thickness (mm)</b>	1,57 (1,31-1,79)	1,79 (1,55-2,08)	<0,001*
<b>Artery Diameter (mm)</b>	2,64 (2,17-3,15)	3,36 (2,93-3,91)	<0,001*
Segmental Generation 6			
<b>Inner Airway Diameter (mm)</b>	1,74 (1,55-1,95)	1,49 (1,15-1,89)	0,012*
<b>Outer Airway Diameter (mm)</b>	3,25 (3,0-3,45)	3,25 (2,79-3,57)	0,864
<b>Wall Thickness (mm)</b>	1,38 (1,30-1,62)	1,71 (1,46-1,98)	<0,001*
<b>Artery Diameter (mm)</b>	2,31 (1,85-2,71)	3,31 (2,74-3,57)	<0,001*
Segmental Generation 7			
<b>Inner Airway Diameter (mm)</b>	1,31-1,43	0,94-1,95 (1,34)	--
<b>Outer Airway Diameter (mm)</b>	2,40-2,75	2,4-3,57 (2,99)	--
<b>Wall Thickness (mm)</b>	1,09-1,32	1,09-1,98 (1,65)	--
<b>Artery Diameter (mm)</b>	1,77-2,04	1,77-3,29 (3)	--

Table A5: Dimensions of Airway-artery ratio of PCD and control patients, divided according to different Segmental Generation. Values are given as media (IQR), except for generation 7 in which data are given as minimum and maximum value (median value). *AinA*=inner airway diameter/artery diameter; *AoutA*=outer airway diameter/artery diameter; *Awt*=airway wall thickness/outer airway diameter; *AwtA*=airway wall thickness/artery diameter; \*=statistically significant; --= not available because only 2 measurements.

	PCD patients	Control patients	p-value
Segmental Generation 1			
<b>AinA</b>	0,71 (0,62-0,85)	0,56 (0,49-0,64)	<0,001*
<b>AoutA</b>	1,17 (1,03-1,35)	1,04 (0,96-1,16)	<0,001*
<b>Awt</b>	0,39 (0,34-0,44)	0,46 (0,41-0,52)	<0,001*
<b>AwtA</b>	0,44 (0,38-0,54)	0,49 (0,42-0,56)	0,002*
Segmental Generation 2			
<b>AinA</b>	0,7 (0,58-0,87)	0,51 (0,43-0,59)	<0,001*
<b>AoutA</b>	1,18 (1,02-1,43)	1,01 (0,92-1,1)	<0,001*
<b>Awt</b>	0,41 (0,36-0,47)	0,50 (0,44-0,55)	<0,001*
<b>AwtA</b>	0,49 (0,42-0,63)	0,50 (0,41-0,60)	0,738
Segmental Generation 3			
<b>AinA</b>	0,67 (0,54-0,83)	0,49 (0,41-0,55)	<0,001*
<b>AoutA</b>	1,19 (1,03-1,39)	1,01 (0,93-1,10)	<0,001*
<b>Awt</b>	0,43 (0,38-0,50)	0,52 (0,47-0,58)	<0,001*
<b>AwtA</b>	0,53 (0,43-0,63)	0,53 (0,46-0,60)	0,690
Segmental Generation 4			
<b>AinA</b>	0,74 (0,54-0,89)	0,49 (0,41-0,55)	<0,001*
<b>AoutA</b>	1,2 (1,05-1,52)	1,01 (0,92-1,11)	<0,001*

<b>Awt</b>	0,44 (0,39-0,50)	0,52 (0,47-0,57)	<0,001*
<b>AwtA</b>	0,54 (0,46-0,68)	0,52 (0,45-0,61)	0,008*
Segmental Generation 5			
<b>AinA</b>	0,71 (0,58-0,84)	0,48 (0,40-0,56)	<0,001*
<b>AoutA</b>	1,28 (1,13-1,51)	1,01 (0,93-1,10)	<0,001*
<b>Awt</b>	0,46 (0,40-0,51)	0,52 (0,49-0,57)	<0,001*
<b>AwtA</b>	0,59 (0,51-0,69)	0,54 (0,46-0,60)	<0,001*
Segmental Generation 6			
<b>AinA</b>	0,76 (0,58-1,03)	0,46 (0,38-0,59)	<0,001*
<b>AoutA</b>	1,37 (1,14-1,78)	1,01 (0,94-1,08)	<0,001*
<b>Awt</b>	0,46 (0,4-0,5)	0,54 (0,43-0,61)	0,001*
<b>AwtA</b>	0,61 (0,52-0,74)	0,54 (0,43-0,62)	0,009*
Segmental Generation 7			
<b>AinA</b>	0,66-0,70	0,33-0,75 (0,49)	--
<b>AoutA</b>	1,33-1,35	0,84-1,52 (1,0)	--
<b>Awt</b>	0,45-0,48	0,45-0,65 (0,57)	--
<b>AwtA</b>	0,62-0,64	0,45-0,84 (0,56)	--

Table A6: Dimensions of Airway-artery ratio of PCD and control patients, divided according to different Lung Lobes. Values are given as median (IQR). AinA=inner airway diameter/artery diameter; AoutA=outer airway diameter/artery diameter; Awt=airway wall thickness/outer airway diameter; AwtA=airway wall thickness/artery diameter; RUL=right upper lobe; RML=right middle lobe; RLL=right lower lobe; LUL=left upper lobe; LING=lingual; LLL=left lower lobe. \*=statistically significant.

	PCD patients	Control patients	p-value
RUL			
<b>AinA</b>	0,66 (0,52-0,83)	0,51 (0,42-0,58)	<0,001*
<b>AoutA</b>	1,2 (1,03-1,45)	1,04 (0,96-1,14)	<0,001*
<b>Awt</b>	0,45 (0,4-0,52)	0,51 (0,46-0,57)	<0,001*
<b>AwtA</b>	0,56 (0,46-0,66)	0,53 (0,46-0,63)	<0,001*
RML			
<b>AinA</b>	0,72 (0,59-0,91)	0,49 (0,44-0,56)	<0,001*
<b>AoutA</b>	1,23 (1,09-1,56)	1,0 (0,94-1,09)	<0,001*
<b>Awt</b>	0,42 (0,37-0,49)	0,51 (0,46-0,56)	<0,001*
<b>AwtA</b>	0,55 (0,43-0,70)	0,51 (0,45-0,58)	0,228
RLL			
<b>AinA</b>	0,70 (0,58-0,85)	0,52 (0,42-0,59)	<0,001*
<b>AoutA</b>	1,2 (1,05-1,44)	1,01 (0,93-1,10)	<0,001*
<b>Awt</b>	0,43 (0,38-0,48)	0,5 (0,44-0,56)	<0,001*
<b>AwtA</b>	0,52 (0,43-0,65)	0,51 (0,44-0,58)	0,020*
LUL			

<b>AinA</b>	0,64 (0,53-0,79)	0,47 (0,4-0,56)	<0,001*
<b>AoutA</b>	1,14 (0,98-1,35)	1,0 (0,92-1,08)	<0,001*
<b>Awt</b>	0,44 (0,38-0,50)	0,52 (0,47-0,59)	<0,001*
<b>AwtA</b>	0,5 (0,41-0,61)	0,52 (0,44-0,6)	0,142
	LING		
<b>AinA</b>	0,68 (0,58-0,85)	0,50 (0,43-0,55)	<0,001*
<b>AoutA</b>	1,16 (1,05-1,43)	1,0 (0,92-1,08)	<0,001*
<b>Awt</b>	0,41 (0,35-0,48)	0,51 (0,46-0,55)	<0,001*
<b>AwtA</b>	0,51 (0,44-0,66)	0,52 (0,44-0,58)	0,309
	LLL		
<b>AinA</b>	0,74 (0,61-0,91)	0,5 (0,42-0,57)	<0,001*
<b>AoutA</b>	1,22 (1,06-1,44)	1,0 (0,91-1,11)	<0,001*
<b>Awt</b>	0,4 (0,35-0,45)	0,52 (0,45-0,56)	<0,001*
<b>AwtA</b>	0,49 (0,41-0,61)	0,51 (0,44-0,6)	0,220