

### **Chest high-resolution computed-tomography (c-HRCT) scans**

From 2015 onwards, chest multidetector computed-tomography [MDCT] scans were performed on a Siemens SOMATOM Force scanner (Dual Source 384 [2x192] slice, Siemens, Forchheim, Germany) with c-HRCT reconstructions were obtained. Patients were scanned using 100 kilovolts (kV) and 32 milliamperes (mA). ‘Care Dose 4D’ (Siemens dose modulation) was used to modulate exposure factors using the x, y, and z-axis in real-time. Images were obtained using a detector collimation of 0.6 mm x 192 rows, pitch of 1.9 and rotation speed of 0.25-seconds. From the raw data (using Siemens ‘Syngo’ platform), thin reconstructions were produced at 0.6mm x 0.4mm. Lung windows were reconstructed with a 2mm thickness and interval. Soft tissue windows were also reconstructed with a thickness and interval of 5mm.

Prior to 2015, chest MDCT scans were performed on a Toshiba Aquillion One scanner (64 slice) (Toshiba Medical Systems Corp; Otawara, Tochigi, Japan). All patients were scanned using 120 kV and 52 mAs. Sure Exposure 3D (Toshibas dose modulation) was used to modulate exposure factors. A detector collimation of 0.5 mm x 64 rows was employed with a pitch of 0.828. From the raw data (using Toshiba's inbuilt platform) thin reconstructions were produced at 0.5mm x 0.3mm. Lung windows were reconstructed with a 2mm thickness and interval. Soft tissue windows were also reconstructed with a thickness and interval of 5mm.

### **Congenital Heart Disease patients**

Of the four children with history of congenital heart disease, only one child had tracheomalacia according to the ERS-TM definition. Another child had tracheomalacia according to the Any-TM definition. Both children were part of the cases group. Two other

children (one from cases group, one from control group) had no tracheomalacia (Any-TM or ERS-TM).

### **Sensitivity analysis**

There was a significant age difference between controls and cases. The distribution of ages of the controls and cases for patients having presence (yes) or absence (no) of tracheomalacia using both definitions of Any-TM and ERS-TM are shown in Figure S1.

A post-priori sensitivity analysis was undertaken because of the significant between-group differences in ages with controls of older than bronchiectasis cases. In a 2:1 distribution (to be consistent with the sample size calculation), the 16 oldest controls and the eight youngest cases were removed from the analysis. With this adjustment, the median age of the cases increased to 3.3-years (IQR 2.0-5.8) and for controls it reduced to 7.0-years (IQR 2.6-10.0). The 2x2 frequency table for the any-TM and ERS-TM groups are presented in Table S1 and the odds ratios and the adjusted odds ratios (for the sensitivity analysis) for other variables including age, ethnicity and sex using univariable and multivariable analyses are presented in Table S2.

### **Reference**

1. Wallis C, Alexopoulou E, Anton-Pacheco JL, Bhatt JM, Bush A, Chang AB, Charatsi AM, Coleman C, Depiazzi J, Douros K, Eber E, Everard M, Kantar A, Masters IB, Midulla F, Nenna R, Roebuck D, Snijders D, Priftis K. ERS statement on tracheomalacia and bronchomalacia in children. *Eur Respir J* 2019; 54: 1900382.

**Table S1:** Two-by-two frequency table of tracheomalacia diagnosed by two different diagnostic criteria: a sensitivity analysis<sup>a</sup>

	Any-TM n (%)			ERS-TM n (%)		
	No	Yes	Total	No	Yes	Total
<b>Control subjects</b>	71 (96%)	3 (4%)	74	<b>Control subjects</b>	74 (100%)	0 74
<b>Bronchiectasis</b>	23 (62%)	14 (38%)	37	<b>Bronchiectasis</b>	28 (76%)	9 (24%) 37
Total	95	17	111	Total	126	9 111

**Abbreviations:** Any-TM: presence of any tracheomalacia; ERS-TM: European Respiratory Society definition of tracheomalacia requiring >50% reduction in cross-sectional luminal area during quiet breathing [1]

<sup>a</sup> Eight youngest bronchiectasis cases and 16 oldest controls were excluded.

**Table S2:** Univariable and multivariable analyses - sensitivity analysis

		OR	95%CI	<i>P</i>	OR <sub>adj</sub> <sup>a</sup>	95%CI	<i>P</i>	OR <sub>adj</sub> <sup>b</sup>	95%CI	<i>P</i>
BE	<b>Any-TM</b>	12.8	3.4-49	<0.001	<b>13.3</b>	3.3-53	<0.001			
	<b>ERS-TM</b>	31.4	4.7-Infinity	<0.001				<b>26.4</b>	3.9-Infinity	<0.001
	Age	0.9	0.7-0.9	0.004	0.8	0.7-0.9	0.01	0.9	0.7-0.9	0.02
	Ethnicity	0.5	0.1-2.7	0.5						
	Gender	1.1	0.5-2.3	0.9						

**Abbreviations:** Any-TM; presence of any tracheomalacia; ERS-TM: CI: confidence interval; European Respiratory Society definition of tracheomalacia (i.e., cross-sectional luminal >50% reduction) [1]; OR: odds ratio; OR<sub>adj</sub><sup>a</sup>: Adjusted odds ratio from multivariable analysis of Any-TM and age; OR<sub>adj</sub><sup>b</sup>: Adjusted odds ratio from multivariable analysis of ERS-TM and age; *P*: p-value.

**Figure S1 legend**

Ages of control and case subjects with tracheomalacia (Any-TM and ERS-TM).

**Abbreviations:** Any-TM: presence of any tracheomalacia; ERS-TM: European Respiratory Society definition of tracheomalacia requiring >50% reduction in cross-sectional luminal area during quiet breathing <sup>1</sup>

