

included. Forced expiratory volumes and flows pre- and post-BD were reported. Absolute mean  $\pm$  SD changes (ml) in children with and without asthma and the difference between the two groups were computed. Asthma diagnosis was physician-based and current asthma medication was also recorded. Children stopped short- and long-acting  $\beta$ 2-agonists at least 4h and 12h, respectively, before performing spirometry. Independent sample t-test and chi-square tests were used to compare groups.

### Results

Of the 130 included children (mean  $\pm$  SD age 10.1  $\pm$  4.1 years; 77(59%) boys), a total of 47 (36.2% [95% CI: 27.9–44.4]) had asthma. After BD inhalation, the absolute mean  $\pm$  SD change was significantly greater in children with asthma in comparison to those without asthma in FEV1 (16.3  $\pm$  17.0 ml vs. 8.4  $\pm$  13.8 ml,  $p=0.008$ ), FEV0.5 (19.8  $\pm$  14.4 ml vs. 10.7  $\pm$  15.4 ml,  $p=0.035$ ), FEF25–75% (54.2  $\pm$  42.6 ml vs. 27.7  $\pm$  42.4 ml  $p=0.001$ ) and FEF75% (34.9  $\pm$  34.1 ml vs. 17.7  $\pm$  32.3 ml  $p=0.006$ ). The mean difference (95%CI) of the changes after BD between both groups was: 4.16 (1.45–6.87)% in FEV1; 6.18 (0.32–12.0)% in FEV0.5; 15.8 (8.4–23.2)% in FEF25–75% and 20.6 (9.8–31.4)% in FEF75%. Restricting the analysis to children with asthma, 22 (58%) had current medication. There was no difference in post-BD changes between asthma children with and without current medication.

### Conclusion

The assessment of bronchodilator response using spirometry should consider parameters that reflect small and medium airways function and not be limited to FEV1. Furthermore, interpretation of significant differences in bronchodilator must be considered whether they are both statistically and clinically meaningful.

## #J74 – Clinical Value of Functional Parameters in the Differential Diagnosis of Protracted and Chronic Children's Cough.

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### Aim

To investigate the clinical significance of the features of functional parameters of the respiratory and cardiovascular systems in children with cough.

### Patients and methods

91 children aged from 1 to 17 years with cough during more than 3 weeks were examined. All patients were divided into four groups according to diseases: 31 patients with mild persistent bronchial asthma (BA) in exacerbation and incomplete remission (group (Gr) 1); 22 patients with upper respiratory tract infection (URTI) (Gr2); 18 patients with lower respiratory tract infection (LRTI) (Gr3); 11 patients with gastroesophageal reflux disease (GERD) (Gr4). The control Gr (C) included 60 healthy children (1–17 years of age). Excluded from this

study were patients with the diagnosis of a foreign body airway ( $n=1$ ), psychogenic and neurogenic cough ( $n=2$ ), bronchopulmonary malformations ( $n=6$ ). All patients underwent history, examination, evaluation of heart rate variability (HRV); and computerized bronchophonography (CBPG) for patients under 7 years old.

### Results

Children with cough due to BA were characterized by significant change in the acoustic characteristics of breath sounds: increased level of the acoustic component of the work of breathing (A) in the high-frequency zone (5.0–12.6 kHz, A3) – 69.8(4.88–600.5) mJ ( $p1-c < 0.01$ ) and the proportion of the A in the middle-(1.2–5.0 kHz,  $\phi$ 2) and high-frequency zone ( $\phi$ 3) in level of the A of the general-frequency zone (respectively, 0.09 (0.0165–0.43); 0.01 (0.0016–0.03);  $p1-c < 0.01$ ). Gr1 was characterized by the prevalence of the activity of the parasympathicus (PNS) (at HRV analysis): increase in RMSSD, pNN50% and HF (respectively, 45.6 (10.9–101.3) ms, 15.3(1–76)%; 46.6(12.1–64.3) ms); reducing level of the LF (26.6(8.5–43.8) vs. Gr2, 3, 4, C ( $p<0.05$ ).

The patients with cough due to URTI were characterized by minimal disruption of the functional state of the respiratory system: increase in A2(274.48(20.63–779.49) mJ) vs. C (55.03(2.47–493.94) mJ) ( $p2-c<0.05$ ).

The patients with cough due to LRTI were characterized by a moderate disturbance of the functional state of the respiratory system: increase in A2, A3 (respectively, 2448.26(562.67–4722.69) mJ; 322.75(43.31–1818.78) mJ;  $p2-3 < 0.01$ ) and  $\phi$ 2,  $\phi$ 3 (respectively, 0.14(0.0334–0.271); 0.021(0.005–0.096);  $p3-c < 0.01$ ). Parameters of HRV in Gr2 and Gr3 had a similar orientation as the predominance tone of the sympatheticus: reduction in RMSSD, pNN50%, HF and increase in IC, LF compared with Gr1, C ( $p<0.05$ ).

Changes in the functional parameters of the respiratory system were not typical for children with cough due to GERD. They had a moderate increase in activity of the PNS (RMSSD, pNN50%, HF) compared with C ( $p4-c<0.05$ ). The level of the SDNN was highest in this Gr (37.8(14.4–61.5) ms ( $p4-c<0.05$ ).

Thus, analysis of the functional state of the respiratory and cardiovascular system can be useful as additional criteria for the differential diagnosis of chronic and protracted cough in children.

## #J75 – Evaluation of Nasal Patency in Children: Data of 737 Consecutive Rhinomanometry Tests before and after Vasoconstrictor Treatment.

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## Background

Rhinomanometry is a simple and useful method for objective evaluation of nasal airway patency. However, there is a lack of published studies in pediatric patients. We aimed to evaluate nasal patency assessed by rhinomanometry and its variation after administration of an intranasal vasoconstrictor in children.

## Methods

We included all children (age <18 years) who underwent rhinomanometry (Masterscreen Rhino<sup>®</sup>) pre- and post-intranasal vasoconstrictor (phenylephrine hydrochloride 2.5 mg/ml), at CUF Porto – Instituto and Hospital from July 2011 to July 2016. When more than one rhinomanometry was performed, only the first one was included in the analysis. We assessed the demographic (gender, age, race) and nasal patency variables pre- and post-vasoconstriction: inspiratory and expiratory nasal airflow in the right and left nostrils; inspiratory (RAARi) and expiratory (RAARe), right and left, airflow resistance, at a sample pressure of 150 Pa, and nasal airflow and resistance variation ( $\Delta$ ). The measurements of right and left nostrils were described by considering the total number of measurements regardless of laterality, and stratified in “best” and “worst” nostrils according to baseline inspiratory airflow. The Jonckheere-Terpstra test was used to identify trends across ranked groups by age.

## Results

We included 737 children, 466 (63%) boys, with a mean (SD) weight of 43.5 (17.1) kg, height of 147.1 (19.4) cm and age of 10.9 (3.5) years (min-max: 4–17); 148 (20%) children were < 7 years old, 142 (19%) 7 – 9 years, 189 (26%) 10 – 12 years and 258 (35%) between 13 and 17 years. Among the age groups, statistically significant differences were observed in all baseline variables ( $p < 0.05$ ), with a trend for increasing flows and decreasing resistances with increasing age. Otherwise, the variations in flows and resistances with vasoconstriction were not significantly different across the age groups. Median (P25;P75) of the inspiratory flow in the “best nostril” was 211 (140;313) mL/s vs.

115 (72;176) mL/s in the worst nostril ( $p < 0.001$ ). The variation in the “worst nostril” was 72% (19;146) vs. 18% (-3;58) in the best nostril ( $p < 0.001$ ). After vasoconstrictor treatment, the pre “worst nostril” reached a flow higher than the pre “best nostril” in 32% of children.

## Conclusions

The differences found between the age groups indicate that age may be an important factor that should be taken into account when evaluating nasal patency with rhinomanometry. The high proportion of children with variation after intranasal vasoconstrictor is an indication of the usefulness of assessing vasoconstrictor response at pediatric age.

## #197 – Quantitative Assessment of the Effect of External Stents in Trachea-Bronchomalacia by Measuring Tracheal Collapsibility.

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Using a graft as an external stent is an effective mode of treatment in trachea-bronchomalacia, but there are cases where the airway collapses after the operation when the work of breathing increases, even though during the operation under muscle relaxant the airway seemed to be patent. We studied tracheal collapsibility aimed at quantitatively assessing the effect of external stents in tracheo-bronchomalacia.

## Patients and Methods

available data of tracheal collapsibility before and after external stents were assessed in 32 patients, 44 lesions (trachea 27, left main bronchus 13, right main bronchus 5). A Gore-Tex ringed vascular

	Age groups					p-value
	Total (n=737)	< 7years (n=148)	7-9 years (n=142)	10-12 years (n=189)	13-17 years (n=258)	
<b>Height (cm), mean (sd)</b>	147 (19.4)	121 (6.6)	135 (6.3)	150 (8.1)	167 (11.4)	
<b>Insp flow (ml/s), med (P25;P75)</b>						
Pre	154.5 (90.0;248.3)	124.0 (73.0;188.0)	127.5 (76.0;200.3)	152.0 (87.0;242.0)	196.0 (121.0;306.3)	< 0.001
$\Delta$	38.3 (3.2;105.0)	31.7 (-0.2;95.3)	54.9 (7.9;111.6)	40.4 (3.0;114.2)	32.0 (3.8;99.4)	0.603
<b>Exp flow (ml/s), med (P25;P75)</b>						
Pre	124.0 (69.8;211.3)	85.0 (55.8;156.5)	104.0 (56.0;162.0)	126.0 (72.0;209.0)	171.5 (100.8;265.0)	< 0.001
$\Delta$	44.9 (4.4;116.4)	44.9 (0.0;118.9)	53.2 (5.9;130.0)	47.4 (3.9;134.0)	39.5 (5.0;100.0)	0.271
<b>RAARi (kPa*s/L), med (P25;P75)</b>						
Pre	0.9 (0.6;1.5)	1.1 (0.8;1.8)	1.1 (0.7;1.7)	0.9 (0.6;1.6)	0.7 (0.5;1.2)	< 0.001
$\Delta$	-27.3 (-51.0;-3.1)	-24.4 (-48.8;0.2)	-35.1 (-52.1;-7.3)	-28.7 (-53.2;-3.0)	-23.9 (-49.6;-3.5)	0.523
<b>RAARe (kPa*s/L), med (P25;P75)</b>						
Pre	1.1 (0.7;2.0)	1.5 (0.9;2.3)	1.4 (0.8;2.2)	1.1 (0.7;1.9)	0.9 (0.6;1.4)	< 0.001
$\Delta$	-30.5 (-53.0;-4.0)	-30.3 (-52.8;0.2)	-33.7 (-55.6;-5.4)	-31.8 (-57.0;-3.7)	-27.9 (-49.0;-4.7)	0.356

**Table 1.** Nasal airway resistances and flow and its variation after intranasal vasoconstrictor. Data of right and left nostrils were considered together. sd- standard deviation; insp- inspiratory; exp- expiratory; cm- centimeters; ml- milliliters; s- second; kPa- kilopascal; L- liters; med- median; P- percentile;  $\Delta$  - variation.