Data in Brief 31 (2020) 105859

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Respiratory polygraphy data of children investigated for sleep-disordered breathing with different congenital or respiratory diseases

Regula Corbelli[a,*], Marine Michelet[b], Constance Barazzone-Argiroffo[a]

[a] Pediatric Pulmonology Unit, Department of Pediatrics, Gynecology and Obstetrics, University Hospitals of Geneva, Geneva, Switzerland
[b] Division of Pediatric Pulmonology and Allergy, Children's Hospital, University Hospital of Toulouse, Toulouse, France

ARTICLE INFO

Article history:
Received 30 January 2020
Revised 12 May 2020
Accepted 8 June 2020
Available online 15 June 2020

Keywords:
Respiratory polygraphy in children
Sleep-disordered breathing
Respiratory indices in different pediatric diseases
Transcutaneous capnometry

ABSTRACT

This short report describes respiratory indices of polygraphies (PG) performed to investigate several sleep-related disorders of breathing in children. It refers to the work of Michelet et al., Successful home respiratory polygraphy to investigate sleep-disordered breathing in children, Sleep Medicine [1]. Indications for PGs were grouped according to 6 categories: craniofacial malformation, neuromuscular disease, obesity, suspected obstructive sleep apnea (OSA), prematurity, and other. The reported data concern the initial interpretable PGs ($N = 289$); initial was defined as performed for the first time in any subject. Non-interpretability was defined as absent or unreliable oxygen saturation by pulse oximetry (SpO_2), and/or airflow and respiratory inductance plethysmography (RIP) flow trace signals during time analyzed. Analyzed time is reported. In a subset of patients, transcutaneous carbon dioxide partial pressure ($p_{tc}CO_2$) was also measured. Data may be re-used for comparison in future validating research for PGs in children [2].

* Corresponding author.
E-mail address: regula.corbelli@hcuge.ch (R. Corbelli).

https://doi.org/10.1016/j.dib.2020.105859

Specifications Table

Subject	Pulmonary and Respiratory Medicine
Specific subject area	Pediatric sleep-disordered breathing investigated by polygraphy
Type of data	Table of respiratory indices in comparison to different underlying pathologies
How data were acquired	Respiratory polygraphies were recorded using Embla® Embletta® GOLD™ portable sleep system (made in the United Kingdom), downloaded and scored manually with RemLogic-E™ software. $P_{tc}CO_2$ was measured using the Radiometer's transcutaneous monitoring systems TOSCA 500® and TCM TOSCA® using TCM 4®, with the tc Sensor 92®. Data were downloaded, analyzed and stored using Visi-Download® software from Stowood. Indices and indications and underlying diseases were taken from the server-based PG archive and the computerized patient medical records.
Data format	Analyzed data. Raw data.
Parameters for data collection	Retrospective data collection from computerized PG archives and computerized patient records.
Description of data collection	We collected the data of all PGs performed between 2012 and 2015. No records were excluded. We divided the records into two groups, initial PGs and subsequent PGs. Initial PGs were defined as those performed for the first time in any subject. The data presented in this paper refer to initial and interpretable PGs. The indications for PG and indices were drawn from the computerized patient records and computerized PG archive.
Data source location	Institution: University Hospitals Geneva, Children's Hospital City/Town/Region: Geneva Country: Switzerland
Data accessibility	Analyzed data is provided in Table 1. Raw data is stored in a public repository: Repository name: Mendeley Data Corbelli, Regula (2020), "Data of respiratory polygraphy of children investigated for sleep disordered breathing with different congenital or respiratory diseases.", Mendeley Data, v3http://dx.doi.org/10.17632/pnrp24rkyj.3
Related research article	The data presented in this article are related to [1] Michelet et al., Successful home respiratory polygraphy to investigate sleep-disordered breathing in children, Sleep Medicine, https://doi.org/10.1016/j.sleep.2019.11.1264 and do not duplicate what is described in the latter.

Value of the data

- This dataset presents the comparison of respiratory indices as well as the oxygen saturation obtained by PG between different groups of sleep-disordered breathing.
- In addition to the mainly described OSA, our dataset adds useful values for other sleep-related breathing disorders in children.
- The data promote the feasibility of transcutaneous carbon dioxide partial pressure measurement concomitantly to PG in children.
- The dataset may be of use for pediatricians, pediatric pulmonologists and sleep specialists.
- The data can be used to encourage validating of PG devices in children.

1. Data description

In Table 1 we present the analyzed data of the initial interpretable PGs ($N = 289$) showing their respiratory indices in relationship to 6 groups of indications: craniofacial malfor-

Table 1
Respiratory indices and indications of children's polygraphies.

	Indication						*p*-value*
	Craniofacial malformation	Neuromuscular disease	Obesity	Suspected OSA	Prematurity	Other (excl. prematurity)	
AHI	3.07 (± 7.23, 0, 15)	4.23 (± 3.14, 3, 13)	3.81 (± 11.7, 1, 32)	3.06 (± 6.48, 1, 191)	12 (± 13.4, 8.5, 6)	4.59 (± 7.62, 2, 32)	0.0016
OAI	1.27 (± 3.59, 0, 15)	1.08 (± 2.56, 0, 13)	1.44 (± 7.77, 0, 32)	0.513 (± 2.02, 0, 189)	1.67 (± 1.21, 1.5, 6)	0.188 (± 0.78, 0, 32)	0.0004
CAI	0.467 (± 0.743, 0, 15)	0.462 (± 0.519, 0, 13)	0.313 (± 0.931, 0, 32)	0.339 (± 1.01, 0, 189)	7.83 (± 14.3, 2.5, 6)	1.88 (± 6.58, 0, 32)	0.0002
MAI	0 (± 0, 0, 15)	0 (± 0, 0, 13)	0 (± 0, 0, 32)	0.0106 (± 0.103, 0, 189)	0.167 (± 0.408, 0, 6)	0.0938 (± 0.39, 0, 32)	0.0221
AI	1.8 (± 4.092, 0, 15)	1.692 (± 2.428, 1, 13)	1.781 (± 7.766, 0, 32)	1.03 (± 3.209, 0, 191)	9.833 (± 13.93, 5.5, 6)	2.156 (± 6.609, 0, 32)	0.0004
HI	1.33 (± 3.33, 0, 15)	2.46 (± 2.18, 2, 13)	2.06 (± 4.2, 1, 32)	2.01 (± 4.36, 0, 191)	2.17 (± 2.64, 1.5, 6)	2.38 (± 4.1, 1, 32)	0.0977
ODI	3.33 (± 7.91, 1, 15)	8.69 (± 17, 3, 13)	4.63 (± 10.7, 2, 32)	4.87 (± 8.26, 2, 191)	18.2 (± 16.6, 13.5, 6)	7.13 (± 11.3, 3, 32)	0.0243
Mean SpO_2(%)	97.2 (± 1.38, 97, 15)	94.8 (± 4.15, 96, 13)	94.6 (± 6.74, 96, 32)	96.7 (± 1.8, 97, 191)	95 (± 2.28, 95, 6)	95.9 (± 1.99, 96.2, 32)	0.0009
SpO_2<90% (mn)	1.2 (± 2.57, 0, 15)	30.7 (± 84.8, 0, 13)	0.29 (± 0.864, 0, 31)	6.13 (± 34.5, 0, 191)	17.2 (± 22, 7.5, 6)	14.4 (± 45.6, 0, 32)	0.0055
Time analyzed (mn)	469 (± 106, 463, 15)	445 (± 122, 454, 13)	475 (± 75.3, 479, 32)	483 (± 90.3, 484, 191)	593 (± 144, 611, 6)	521 (± 132, 542, 32)	0.0297
$p_{tc}CO_2$ mean (kPa)	7.35 (± 2.62, 7.35, 2)	5.67 (± 0.589, 5.85, 10)	6.6 (± 1.14, 7.1, 3)	5.64 (± 0.552, 5.5, 11)	5.3 (± 1.13, 5.3, 2)	5.13 (± 0.996, 5.3, 11)	0.2292
% of analyzed time spent with $p_{tc}CO_2 \geq$ 6.5 kPa	0 (± NA, 0, 1)	18.4 (± 31.8, 0, 7)	50.7 (± 45, 66, 3)	14.6 (± 21.2, 0, 9)	NA (± NA, NA, 0)	9.7 (± 28.3, 0, 10)	0.4559

* Kruskal-Wallis test. Values are given as mean (± standard deviation, median, number of observations), Prism (version 8.1.0, GraphPad Software Inc.).AHI, apnea hypopnea index; OAI, obstructive apnea index; CAI, central apnea index; MA, mixed apnea index; AI, total apnea index; HI, hypopnea index; ODI, oxygen desaturation index; SpO_2, peripheral capillary oxygen saturation by pulse oximetry; $p_{tc}CO_2$, transcutaneous carbon dioxide partial pressure; OSA, obstructive sleep apnea; mn, minutes; NA, not applicable; PG, polygraphy.Respiratory indices and indications reported for the initial and interpretable PGs of our series (289/400 PGs).

mation 15/289 (5%), neuromuscular disease 13/289 (5%), obesity 32/289 (11%), suspected OSA 191/289 (66%), prematurity 6/289 (2%), other 32/289 (11%). The data presented are given as mean (±standard deviation, median, number of observations).

The following respiratory indices are displayed: apnea hypopnea index; obstructive apnea index; central apnea index; mixed apnea index; total apnea index; hypopnea index; oxygen desaturation index; mean peripheral capillary oxygen saturation by pulse oximetry (SpO_2) and time spent with $SpO_2 < 90\%$. The time analyzed (expressed in minutes) to calculate the above mentioned indices is also reported and was obtained by cutting off the awake times of the recorded time. This information was provided by the nursing staff or parents and children on a diary.

In a subset of PGs, measurement of transcutaneous carbon dioxide partial pressure ($p_{tc}CO_2$) was performed. We report mean $p_{tc}CO_2$ in kilopascals (kPa) and% of analyzed time spent ≥ 6.5 kPa.

The raw dataset used to analyze above mentioned data is stored in the Mendeley Data repository.

2. Experimental design, materials, and methods

2.1. Design

Retrospective data collection using server based PG archive and computerized patients medical records. Between 2012 and 2015, we performed 400 PGs in 332 subjects. We divided records into two groups, initial PGs and subsequent PGs. Initial PGs were defined as those performed for the first time in any subject. Data shown in this report are restricted to initial interpretable PGs (289/400).

2.2. Material

PGs were performed with the Embla® Embletta® GOLD portable sleep system, over one night of sleep, either in hospital or at home. The child was equipped with the belts and polygraph in hospital by a dedicated nurse. Nasal cannula was locked into the polygraph and inserted later into the nostrils when going to sleep. PGs were performed in hospital when patients were already hospitalized or in patients with risk of life threatening events or difficult to look after at home. PGs were done at home when children and parents were capable or willing to do so. For home PG, children were equipped in hospital in the same way as described above and went home wearing the equipment. Parents, children or ward nurses were asked to fill in a diary for the night and to record the awake time and all intercurrent events. In hospital, PGs were done on a general ward or in the intermediate care unit, and not in a dedicated sleep laboratory.

Indications for performing PG were grouped according to categorized diseases, for further details please refer to [1].

2.3. Methods

Each PG was downloaded and scored manually for respiratory events using RemLogic-E™ software. Total recording time was adjusted regarding sleep and awake periods by using the information in the patient's diary and reported as time analyzed. Non-interpretability was defined as an absent or unreliable SpO_2 signal and/or when airflow and RIP flow trace signals were absent or unreliable during time analyzed. Time analyzed is reported (see Table 1).

Respiratory indices were scored according to pediatric scoring rules published by the American Academy of Sleep Medicine (AASM) [3,4].

Apnea was defined as a drop in the peak signal excursion of the nasal flow trace or RIP flow (Xflow^{TM}) trace by $\geq$ 90% of the pre-event baseline for at least the time equivalent to two breaths. Obstructive apnea was scored if respiratory effort was maintained. Central apnea was scored if inspiratory effort was absent, and associated with a drop in oxygen desaturation $\geq$ 3% or if the event was lasting 20 s or longer. Hypopnea was defined as a decrease in $\geq$ 30% of the amplitude of nasal flow trace or RIP flow (Xflow^{TM}), during the time equivalent to two breaths, and associated with a drop in oxygen saturation of $\geq$ 3% [3, 4].

The apnea hypopnea index (AHI) was defined as the total number of respiratory events (apneas plus hypopneas) divided by the time analyzed in hours. Mean oxygen saturation was recorded, and the number of events of oxygen desaturation $\geq$ 3% divided by the time analyzed in hours was defined as the oxygen desaturation index (ODI).

Transcutaneous carbon dioxide partial pressure ($p_{tc}CO_2$) was measured using the Radiometer's transcutaneous monitoring systems TOSCA 500® and TCM TOSCA® using TCM 4®, with the tc Sensor 92® placed either on the forehead or on the upper sternum. Data were downloaded using Visi-Download® software from Stowood. Total recording time was adjusted by cutting off artifacts from the $p_{tc}CO_2$ channel to calculate time analyzed. For the present dataset we collected mean $p_{tc}CO_2$ and percentage of analyzed time spent above a $p_{tc}CO_2$ of $\geq$ 6.5 kPa to detect hypoventilation.

2.4. Statistics

The respiratory indices were compared between the different groups by using Kruskal Wallis test. The statistical analysis was performed with Prism application (version 8.1.0, GraphPad Software Inc.).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

Acknowledgments

We thank Y. Donati for assistance with statistical analysis.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dib.2020.105859.

References

[1] Michelet M. et al., Successful home respiratory polygraphy to investigate sleep-disordered breathing in children, Sleep Med., 10.1016/j.sleep.2019.11.1264.
[2] V. Kirk, J. Baughn, L. D'Andrea, N. Friedman, A. Galion, S. Garetz, et al., American academy of sleep medicine position paper for the use of a home sleep apnea test for the diagnosis of OSA in children, J. Clin. Sleep Med. Off Publ. Am. Acad. Sleep. Med. 13 (2017) 1199–1203, doi:10.5664/jcsm.6772.
[3] R.B. Berry, R. Budhiraja, D.J. Gottlieb, D. Gozal, C. Iber, V.K. Kapur, et al., Rules for scoring respiratory events in sleep: update of the 2007 AASM manual for the scoring of sleep and associated events. Deliberations of the sleep apnea definitions task force of the American academy of sleep medicine, J. Clin. Sleep Med. Off Publ. Am. Acad. Sleep. Med. 8 (2012) 597–619, doi:10.5664/jcsm.2172.
[4] R.B. Berry, C.E. Gamaldo, S.M. Harding, R. Brooks, R.M. Lloyd, B.V. Vaughn, et al., AASM scoring manual version 2.2 updates: new chapters for scoring infant sleep staging and home sleep apnea testing, J. Clin. Sleep Med. Off Publ. Am. Acad. Sleep. Med. 11 (2015) 1253–1254, doi:10.5664/jcsm.5176.