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tested prospectively, including a sensitivity of 82% and NPV of 81% for the presence of moderate/severe OSA (OAHI > 5/hr).

Conclusion: The OSA-5 is a simple questionnaire that performs well as a triage screening tool to identify those children at risk of OSA among large numbers of referrals for SDB.

O018 | Intricacies of managing home ventilation: A hospital based program

K. Jess; M. Hollamby; J. Chawla; M.-A. Harris
Lady Cilento Children's Hospital, South Brisbane, Australia

Introduction: Paediatric home ventilation has escalated rapidly over the past decade; resulting in the need for a more structured program to meet the needs of these children and families at home. The Paediatric Home Ventilation program at our centre has recently undergone a major restructure. The aim of this study is to describe the intricacies of management within the current program, which cares for 14 children dependent on long-term ventilation and their associated complex needs.

Aims: (a) To determine if care requirements were regularly met for families, and describe any adverse events occurring in the home environment. (b) To review scheduled and unscheduled hospital visits with the aim of determining if a more efficient care coordination is possible for families using the new program.

Methods: A retrospective review of the12-month period following establishment of the new program. Data was obtained from the locally held electronic database.

Results: For the 14 patients on the program an average of 4,987 hr of care support is required per month to meet their medically recommended requirements (~1,247/week). With the new system (coordinated by nurse manager/admin staff) provision of care was achieved for >95% of shifts; this was predominantly overnight care support plus daytime and school shifts for specific patients (medically assessed). Reasons for failure of support worker provision included family refusal, support worker sickness. Over the 12 months 1 major and 9 minor adverse events were recorded with no overall negative outcomes. Events were reviewed by the specialist nurse to prevent further problems arising. Hospital visit data demonstrated a reduction in the number of scheduled visits with improved coordination of specialists involved; and a decreased in unscheduled visits through nurse led home visits.

Discussion: Through the development of a new program it has been possible to establish a successful system for improved family support, procedures for promptly evaluating and resolving adverse events occurring in the home, as well as reducing the burden of hospital visits for these complex patients. This model may be of interest to other centres that care for complex patients who require home long-term ventilation.

O019 | Lung function changes with initiation of non-invasive ventilation (NIV) in childhood Duchenne Muscular Dystrophy

M. Angliss; L. Gauld; K. Sclip
Lady Cilento Children's Hospital, Brisbane, South Brisbane, Australia

Introduction: The use of non-invasive ventilation (NIV) support in children has increased over the past decade. The aim of this study was to describe and analyse Lung Function (LF) changes with initiation NIV in children with Duchenne Muscular Dystrophy (DMD).

Methods: A retrospective clinical audit of children with DMD who were initiated on NIV in the past 10 years was conducted. Serial LF data was collected for individuals in the 4 years before and following NIV initiation. The rates of decline in LF were calculated by fitting a regression model to the combined data using the generalized estimating equations method to allow for repeat measures on patients. The influence of long-term steroid use was explored.

Results: 27 male patients with DMD initiated NIV during the study period at median age 14.67 years (IQR 2.41 years). Eight boys (29.6%) were long-term steroid users from a median age 7 years and 6 (22.2%) boys were steroid naive. The age NIV started was 14.26 years (IQR 3.82) for the steroid treated group, and 14.87 years (IQR 2.33) for the steroid naive group, with no statistical difference ($p = 0.44$). 26 children had >2 PFT before (121 tests), and 26 had >2 PFT after initiating NIV (109 tests). The rate of decline in FVC % predicted pre-NIV was −7.14% (95% CI −8.30 to −6.09) and post- NIV was −5.68% (95% CI −6.91 to −4.46), $p < 0.05$. The total AHI on diagnostic sleep study had median 8.3 (IQR 12.8) and maximum TcCO2 50.4 mmHg (IQR 8.8). When NIV was initiated a significant reduction in total AHI ($p < 0.001$) to 1.9 (IQR 3.7) and TcCO2 ($p < 0.001$) to 46.5 mmHg (IQR 6.1) was seen. 2 of the 27 children were deceased at time of writing.

Conclusion: The rates of decline in FVC are higher in boys with DMD prior to NIV than they are following NIV initiation, however, long-term steroid use does not affect the age when NIV is needed in DMD.

SLEEP & BREATHING MEASUREMENT

O020 | The upper airway is most collapsible during expiration in obstructive sleep apnoea

A. Osman[1,2]; J. Butler[1,2]; S. Gandevia[1,2]; D. Eckert[1,2]
[1]Neuroscience Research Australia (NeuRA), Sydney, Australia, [2]School of Medical Sciences, UNSW, Sydney, Australia

Introduction: Upper airway collapsibility is an important contributor to obstructive sleep apnoea (OSA) pathogenesis. Pharyngeal dilator muscle activity varies throughout the respiratory cycle and may

contribute to dynamic changes in upper airway collapsibility. We have recently shown that a test of upper airway collapsibility when awake correlates (r = 0.8, n = 34) with upper airway collapsibility during sleep (Pcrit) in people with OSA. However, whether upper airway collapsibility varies throughout the respiratory cycle is unknown. Thus, this study aimed to quantify differences in pharyngeal muscle activity and upper airway collapsibility during different phases of the respiratory cycle.

Methods: 8 middle-aged people with OSA (2 female) were fitted with standard polysomnography equipment, a nasal mask, pneumotachograph, two fine-wire intramuscular electrodes into the genioglossus muscle, and two pressure catheters across the collapsible portion of the upper airway (one at the level of the epiglottis, the other at the choanae). The upper airway collapsibility index (UACI) in the supine posture was quantified as: 100 * (choanal-epiglottic pressure)/choanal pressure in response to brief pulses of negative airway pressure (~−11 cmH_2O mask pressure). ~15 pulses were delivered every 2–8 breaths at random during each of the following four conditions: (a) early inspiration, (b) mid-inspiration, (c) early-expiration and (d) mid-expiration. Mean genioglossus EMG of the raw rectified signal in the 100 ms prior to pulse delivery was also quantified.

Results: Genioglossus EMG activity varied throughout the respiratory cycle (e.g. mid-expiration genioglossus EMG was 75 ± 15 whereas mid-inspiration was 128 ± 47% of the early inspiration value, p = 0.004). Similarly, upper airway collapsibility changed during the respiratory cycle (UACI during early-inspiration = 50 ± 28, mid-inspiration = 30 ± 19, early-expiration = 86 ± 17, mid-expiration = 99 ± 3%, $p < 0.01$).

Discussion: Consistent with changes in pharyngeal dilator muscle activity, upper airway collapsibility varies throughout the respiratory cycle. Indeed, the upper airway is more than 3 times more collapsible during mid-expiration compared to mid-inspiration. These findings provide insight into the physiological mechanisms of pharyngeal collapse in OSA.

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O021 | Diurnal changes in central blood pressure and pulse pressure amplification in obstructive sleep apnoea

Y. Serinel[1,2,3]; C. Hoyos[1,4]; A. Qasem[5]; B. Yee[1,2,6]; R. Grunstein[1,2,6]; K. Wong[1,2,6]; C. Phillips[1,2,7]

[1]NHMRC Centre for Integrated Research and Understanding of Sleep (CIRUS), and NHMRC Neurosleep Centre Woolcock Institute of Medical Research, The University of Sydney, Glebe, Australia, [2]The University of Sydney, Faculty of Medicine and Health, Sydney, Australia, [3]Dept of Respiratory and Sleep Medicine, Nepean Hospital, Penrith, Australia, [4]School of Psychology, University of Sydney, Sydney, Australia, [5]Department of Biomedical Sciences, Faculty of Medicine and Health Sciences, Macquarie University, Macquarie, Australia, [6]Department of Respiratory and Sleep Medicine, Royal Prince Alfred Hospital, Camperdown, Australia, [7]Department of Respiratory and Sleep Medicine, Royal North Shore Hospital, St Leonards, Australia

Study Objectives: Recent evidence suggests that compared to peripheral blood pressure (BP), central BP may be more strongly associated with target organ damage and cardiovascular morbidity and mortality. Technological advances now allow the ambulatory measurement of peripheral and central BP over 24 hr. For the first time, we set out to characterise the diurnal profile of central BP and pulse pressure amplification (PPA) in patients with obstructive sleep apnoea (OSA).

Methods: In this observational study, patients with moderate to severe OSA underwent 24 hr central and peripheral BP testing. Testing was repeated after at least 4 weeks of CPAP therapy. Concurrent actigraphy was performed to confirm sleep and wake times.

Results: 36 patients were screened, 31 had successful testing (mean (*SD*) age 45 ± 10 years, AHI 58 ± 27 events/hr, Office BP 136/89 ± 10.7/9.5 mmHg, 32% on anti-hypertensive medication, 77% dippers), 21 completed testing post CPAP. Central systolic and diastolic BP followed the same nocturnal dipping profile as peripheral BP, however the peripheral pulse pressure (PP) narrowed in sleep (−3.2 mmHg, $p < 0.001$), whereas the central PP remained unchanged (0.124 mmHg, NS), causing a significant reduction in PPA overnight (−10.7%, $p < 0.001$). After treatment with CPAP, the PPA reduction overnight was attenuated (by −3.3%, p = 0.004).

Conclusions: In moderate to severe OSA, central blood pressure and pulse pressure amplification reduce overnight during sleep. Further research is needed to quantify the differential effects of CPAP and anti-hypertensives on central vs. peripheral BP and the prognostic significance of changes in central BP with treatments.