ABSTRACT BOOK

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Topic: Asthma / Allergy

A qualitative explanation of indoor aeroallergen avoidance decisions amongst families of children and young people with asthma and allergic sensitisation

Abstract ID:14259

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Presenting Author: Grace Lewis

Introduction & Objectives: Allergen avoidance is frequently recommended for children and young people (CYP) with asthma and co-existing allergic sensitisation, to maximise asthma control. Evidence suggests that avoidance uptake is often limited or inconsistently implemented. To promote allergen remediation, a strong understanding of family beliefs and behaviours is needed to base interventions upon. A priori scoping review indicated a paucity of evidence explaining what informs remediation uptake[1]. Objective: To explain relevant beliefs and behaviours from CYP's and parents' perspectives.

Methods: In-depth interviews with CYP (11-15 years) with severe or sub-optimally controlled asthma and allergic sensitisation to domestic pets and house dust mite, and CYP's parents were conducted and analysed using grounded theory methodology.

Results: Families employed a range of trigger and allergen avoidance methods, often including those with the least evidence of effectiveness. Indoor allergens were not perceived in the same way as other triggers, due to not consistently seeing an exposure-outcome relationship for indoor allergens. The explanation for beliefs and behaviours centred on families needing to see an exposure-outcome relationship to promote indoor allergen remediation, unless prompted by recurrent attacks or informed by family history and experiences. Families respond dynamically to changes in how certain they are that indoor aeroallergens are problematic. This is often informed by a process of eliminating other causes of reduced asthma control, such as varied medication adherence or other trigger exposures, a process which delays remediation uptake for some.

Conclusions: Families learn iteratively, through experiences with triggers and allergens, alongside clinical discussions. As triggers and indoor aeroallergens are conceptualised differently, it is likely families would benefit from interventions to promote understanding of sensitisation and effects of chronic exposures to indoor aeroallergens. Interventions may require novel approaches to show potential exposure-outcome relationships. However, the dynamic responses of families to their experiences suggest they are open to trying remediations.

Funding: [This work is funded by Asthma + Lung UK as part of Asthma UK Centre for Applied Research AUK-AC-2018-01]

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1. Lewis, G., *et al.,* 2022. Influences on indoor environmental trigger remediation uptake for children and young people with asthma: A scoping review. *Health Expectations*. 26, 87-97. DOI: 10.1111/hex.13670

Topic: Asthma / Allergy

Dupilumab Reduces Exacerbations and Improves Lung Function In Children (6 to 11 Years) With Moderate-To-Severe Asthma and High Eosinophils

Abstract ID:14291

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Introduction & Objectives: Children with moderate-to-severe asthma often remain symptomatic despite standard-of-care treatments, and patients with elevated eosinophil levels frequently have increased rates of exacerbations and worse asthma control. In the phase 3 LIBERTY ASTHMA VOYAGE study (NCT02948959), treatment with dupilumab, a fully human monoclonal antibody that blocks the shared receptor component for IL-4 and IL-13, was generally well tolerated and resulted in fewer exacerbations and improved lung function vs placebo in children aged 6–11 years with uncontrolled moderate-to-severe asthma. This post hoc analysis evaluates dupilumab efficacy in patients with high blood eosinophils at baseline enrolled in the VOYAGE study.

Methods: Patients received add-on dupilumab (100/200 mg by body weight at randomization) or matched add-on placebo every 2 weeks (q2w) for 52 weeks. Endpoints included annualized rate of severe exacerbations and least squares mean (LSM) change from baseline in pre-bronchodilator (pre-BD) percent predicted forced expiratory volume in one second ($ppFEV_1$).

Results: In participants with baseline blood eosinophils ≥ 500 cells/μL, add-on dupilumab significantly lowered annualized exacerbation rates (0.249 [95% CI 0.156–0.397]; n = 126) compared with add-on placebo (0.749 [0.453–1.239]; $P < 0.001$; n = 48) and significantly improved pre-BD $ppFEV_1$ vs placebo (LSM difference [95% CI] 7.98 percentage points [2.17–13.78]; $P < 0.01$) at Week 52 in this population.

Conclusions: Dupilumab significantly reduced severe exacerbations and improved lung function as assessed by pre-BD $ppFEV_1$ vs placebo in children with moderate-to-severe asthma and baseline blood eosinophils ≥ 500 cells/μL.

Topic: Asthma / Allergy

Identifying factors acting as barriers to follow-up of children in general practice after secondary care emergency treatment for viral induced wheeze and asthma

Abstract ID:14232

Main Author: Thomas Williams

Author Organisation: University of Edinburgh / Royal Hospital for Children and Young People, Edinburgh

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Presenting Author: Thomas Williams

Introduction & Objective: Guidance from the National Institute for Health and Care Excellent (NICE) Quality Standard (QS) 25, Quality Statement 4, states that children and young people who receive treatment in an emergency care setting for an asthma attack should be followed up by their general practice within 2 working days of discharge. We were interested in establishing which factors were acting as a barrier to implementation of this statement.

Methods: We conducted an online, anonymous questionnaire of healthcare professionals working in primary care with children with viral induced wheeze (VIW) and asthma in NHS Lothian. We asked whether they routinely reviewed children with these diagnoses following an acute asthma attack, the time-frame for this review, whether a template was used, what additional resources would be helpful, and whether they would support a specialist nurse led Safe Discharge Pathway model for children admitted with asthma.

Results: A total of 97 healthcare professionals responded. As it was anonymised to encourage completion, we could not identify what proportion of the 122 primary care practices in NHS Lothian were covered; within some practices >1 respondent may have completed the questionnaire. GPs were the most common respondents (58/97, 59.8%), followed by Practice Nurses (23/97, 23.7%) and pharmacists (5/97, 5.2%). Of the respondents 56/97 (57.7%) stated that they did not routinely review paediatric patients following an asthma attack treated in secondary care, and 68/97 (70.1%) did not do so for VIW. Of respondents, only 9/97 (9.3%) worked in practices which provided a review within 48 hours. Eight respondents stated that they used a template for a post-attack review (8/97, 8.2%), and 48/97 (49.5%) stated that they did not but would find such a template helpful. When asked for which resources would be helpful in facilitating reviews, the most common responses were for online (60/97, 61.9%) or face-to-face (33/97, 34%) training in VIW and asthma management in children, for extra dedicated hours for a member of the team to perform a review (54/97, 55.7%), and for access to written asthma plans (44/97, 45.4%). When asked whether they would support a specialist nurse led post-attack review service such as implemented in Northern Ireland, 94/97 (96.8%) of respondents stated they would. A review of free-text comments showed common themes of logistical difficulties in organising post-attack reviews, poor communication from secondary care, lack of funding for such reviews, and queries about what such reviews would achieve, particularly for younger children with VIW.

Conclusions: Quality Statement 4 from the NICE Asthma QS (25) was rarely met amongst primary care respondents. Common themes identified were requests for further resources to provide post-attack reviews in primary care, but also strong support for the proposal that these be carried out in secondary care by a dedicated team.

Topic: Asthma / Allergy

Long-Term Safety and Efficacy Of Dupilumab in Children with Asthma: LIBERTY ASTHMA EXCURSION

Abstract ID:14264

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Presenting Author: Ross Thomas

Introduction & Objectives: Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for IL-4/IL-13. Efficacy and safety of dupilumab in children with asthma have been demonstrated up to 52 weeks in VOYAGE (NCT02948959).

Methods: 365 pediatric participants who completed VOYAGE entered EXCURSION (NCT03560466), a 52-week open-label study of dupilumab 100/200mg (body-weight based) every 2 weeks; a patient subgroup received 300mg every 4 weeks. Treatment-emergent adverse events, blood eosinophil count, total serum IgE, annualized rate of severe asthma exacerbations (AER), and change from VOYAGE baseline in percent predicted forced expiratory volume in 1 second ($ppFEV_1$) were assessed.

Results: Dupilumab was well tolerated, and the safety profile was consistent with the parent study (**Table**). Blood eosinophil count decreased from baseline in VOYAGE with median changes (Q1:Q3) of -140 (-410:10) cells/µL at EXCURSION Week 52 for dupilumab/dupilumab (n=191) and -30 (-260:70) cells/µL for placebo/dupilumab (n=105). Total IgE declined substantially throughout EXCURSION with median percent change from VOYAGE baseline to EXCURSION Week 52 of -89.9% for dupilumab/dupilumab (-339.0 IU/mL; n=219) and -80.0% for placebo/dupilumab (-278.0 IU/mL; n=114). Median total IgE at Week 52 was 40.5 and 53.5 IU/mL for dupilumab/dupilumab and placebo/dupilumab, respectively. The low unadjusted AER and improved $ppFEV_1$ observed in VOYAGE were sustained in patients with type 2 inflammatory phenotype (**Table**).

Conclusions: Long-term use of dupilumab was well tolerated, with a decline in type 2 biomarkers including blood eosinophils and total serum IgE. Efficacy observed in VOYAGE in patients with type 2 asthma was sustained in EXCURSION over an additional 52 weeks.

Topic: Asthma / Allergy

Low-Dose LPS Induces Tolerogenic Treg Skewing in Asthma

Abstract ID:14314

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Co-Authors: Bo Liu, Jihong Dai, Zhengxiu Luo, Zhou Fu

Presenting Author: Fengxia Ding

Introduction & Objectives: Asthma is one of the most common chronic respiratory diseases distinguished by airway inflammation and airway hyperresponsiveness. LPS is found in the cell wall of Gram-negative bacteria which are ubiquitous components of our environment. LPS is a common experimental mimic of bacterial exposure and is one of the most potent microbial stimuli of inflammation. Several studies have shown that LPS exacerbated bronchoconstrictive and inflammatory effects in patients and animal model with allergic asthma, and enhanced antigen-specific allergic responses in the airway, and the severity of asthma is associated with LPS concentration. However, recent experiments and epidemiological studies show that LPS protects against asthma. Explanations for these discrepancies may include: 1) LPS concentration affects the severity of asthma, and 2) different airway responses to endotoxin depend on subject age.We explored whether prior exposure to LPS before OVA induction of asthma protects mice from developing asthma, and whether these effects are concentration-dependent. Furthermore, the mechanisms mediating the protective effects of LPS in asthma were investigated.

Methods: Three-day or four-week-old Balb/c mice were treated intranasally with varying concentrations of LPS (1 ug, 10 ug, and 100ug) or sterile PBS for 10 days, then mice were exposed to OVA at six-week-old. Asthma phenotype and T-cell immune balance were assessed following prior exposure to different stage and dosage of LPS. Then the change of GITRL/GITR signaling pathway and the therapeutic effect of its blocking on asthma is investigated.

Results: Low doses LPS （1ug） pre-exposure in neonatal mice（from third day of life） can protect from OVA-induced asthma by inducing tolerogenic Treg skewing, which is regulated by downregulating GITRL/GITR signaling pathway.

Conclusions: Low doses LPS pre-exposure in neonatal mice may protect from OVA-induced asthma by downregulating GITRL/GITR signaling pathway

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Topic: Asthma / Allergy

Paediatric Asthma Spacer Management- Protecting Our Planet with Less Plastic

Abstract ID:14324

Main Author: Matthew Hick

Author Organisation: Leeds Teaching Hospitals NHS Trust

Co-Authors: Matthew Hick, Emma Guy, Alex Adams

Presenting Author: Matthew Hick

Introduction & Objectives: The green agenda for asthma has identified the significant carbon footprint of asthma treatments. As a tertiary asthma service we evaluated the spacer usage across our medical wards, to assess the possibility of a targeted reduction in the use of plastic consumables. We assessed spacer use in children admitted to hospital with asthma. The hypothesis was that we would be able to reduce our carbon footprint across our trust and also implement cost savings; our total spend on spacer devices on three of our medical wards was £15,400 in 2021.

Methods: We identified that spacer devices across our teaching hospital were being duplicated, with multiple spacer devices at the patient's bedside. We set out to reduce the number of spacer devices used by encouraging patients to bring their existing spacers to hospital. We also used education to ensure when a spacer device was initiated within the Trust, it was the most appropriate one for the patient. We educated staff and put interventions in place to encourage the appropriate use of spacers across the Trust. These interventions were undertaken for a 12 month period at the end of which we analysed spacer numbers for comparable admission data.

Results: Over the 12 months of the project we saw a reduction in the number of spacers used across the medical ward, in 2020-21 we used 1674, following the intervention in 2021-22 with used a total of 1329, resulting in a 15% reduction in spacers with a cost saving of over £2,500. We saw an overall increase in the number of spacers with mouthpieces and reduction in spacers with masks.

Conclusions: By identifying the correct spacer device and reducing duplication we were able to reduce spacer use by 15% in 12 months. This has both a positive environmental impact and showed a significant cost saving. With the implementation of this work across the trust including the emergency department we will increase the cost savings and further reduce the use of plastic consumables.

Topic: Asthma / Allergy

Perceptions of risks of fatal attacks: asthma and food anaphylaxis

Abstract ID:14192

Main Author: Yvonne Bingham

Author Organisation: Imperial College London

Co-Authors: Louise Fleming

Presenting Author: Yvonne Bingham

Introduction & Objectives: The UK has the highest rate of asthma deaths in children and young people (CYP) in Europe but few recommendations from confidential death reviews have been implemented. Highly publicised deaths from food anaphylaxis (FA) have led to changes in the way that allergen information is presented. The aim of the study is to assess risk perception of an asthma related death compared to FA among parents of CYP with asthma and healthcare professionals (HCPs).

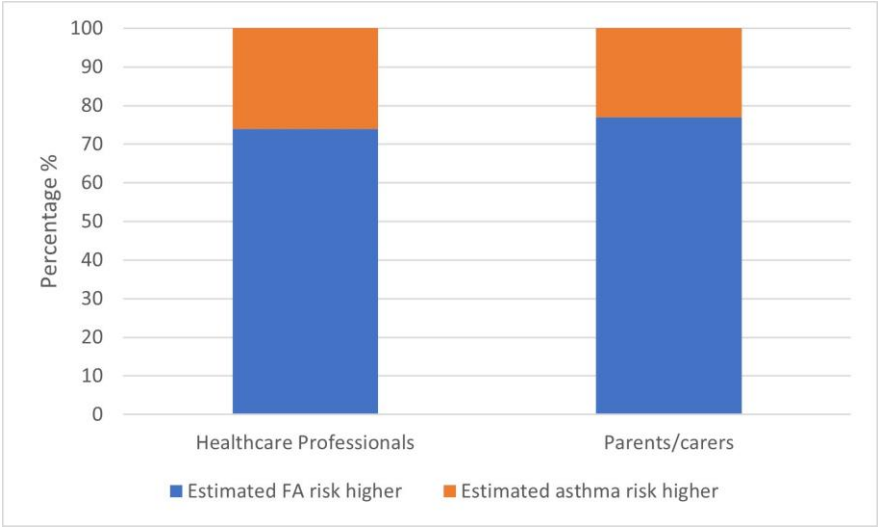
Objectives:

- Define the current risk of death in CYP with asthma and compare this to published data on anaphylaxis related deaths.
- Assess risk perception of both an asthma related death and a FA death.

Methods:

1. Review of literature and public databases in order to determine the current mortality rate and risk of death in CYP with asthma.
2. A survey of risk perception of both asthma related and FA related death among parents of CYP with asthma and HCPs. Participants estimated the risk of both an asthma related death and a FA related death using a risk ladder.

Results: The risk of death for CYP with asthma is 1 per 1 million compared to 1 per 10 million for FA. 13 parents and 27 HCPS were surveyed. 10% people surveyed accurately estimated the risk of an asthma death. 90% over-estimated the risk and nobody under-estimated the risk. All participants over-estimated the risk of fatal food anaphylaxis. The majority of parents and HCPs (77% and 74% respectively) estimated the risk of FA greater than the risk of an asthma related death (Figure 1).



Conclusions

CYP with asthma are more likely to die from asthma than those with food allergy are to die from anaphylaxis. HCPs looking after children with asthma need to be aware of the risks so that a balance can be struck between ensuring that CYP and their families are aware of the risks without causing undue anxiety.

Topic: **Asthma / Allergy**

Real life evaluation of maintenance and reliver therapy (MART) for treating paediatric asthma.

Abstract ID:14271

Main Author: Steph Harper

Author Organisation: University Hospitals Trust Southampton

Co-Authors: Catherine Crocker, Amanda Harris, Alison McEvoy, Gary Connett

Presenting Author: Steph Harper

Introduction & Objectives: MART therapy for asthma is not a new concept. In recent years it has become the most common management approach for those attending our paediatric respiratory service. We have received positive feedback after out-patient follow up and have gone on to obtain more structured feedback about efficacy from families in a real-world setting.

Methods: An anonymous questionnaire was sent to 62 families of young people known to be on a MART regime under the specialist care of Southampton Children's Hospital.

Results: 47% (29) families provided feedback from across a wide age range: under six (10%), 6-12 (48%) and over 12's (42%). 82% (24) thought their child's asthma was not under control prior to starting treatment. After the introduction of a MART regime 89% (26) reported improved control. 79% (23) had been started by a respiratory consultant. 72% (21) were using a dry powder device and 27% (8) were using an MDI and spacer. All families stated they were confident that the inhaler technique for their chosen device was effective and 96% (28) were confident they knew when to seek medical help. Salbutamol use was evaluated. 67% (20) continued to have salbutamol available. 7 had continued using salbutamol to prevent exercise induced symptoms. Of these, 3 stated they still used salbutamol frequently. The remaining 13 only had it available for use in the event of acute severe wheeze in advance of seeking medical attention.

Conclusions: We have received positive feedback about the effectiveness of MART regimes to treat childhood asthma in secondary and tertiary referrals to our service. Further evaluation is needed to determine MART's effectiveness in preventing acute asthma attacks and in achieving long term benefits.

Topic: Asthma / Allergy

Real time mapping of particulate matter (PM) concentrations and paediatric asthma emergency department (ED) visits

Abstract ID:14341

Main Author: Karl Holden

Author Organisation: Alder Hey Children's Hospital

Co-Authors: Alice Lee, Charlotte King, Olufemi Olajide, Jonathan Higham, Ian Sinha

Presenting Author: Karl Holden

Introduction & Objectives: Current evidence linking PM concentrations and paediatric asthma ED visits is based on varying methodologies, often using modelled data. In 2019, modelled government data showed that Liverpool (UK) exceeded the WHO recommended limit for PM in every local authority. Liverpool persistently experiences higher than national average paediatric hospitalisation for asthma.

Aim: To identify children in Liverpool at risk of pollution driven asthma attacks by linking real time business intelligence data for ED visits and city-wide PM sensor data.

Methods: The University of Liverpool's air quality network is equipped with 37 optical particle counters to measure PM concentrations city-wide hourly. Accuracy is ensured by calibration against reference stations and a machine learning algorithm is employed to generate contour plots. The same methodology is applied to interpolate data on asthma ED visits (ICD-10 codes and post code of residence), analysed using the gliding box algorithm to determine the density of ED visits.

Results: We present data for a 150-day period (Figure 1). There is a clear relationship between average PM concentrations around a child’s residence and ED visits with asthma.

Conclusions: Ongoing work includes interrogation of temporal and spatial relationships and linking to prescribing data to further elucidate associations between PM concentrations and asthma morbidity.

Topic: Asthma / Allergy

Reducing asthma exacerbations after the start of the school year: empowering children and families

Abstract ID:14218

Main Author: Lynsey Brown

Author Organisation: Alder Hey Childrens Hospital

Co-Authors: Victoria Worrall, Karl Holden, Lillley Andrew, Claire Hepworth, Helen Harper, Lucy Gait, Ian Sinha, Laura Marsh, Christopher Grime

Presenting Author: Lynsey Brown

Introduction & Objectives: Introduction: Asthma attacks significantly increase for children and young people (CYP) after returning to school from the summer break. This results in increased hospital admissions, missed school and loss of work days for parents/carers. It is important that we innovate ways to reduce asthma attacks after the new school year, which empower CYP and their families.

Aims: We created and provided CYP attending our Multidisciplinary Asthma Service (MDAS) clinic with back to school packs aiming to empower them with tools for improving asthma management to prevent/reduce asthma attacks.

Methods: The specialist MDT team developed advice and action plans to provide to CYP, families and schools, combined to form a back to school pack sent to our 120 patients. This included asthma action and school plans, age and treatment-specific inhaler device advice, and advice on wellbeing/exercise/sleep to empower children and families to make them feel prepared and support schools to manage asthma well.

Results: Our response rate from the questionnaires was 15%. The responses from parents show that the packs were thought to be helpful (82%). In particular the asthma plans (71%) and school plans (77%) were most useful. Parents felt the packs prevented additional visits to school from asthma nurses and helped them manage their child's asthma after going back to school. The preferred way to receive the packs was via email.

Conclusions: We have shown that in CYP attending our MDAS clinic, back to school packs were useful and families felt prepared and empowered to reduce the risk of asthma attacks. Future analysis could look at number of asthma attacks over the school year.

Topic: Asthma / Allergy

Systematic review of remote consultation for paediatric asthma

Abstract ID:14245

Main Author: Lucy Barnard

Author Organisation: King's College London

Co-Authors: Mahta Haghighat Ghahfarokhi

Presenting Author: Lucy Barnard

Introduction & Objectives: During the COVID-19 pandemic, remote consultations provided a solution to overcome social distancing and maintain contact with patients, especially those vulnerable such as asthmatic children. However, remote consultations need investigation to establish their efficacy over in-person consultations and inform guidelines for their implementation.

Methods: This qualitative systematic review analysed English-language studies, conducted between 2018 and 2023, on remote consultations within the paediatric asthma population. The review employed comprehensive searches of PubMed, Embase, and Web of Science databases, utilising search terms such as e-consult(s), teleconsult(s), remote consult(s), digital consult(s) and telemedicine to identify relevant studies.

Results: 199 papers were manually screened, 33 research papers were included. The majority were published in the years 2020 to 2023. Positive impacts on treatment and control were highlighted by the majority of the studies: 24 studies reported improved asthma control as a result of the remote consultations; 26 studies highlighted that remote consults improved patient access to healthcare. 14 studies highlighted difficulties in building rapport with patients, whilst 3 studies noted struggles overcoming language barriers remotely. Notably, few studies reflected on the safeguarding role of paediatric consults.

Conclusions: Remote consultations are as effective as in-person consultations and have numerous demonstrated benefits for the paediatric asthma population. Notably, increased adherence and reduced exacerbations. Importantly for this population, the flexibility that teleconsults provide improves access and reduces the demand for travel which reduces cost, time out of school and carbon emissions. Remote consults are more efficient and timely, allowing clinicians to contact large numbers of patients. Additionally, an advantage unique to digital consults is the ability for clinicians to assess the patient's environment. This is particularly helpful for asthma patients as it can identify potential triggers at home. However, certain aspects of paediatric consultations rely on face-to-face interaction such as the development of rapport. We must also highlight the additional role paediatric consultations play in safeguarding, which must be considered when implementing these consults. As such, we feel they are most effective when implemented alongside face-to-face consultation to provide the utmost level of patient care.

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Topic: Asthma / Allergy

The Effect of Dupilumab on Lung Function by Allergen Sensitization Status in Pediatric Asthma

Abstract ID:14279

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Co-Authors: Nikolaos G. Papadopoulos, Vivian Hernandez-Trujillo, Eckard Hamelmann, Robert S. Zeiger, Francine M. Ducharme, Nami Pandit-Abid, Rebecca Gall, Ross Thomas

Presenting Author: Ross Thomas

Introduction & Objectives: 85% of children with uncontrolled, moderate-to-severe asthma have type 2 inflammatory asthma (baseline blood eosinophils ≥150 cells/μL or FeNO ≥20 ppb); many exhibit an allergic phenotype. Asthma can lead to severe and/or frequent exacerbations and abnormal lung function. Dupilumab, a fully human monoclonal antibody, blocks signaling of IL-4/-13, key drivers of type 2 inflammation. In phase 3 VOYAGE (NCT02948959), add-on dupilumab vs placebo reduced severe exacerbations, and improved lung function and asthma control in children aged 6–11 years with uncontrolled, moderate-to-severe type 2 asthma. Dupilumab demonstrated an acceptable safety profile. This analysis compared the effect of dupilumab vs placebo on lung function in VOYAGE patients with type 2 asthma stratified by allergen sensitization status.

Methods: Children were classified as non-sensitized (n=75; no perennial aeroallergen-specific IgE ≥0.35 kU/L at baseline), monoallergen- (n=58) or multiallergen (n=203)-sensitized (1 [mono-] or >1 [multi-] aeroallergen-specific IgE ≥0.35 kU/L, respectively). Least squares mean (LSM) change from baseline in pre-bronchodilator percent predicted forced expiratory volume in 1 second (pre-BD ppFEV$_1$) was assessed.

Results: Dupilumab vs placebo significantly improved pre-BD ppFEV$_1$ in multiallergen-sensitized patients at Weeks 2 (LSM difference [95% CI]: 5.3 percentage points [1.4–9.2]; P<0.01) and 52 (9.0 percentage points [4.0–14.1]; P<0.001) and in monoallergen-sensitized patients at Week 52 (10.1 percentage points [4.2–16.1]; P<0.01).

Conclusions: Dupilumab improved pre-BD ppFEV$_1$ as early as Week 2 in children with moderate-to-severe type 2 asthma and mono- or multi-allergen sensitizations; improvements were sustained through Week 52. Small sample sizes limited efficacy comparisons among the 3 groups.

Topic: Asthma / Allergy

Weaning Off Weaning Off – A multi-site study appraising the safety of moving away from paediatric salbutamol weaning plans

Abstract ID:14326

Main Author: Niall Durrant

Author Organisation: Epsom and St Helier University Hospitals NHS Trust

Co-Authors: Julia He, Sarah Menezes, Nicholas Stephens, Lorna Reiss, Siobhan Easton, Ritu Handa

Presenting Author: Niall Durrant

Introduction & Objectives: Paediatrics is transitioning from high dose salbutamol weaning discharge plans to a patient-led, symptom focused approach, based on epidemiological and pharmacological evidence of the harms of salbutamol overuse[1]. Concerns were raised to paediatric transformation teams in regards to this change, centring around safety and perceived risk of increased burden on paediatric emergency departments (PED). We set out to examine these concerns in two neighbouring district general hospitals in South-West London. We hypothesised appropriate stakeholder education and engagement would avoid significant impacts on these measures.

Methods: Data was prospectively collected regarding admission and representation rates and duration of admission, over 12 weeks from October 2019 to January 2020, and the same period over 2022-23, having implemented the change in asthma management at St Helier at the start of the 2022 monitoring period. This allowed comparison both to pre-covid standards, and between sites following change in practice.

Results: Rates of representation were essentially unchanged at St Helier after stopping weaning plan use, from 4.92% of children and young people seen in PED in 2019-20 to 4.87% in 2022-23, but rose at Epsom from 9.2% to 11.7% over the same period. Rates of admission fell at St Helier from 37% to 20% of attendances, and rose over the same period at Epsom Hospital from 29% to 33%. Average admission duration fell across both sites during the period studied, 49 hours falling to 44 hours at Epsom, St Helier 36 hours falling to 35.

Conclusions: This study demonstrates the safety of moving away from fixed dose salbutamol weaning regimes. Concerns that change would increase pressures on busy emergency and paediatric departments were not validated. In fact re-presentation and admission rates fell or failed to rise as expected during the intervention, possibly reflecting the benefits of improved clinician, patient and carer understanding of asthma management and of a personalised, patient centred approach. Stepwise implementation and review of outcomes encouraged team feedback and engagement, with confidence in aligning across both sites by February 2023. The data warrants potential further investigation to see if hospitalisation rates and admission duration persistently fall when new discharge planning is established across both sites.

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Topic: Cystic Fibrosis / Suppurative Lung Disease

Common Respiratory Organisms grown within the first year of diagnosis in Cystic Fibrosis

Abstract ID:14282

Main Author: Lindsay Berry

Author Organisation: East Kent NHS Hospitals Trust

Co-Authors: Ola Smith

Presenting Author: Lindsay Berry

Introduction & Objectives: Identify commonly found organisms from cough swabs of an infant/child with Cystic Fibrosis (CF); within the first year of diagnosis

Methods: Review of EKHUFT electronic records to collate data. Comparison of data to national statistics. Caseload of 35 patients within East Kent with CF. First year of diagnosis was confirmed through newborn blood spot screening and/or positive sweat test results. For ease of data collection subjects were removed that had an unconfirmed diagnosis, total of 28 patients results reviewed

Results: CF guidelines suggest respiratory samples are collected at all appointments and when acutely unwell. New patients should be reviewed frequently following diagnosis decreasing to 1-3 monthly in clinic subsequently. Patients in the audit had a sample collection range between 8-13 swabs per year. All samples were collected as cough swabs, total of 348 swabs completed. Within EKHUFT 100% of patients had a respiratory sample collected at diagnosis. Positive results showed most commonly grown Staphylococcus and Enterobacter. Other growths included; E.coli, Haemophilus, Klebsiella, Streptococcus, Stenotrophomonas Maltophilia and Pseudomonas Putida. In the patients first year of monitoring most commonly found organisms were Normal Respiratory Flora (41.7%) Candida (13.86%). Symptom causing organisms, most commonly seen was Enterobacter Cloacae (12.7%), Klebsiella (9.7%) & Haemophilus (6.31%). Staphylococcus Aureus is reported to be frequently grown within the CF airways (national average 25% in <3year olds), however within the audit it was only seen in 3.7% of the total swabs. Likely reduced due to the high use of anti-staphylococcal prophylaxis within the patient group. Prophylactic antibiotic use was seen in 80% of the patients, 89.2% of those- flucloxacillin. Separating the data into mutations (x= Homozygous DF508, y= Heterozygous DF508) showed group X had almost three times more rates of Klebsiella [x 42.7% & y 14.7%], more than tenfold of Acinetobacter (x25% & y1.92%) and nearly double Enterobacter (x32.8% & y19.87). Both groups had a similar incidence in growths of Staphylococcus Aureus, Pseudomonas Aeruginosa and Candida. In group Y, they were twice as likely to grow Haemophilus than the homozygous group.

Conclusions: National data is limited for comparison in under 1years. Also, samples in infants can be troublesome and less reliable, however, within the audit it was found that most samples grew organisms. EKHUFT Data also shows compliance to current UK guidance for use of anti-staphylococcal prophylaxis which has probably given a lower rate of Staphylococcus infection than expected. Patients with DF508 Homozygous appear to be more likely to grow a multi resistant organism and have a broader range of growths compared to heterozygous patients, but the incidence of staphylococcus Aureus and pseudomonas Aeruginosa remain similar. Within groups of mutations, the incidence of growths of organisms is less predictable and environmental exposure and transmission of infection should also be considered.

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Topic: Cystic Fibrosis / Suppurative lung disease

Community based bacterial surveillance, self-swabbing for Paediatric Bronchiectasis and Primary Ciliary Dyskinesia: Our patients benefited

Abstract ID:14332

Main Author: Jill Hyson

Author Organisation: NHS Lothian

Co-Authors: Kirstin Unger, Dr Stefan Unger

Presenting Author: Jill Hyson

Introduction & Objectives: International guidance recommends airway microbiology testing in paediatric outpatients with bronchiectasis (NCFB) every 6-12 months1, and every 3 months in Primary Ciliary Dyskinesia (PCD)2 to identify new pathogens, and guide antibiotic therapy. Previous audits of our caseload showed sporadic microbiology testing for these patient groups 3, 4. As part of a patient centred, equitable, guideline driven pathway quality improvement project for children and young people (CYP) with chronic suppurative lung disease (CSLD) a trial of surveillance self-sampling (SS-Sa) was led by a project community respiratory physiotherapist.

Objectives:

1. Evaluate participation and acceptability of the process to patients and their families/carers
2. Evaluate the impact of increased microbiology data on patient centred decision making

Methods: Participation in the SS-Sa pilot was offered to all CYPs with NCFB and PCD <15 years old on the 2022 caseload. Participating families were visited at home by a community respiratory physiotherapist to receives information about the role of surveillance sampling and to agree the type of sample. Wherever possible sputum samples were requested, throat swabs were accepted if the CYP was unable to expectorate. Nasal rinse samples were collected for all CYP with PCD in addition to sputum/throat swabs. Training for throat swabs was supported by an online video. Families that lacked confidence in sample collection were offered a home visit or video appointment for the second sample collection. After 6 months the sample results and changes to clinical management were reviewed.

Results: 18 CYP participated. NCFB: 11/13 CYP participated. 2 declined as their NCFB had resolved at time of recruitment; 12 samples analysed; recurrent Staphylococcus aureus identified in 2 patients and prophylactic medication changed accordingly and a scheduled course of antibiotics was brought forward as a surveillance result. PCD: 7/7 participated; 11 of 14 samples analysed were positive for bacteria. Pseudomonas aeruginosa was identified in 3/7 patients without exacerbation of baseline symptoms; with successful eradication with targeted antibiotic therapy with one recurrence identified. All CYP who agreed to participate submitted labelled samples to their GP when requested.

Conclusions: The surveillance sample project was welcomed by CYP and families as it gave families confidence that infections were not being missed; surveillance sampling identified PsA early and guided empirical and prophylactic prescribing. Having the sample results available to be discussed at clinic appointments was considered advantageous by the families and Respiratory Team as management plans did not then need to be changed in response to sampling at clinic.

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Topic: Cystic Fibrosis / Suppurative lung disease

Measuring nasal nitric oxide in children for the diagnosis of primary ciliary dyskinesia: A European Respiratory Society technical standard

Abstract ID:14331

Main Author: Amanda Harris

Author Organisation: Southampton Children's hospital

Co-Authors: Claire Hogg, Woolf T. Walker, Nicole Beydon, Jane S Lucas, On behalf of the ERS Taskforce TF-2020-02

Presenting Author: Amanda Harris

Introduction & Objectives: Nasal nitric oxide (nNO) is usually extremely low in primary ciliary dyskinesia (PCD), and its accurate measurement is important to diagnosis. Existing guidelines focus on nNO measurements in older, cooperative children using chemiluminescent analysers.[1] However, electrochemical rather than chemiluminescent analysers are widely used, and measurements in preschool children may facilitate early diagnosis. Technical standards are required to standardise measurements and reduce the risk of false positive or negative results.

Methods: An international, multidisciplinary European Respiratory Society (ERS) task force of 19 PCD experts and 1 patient representative was established.

To guide the development of the technical standard, we undertook:

- An international online survey to understand current practices by those measuring nNO for PCD diagnostics. The survey was circulated throughout the international PCD clinical and research networks. Survey findings informed subsequent phases of development.
- A systematic review, applying the evidence to create the technical standard. We included preschool children and considered both chemiluminescent and electrochemical analysers in use worldwide. Workgroups discussed the manuscripts and drafted the text, which was reviewed by the task force in full. Iterative changes were made in virtual meetings until agreement was reached.

Results: 78 (53%) survey respondents (from 65 centres across 18 countries) were eligible and completed the survey. Results demonstrated huge variability in practices, especially for electrochemical devices and in the measurement of young children where no guideline is available.[2] The task force devised an evidence-based technical standard[3] for use alongside ERS Guideline for Diagnosis of PCD[4] and with input from a specialist PCD Centre. We found that:

- Although chemiluminescent devices remain best, electrochemical devices are reliable and acceptable across the age range when appropriate methods are utilised.
- The standardisation of methods, breathing manoeuvres (tidal breathing and velum closure), analysis and reporting for children ≤5 years, offers reliable and acceptable results to aid in earlier PCD diagnosis.

Conclusions: This is the first step towards standardising the measurement of nNO as part of PCD diagnostic testing in all age groups with electrochemical and chemiluminescent analysers. Given the limited evidence for electrochemical analysers and sampling methods in preschoolers, the technical standard proposes future research priorities to allow future updates.

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Topic: Cystic Fibrosis / Suppurative lung disease

Reversibility of paediatric bronchiectasis – where next?

Abstract ID:14334

Main Author: Stefan Unger

Author Organisation: University of Edinburgh

Co-Authors: Aisha Mir, Kirstin Unger, Alan Quigley, Stefan Unger

Presenting Author: Aisha Mir

Introduction & Objectives: There is limited evidence for reversibility of paediatric non-cystic fibrosis bronchiectasis including complete disease resolution. Effective control of infection and inflammation may be critical in halting disease progression and potentially reversing lung damage. Little is known regarding the populations most likely to improve.

Aims: To investigate reversibility of paediatric bronchiectasis (PB) using broncho-arterial ratio (BAR) as a measure of disease severity, and to identify features associated with radiological improvement on high resolution CT (HRCT) scans.

Methods: Retrospective analysis of 64 children with labelled PB from electronic medical records (2009-2020) in a tertiary children's hospital. 96 HRCTs were reviewed. Patients with multiple HRCT scans were selected. Inner and outer airway diameter BAR measurements were undertaken by a radiologist. Lobar distribution, severity and primary aetiology of bronchiectasis were compared between patients demonstrating radiological improvement and deterioration. Both adult (BAR≥1) versus suggested paediatric (BAR≥0.8) cut-off values were used in the diagnosis of bronchiectasis.

Results: Mean age at HRCT PB diagnosis was 5 years (SD 3.35 years) (30 boys, 34 girls). 17 patients had repeat HRCTs. Of these, 10/17(59%) demonstrated reduced outer and inner BARs on the follow-up scan. The mean inner and outer BAR reduction was 0.301mm (SD0.147) and 0.411mm (SD0.25) respectively with complete resolution of bronchiectasis (BAR≥0.8) in 8/10 cases. Lobar distribution differed significantly (p=0.0038) between those with radiological improvement (primarily right lower (45%) and left lower (40%) lobes) and those with worsening BAR (right middle (33%), left lower (33%), right upper (17%), and left upper (17%) lobes). There was no statistically significant difference in the number of lobes affected between the groups (p=0.239). The most common aetiology in both groups was post-infective (80%(improved) and 67% (worsened)). Asthma was the most common comorbidity (20% (improved) and 33% (worsened)).

Conclusions: We provided further evidence that bronchiectasis can be reversible in children. Further research is required to assess the relationship between bronchiectatic progression and underlying aetiology, lobar distribution, age at first scan, and treatment received. Efforts should be made to promote early diagnosis via objective radiological markers, awareness of contributing factors and early treatment and referral to tertiary services to limit disease progression and aid potential reversal.

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Topic: Cystic Fibrosis / Suppurative Lung Disease

Using computer vision to diagnose primary ciliary dyskinesia

Abstract ID:14249

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Co-Authors: Andreia Lucia do Nascimento Pinto, Britt J van Akker, Oliver Hamilton, Ioannis Katramados, Amelia Shoemark,Claire Hogg, Thomas Burgoyne

Presenting Author: Mathieu Bottier

Introduction & Objectives: Early and accurate diagnosis of primary ciliary dyskinesia (PCD) allows appropriate multidisciplinary management and a reduction in lung function decline. Transmission electron microscopy (TEM) is essential in determining ciliary ultrastructural defects, when diagnosing PCD. This requires highly skilled specialists with considerable experience. Machine learning provides an excellent opportunity to reduce the time experts spend assessing cilia (1–2 hours/patient) and improve accuracy of diagnosis.

Methods: In collaboration with Intel®, we have used an Artificial Intelligence platform, Intel® Geti™, to develop a workflow called PCD-AID (PCD-Artificial Intelligence Diagnosis) that uses computer vision to aid in the diagnosis of PCD. The system was tested alongside the PCD diagnostic pathway (n=158) to determine diagnostic accuracy.

Results: The model has been trained with TEM images from over 21,000 cilia cross-sections to detect cilia and then classify them based on normal or abnormal ultrastructure or 'unusable' for diagnostic purposes (tilted or distorted images). The abnormal cilia identified are further classified based on the type of ultrastructural defect. PCD-AID has been designed to output annotated images as shown in Figure 1 to provide a user-friendly guide for specialist to make a diagnosis. Using retrospective and prospective patient samples, we have found PCD-AID can reliably identify ciliary ultrastructural defects (sensitivity of 0.87 and specificity of 0.88) and assess TEM images in under 1 minute per patient. Strikingly, it outperforms specialists at identifying subtle central pair defects, normally difficult to detect, associated with pathogenic mutations in *HYDIN*.

Conclusions: PCD-AID can improve diagnosis of PCD with a great potential to assist diagnostic centres globally. As well as saving time, it is especially useful for those that are less experienced in assessing TEM images to make a diagnosis of PCD and when analysing patients' samples that have subtle ciliary defects.

Topic:

Déjà Vu

Abstract ID:14301

Main Author: Fiona Murphy

Author Organisation: Sheffield Children's NHS Foundation Trust

Co-Authors: Sonal Kansra (Supervising Consultant)

Presenting Author: Fiona Murphy

Introduction & Objectives: We discuss an intriguing case of a term baby presenting with Respiratory Distress Syndrome (RDS) followed by prolonged respiratory symptoms with a clinical picture mirroring her fathers.

Presentation
A 37+5 week female neonate, born by emergency LSCS, needed inflation breaths and CPAP at birth. Requiring 2 doses of surfactant she was eventually extubated on day 5. She subsequently developed a persistent oxygen requirement, wheeze and a noisy chest and deteriorated intermittently requiring high flow oxygen so was referred to our team at around 4 weeks of age.

Family History
Her Father, born at 35 weeks with RDS requiring ventilation, had several respiratory deteriorations and subsequent on-going symptoms throughout his childhood. He developed severe obstructive lung disease and bronchiectasis. He is on the lung transplant list. Despite extensive investigations no diagnosis has been reached.

Fig 1: Fathers CT Chest

Methods:

Investigations

CT chest revealed multi focal atelectasis, the remaining lung parenchyma was normal. Echocardiogram showed a tiny PFO. An impedance study revealed significant reflux. She was extensively investigated including; screening for COVID, perinatal and routine infections including via bronchoalveolar lavage. Airway structure was normal. Immunological investigations, sweat test, ciliary brushings, surfactant genetics and R189 panel didn't reveal a clear cause for her presentation. Trio-exome sequencing is awaited.

Results:

Clinical course

By 6 weeks she remained in high flow oxygen proving difficult to wean. A trial of systemic steroids, aiming to wean oxygen, was unsuccessful. She was discharged at 3 months on low flow oxygen (0.5l). Due to feeding difficulties she required supplemental naso-gastric feeding.

Current status

She continues with feeding difficulties which are improving, is now weaning but naso-gastrically fed overnight. She is gaining weight and developing normally. She has been in air since 11 months old and requires salbutamol with viral illnesses. She remains on Azithromycin, inhaled steroids, salbutamol, omeprazole and receives proactive treatment with co-amoxiclav for exacerbations. A recent hypoxia challenge showed she requires 0.5l oxygen to fly.

Conclusions:

Diagnosis

Diagnosis is still elusive but we suggest there is a likely heritable element.

References

Points for discussion

- Differential diagnosis for RDS in a term neonate.
- Investigations for chILD (diffuse lung disease) presenting early in life and possible hereditary lung disease
- Management where diagnosis isn't apparent.

Topic: Fellows' Case Round Session

Haemorrhage after intrapleural alteplase: case series

Abstract ID:14338

Main Author: Natalie Lloyd-Gale

Author Organisation: Southampton General Hospital

Co-Authors: Alison Garde,Julie Duncan

Presenting Author: Natalie Lloyd-Gale

Introduction & Objectives: Intrapleural fibrinolytics are a useful adjunct in the treatment of empyema, with effectiveness comparable to video-assisted thoracoscopic surgery. Urokinase shortages have led many centres to use alteplase (tissue plasminogen activator). Significant haemorrhage has been reported after intrapleural alteplase; frequency in studies to date varies from 0-19% of patients treated. [1,2] There is no consensus on the optimal dose regimen.

Methods: 3 recent cases of empyema with significant bleeding after intrapleural alteplase administration were identified. From review of patient record, key clinical features of the patient were noted including: weight, side and size of empyema, organism isolated, and extent of bleeding. Treatment was compared including: chest drain size and method of insertion, alteplase dose received, concomitant use of NSAIDs, and management required for haemorrhage.

Results: Patient age ranged from 4-14 years. Organisms isolated were S. pneumoniae and group A Streptococcus. All patients underwent large-bore surgical chest drain (16-20Fr) insertion using blunt dissection. Alteplase dose varied from 2-4mg (0.06-0.11mg/kg), dwell time was 4 hours, dosing schedule was twice daily. Number of alteplase doses received ranged from 1-3 doses. NSAIDs were used alongside alteplase in all 3 patients. 1 patient had severe acute kidney injury. 1 patient required tranexamic acid treatment; no patient required blood transfusion.

Conclusions: Literature review showed alteplase doses from 0.1-0.4mg/kg, and frequency from 6-48 hourly. Most studies use once daily dosing with a 1-hour dwell time. Highest bleeding complication rates were seen with higher doses of alteplase.[1,3] RCT data suggests intrapleural alteplase causes more haemorrhage than urokinase in adults.[4] New evidence suggests alteplase doses as low as 1mg can be effective for management of empyema.[5] Clinicians should be mindful that move from intrapleural urokinase to alteplase may carry increased haemorrhage risk. Minimising dose, dwell time and dose frequency might reduce haemorrhage risk - prospective trials are needed.

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Supervisor: Dr Duncan

Joint first authors: Dr Lloyd-Gale and Dr Garde

Topic: Fellows' Case Round Session

Primary Ciliary Dyskinesia complicating a case of severe chronic lung disease in a neonate

Abstract ID:14318

Main Author: Harriet Wayman

Author Organisation: RBT

Co-Authors: Paul Settle

Presenting Author: Harriet Wayman

Introduction & Objectives: We present a case of an ex preterm baby girl with severe chronic lung disease, congenital airway abnormalities and a diagnosis of primary ciliary dyskinesia type 5. Baby S was born at 27+2 weeks gestation by emergency C-section for maternal APH. She has had a prolonged NICU stay and remains an inpatient on NICU at 7 months old. Her clinical course has been complicated by difficulties in oxygenation and persistent right sided collapse consolidation on x-ray. She has remained intubated requiring high pressure ventilatory support: any attempts at weaning onto non-invasive respiratory support have failed due to difficulties with oxygenation. Various ventilator strategies have been attempted including but not limited to high frequency oscillation ventilation and high i-time, low rate strategies. She was COVID-19 positive on day 40 of life and considered for treatment with Remdesivir: ultimately not treated as became PCR negative after 72 hours. Treated for pulmonary hypertension with inhaled nitric oxide initially and then sildenafil. Echocardiograms have been normal. She was transferred for Paediatric Respiratory opinion and investigations. She underwent CT Chest on day 78 of life which demonstrated narrowing of right upper and middle lobe bronchi with a high carina, at level of T3, along with right upper lobe collapse consolidation. She is colonised with atypical respiratory bacteria for a neonate including Sternotrophomonas and multidrug resistant Pseudomonas. Baby S has been treated with multiple courses of steroids including high dose methylprednisolone under guidance of tertiary respiratory team with no response in clinical condition. Discussed at local paediatric respiratory MDT meeting on day 112 of life: in view of lack of response to any interventions and poor clinical status (intubated requiring high pressure ventilation in 100% oxygen with oxygen saturations between 30-70%) it was advised that no further investigations or interventions could be offered. Discussions were commenced with parents regarding reorientation of care. Baby S was repatriated back to her local NICU. Subsequently diagnosed at 6 months of life with Primary Ciliary Dyskinesia Type 5 therefore further discussions opened with tertiary respiratory team. Whilst this diagnosis may explain Baby S' colonisation with atypical bacteria it does not wholly explain the severity of her respiratory disease: it is one of many factors. The opinion of the MDT remained that there were no further interventions that could be offered. Following this diagnosis Baby S was noted to have increasing difficulty in secretion management and was commenced on a regular physiotherapy regime which has seen a significant improvement in oxygenation. Discussions continue with her family regarding direction of her care.

Topic: Fellows' Case Round Session

Worse late than never: an unexpected result from the lab

Abstract ID:14329

Main Author: Thomas Williams

Author Organisation: NHS Lothian/University of Edinburgh

Co-Authors: Neil Gibson

Presenting Author: Thomas Williams

Introduction & Objectives: Here we present a case where an unexpected result from our local microbiology service led to a further round of investigations for our patient, and a prolonged period of uncertainty for their family.

Methods: A five year old boy was admitted with 5 day history of fever, cough and abdominal pain. His past medical history was unremarkable except for birth at 32 weeks gestation requiring intubation and mechanical ventilation, and subsequent episodes of viral induced wheeze. All his immunisations were up to date, and he had received a BCG in the neonatal period. Examination revealed reduced air entry and dullness to percussion in the right base, and a CXR showed a right sided pleural effusion. Video assisted thoracoscopic surgery was performed and a chest drain inserted; a pleural fluid culture was positive for *Streptococcus pyogenes.* He showed a good response to antibiotic therapy with intravenous (IV) cefuroxime and clindamycin, and he was discharged home after 10 days of IV therapy to complete a further two weeks of oral amoxicillin.

Results: Six weeks after his initial admission his pleural fluid was reported as showing a growth of a mycobacterial species. The family was contacted to find out whether there were risk factors for *Mycobacterium tuberculosis* infection. His parents were initially of North African heritage and had moved to the United Kingdom before the patient was born. There was no history of TB in any close family members. The patient had a history of intermittent cough in the months preceding his presentation for which he had received a salbutamol inhaler; his mother felt that he had not gained much weight recently and had attributed this to him "not being a good eater". There was no history of night sweats. He was recalled for a detailed clinical examination and further investigations. On assessment he appeared very well and had no clinical findings suggestive of TB. A repeat CXR showed complete resolution of the empyema and no hilar lymphadenopathy. A Mantoux and interferon gamma release assay were both negative. The sample grown in the laboratory subsequently confirmed a growth of *M. tuberculosis*, confirmed on whole genome sequencing. Due to the discrepancy between the clinical presentation and the mycobacterial culture results, a detailed investigation was undertaken. This showed that there had been a growth of a genetically identical strain of *M. tuberculosis* from a different adult patient at the same time as the positive result for the child. It was concluded that the positive growth for our patient was likely to represent a contaminant.

Conclusions: This case highlights the importance of conducting orthogonal investigations to support an unexpected positive laboratory result, and of close collaboration between clinical and laboratory teams in such a situation.

Topic: Infections / Epidemiology

A young person with a facial lesion and breathlessness

Abstract ID:14261

Main Author: Grace Kuruvilla

Author Organisation: Norfolk and Norwich University Hospital NHS Trust

Co-Authors: Bikalpa Neupane, Ruchi Arora, Christina Gladwell, Samantha Low, Ashok Ram, John Mcewan, Anjay Pillai

Presenting Author: Grace Kuruvilla

Introduction & Objectives:

Septic pulmonary embolism (SPE) is uncommon and may present with an insidious onset of fever, cough, chest pain. Causes of septic PE in children described in literature include right sided bacterial endocarditis, septic thrombophlebitis, osteomyelitis, soft tissue or urinary tract infections. Other risk factors are intravenous drug use, indwelling catheters or devices. Rare manifestations of disseminated staphylococcal disease are multiple: some as frequent as cellulitis, osteomyelitis/arthritis, pneumonia, and others rare such as septic pulmonary embolism and glomerulonephritis.

Methods: We describe a case of a 15-year-old male previously fit and well who presented with fever, facial cellulitis, mouth ulcers and subsequently developed chest pain. Imaging showed bilateral unusual lung changes, bilateral empyema, left pulmonary abscess. He was managed with MDT approach. Lemierre's syndrome was excluded and echocardiogram showed no evidence of infective endocarditis. Panton-Valentine Leukocidin Staphylococcus aureus (PVL-SA) was identified from the mouth lesion. He was treated with prolonged intravenous antibiotics and required a brief period in HDU, oxygen and intravenous fluids. He made good clinical recovery with improvement in inflammatory markers. Repeat imaging and Respiratory follow up was arranged.

Results: Mouth swab, throat cultures isolated PVL positive Staphylococcus aureus. Initial chest x-ray showed left upper, lower lobe consolidation, left small pleural effusion, right basal consolidation. Ultrasound pleural cavity confirmed 3.2x 6.8 left loculated empyema, CT chest with contrast showed bilateral empyemas, bilateral lung nodules, some with cavitation, pulmonary abscess at left base- features consistent with **septic emboli**

Repeat chest x-ray showed stable appearances
Blood cultures, urine pneumococcal antigen, quantiferon were negative
Immunology and autoantibody results awaited.

Conclusions: Pulmonary involvement with pneumonia and/or empyema, in addition to septic emboli are commonly observed in patients with invasive community acquired Staphylococccus aureus infections. Characteristic radiographic findings are multiple peripheral lung nodules with or without cavitation. We considered causes of septic lung emboli from clinical and epidemiological features. In our case, septic emboli were due to PVL Staphylococcus aureus from the facial source. PVL toxin Staphylococcus aureus causes severe pneumonia and requires prolonged antibiotics. Our case highlights the importance of considering the rare diagnosis of septic emboli when there are suggestive clinical and radiologic features.

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Topic: Infections / Epidemiology

An audit assessing the clinical management of bronchiolitis as per the NICE guidelines in a District General Hospital

Abstract ID:14234

Main Author: Vanessa Naguleswaran

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Co-Authors: Amelita Biba, Sally Holland, Kilali Ominu-Evbota

Presenting Author: Vanessa Naguleswaran

Introduction & Objectives:

Background

Bronchiolitis is a very common condition in children less than two years (1); in 2021 in England, there were approximately 518 per 100 000 patients (0.5%) of patients that were admitted to hospital with bronchiolitis (2). Respiratory syncytial virus is the most common virus that causes bronchiolitis. The virus infects epithelial cells in the airway which induces an inflammatory reaction ultimately resulting in ciliary dysfunction and cell death. This further causes oedema and narrowing of the airways, reducing lung compliance, and causing an increase work of breathing. Bronchiolitis is a self-limiting condition with a good prognosis that is managed with supportive treatment i.e., hydration, oxygenation and managing fever (1).

Aims

- What proportion of patients had overall appropriate clinical management as per NICE guidelines (3)?
- What proportion of patients had appropriate clinical management of oxygen delivery, drugs and investigations as per NICE guidelines?

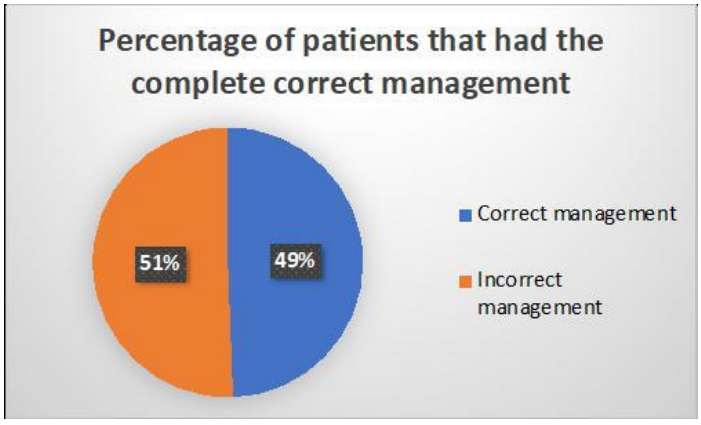
Our set standard is that:

- 100% of children with bronchiolitis should have the correct management as per the NICE guidelines (3).

Methods: A random selection of **83 patients** were identified in October 2022 and the patients' records were checked to identify if the children were treated as per the NICE guidelines with regards to oxygen administration, drugs administered and investigations.

Results:

- 49% of patients had overall appropriate clinical management as per NICE guidelines.
- 100% of patients had appropriate clinical management of oxygen delivery as per NICE guidelines
- 27% of patients were given drugs (aside from oxygen) not in line with NICE guidelines i.e. antibiotics, steroids and bronchodilators,
- 49% of patients had investigations, in line with NICE guidelines.



Conclusions: Only 49% of patients had overall appropriate clinical management as per NICE guidelines. This is important as bronchiolitis is such a common condition and it is important to ensure patients are not having unnecessary radiation exposure or distress due to investigations or giving other medications that could have side effects.

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Topic: Infections / Epidemiology

Community Acquired Pneumonia (CAP) in children: Value Driven Care (VDC) project

Abstract ID:14210

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Presenting Author: Biju Thomas

Introduction & Objectives: Background: Community Acquired Pneumonia (CAP) is common in children and is associated with considerable morbidity, healthcare utilisation and economic impact. The CAP Value Driven Care (VDC) project was started with an objective of value optimisation for children admitted with CAP.

Aim: Our aims were to assess the effectiveness of the CAP VDC project in terms of the composite measure of clinical outcomes - the Clinical Quality Index (CQI, defined as the proportion of patients who meet all of the following four key clinical quality indicators: Length of Stay [LOS] ≤ 5days, no 30-day complications, no 30-day readmissions and no inpatient mortality) and patient reported experience measures (PREMs) of children admitted with CAP.

Methods:

Methodology: The multi-faceted approach of the VDC project included (i) updating the CAP guidelines in line with the best available evidence, (ii) refining the CAP specific order set that facilitated electronic ordering investigations and antibiotics, (iii) enhancements to electronic in-patient documentation with direct access to the guidelines and order set, (iv) new CAP Patient Information Leaflet (PIL) (v) collecting data on patient reported experience measures (PREM) using three approaches: shadowing (using the goShadow® mobile application, Hospital Consumer Assessment of Healthcare Providers and Services [HACHPS] survey and patient focus groups), (vi) initiatives based on the PREM data, that included refining admission and discharge processes, (vi) sharing sessions with relevant stakeholders for effective communication of the initiatives and (vii) periodic re-audits leveraging on data analytics to maintain the dashboard.

Results: 1287 children were admitted with CAP in 2019 and the baseline CQI was 84.3%. The CQI improved by 4.1% (95% CI = 0.49-7.36) to 88.4% in both 2020 and 2021 (p=0.02). Of note, the LOS indicator (proportion of patients with LOS≤ 5days) – the main driver of cost of care, improved from 85.9% in 2019 to 89.4% in 2020 (increase by 3.5% [95% CI = 0.02-6.62], p=0.04) and this improvement was sustained at 90.1% in 2021. On the HCAHPS survey, the proportion of patients providing positive feedback on the admission process improved from 39.5% (in Q1, 2021) to 43.6%, 61.5% and 76.9% (in Q2, Q3 and Q4 2021 respectively) and the improvement (Q1 vs Q4 2021 [37.4% (95% CI = 5.9-57.8)] was significant (p=0.02). Moreover, though not statistically significant (p=0.11), the five items on the HCAHPS survey related to discharge processes showed an improving trend from 2019 to 2021. The median cost of care was S$3424 in 2018. The marginal rise in the median cost of care (S$3580 [2019] and S$3586 [2020]) was not significant (p=0.37).

Conclusion: The data driven and patient centered initiatives under paediatric CAP VDC project have led to significant and sustained improvement in clinical outcomes and PREMs without significant rise in the cost of care.

Topic: Infections / Epidemiology

Eight year trends in Paediatric Thoracic Empyema - A Regional Perspective

Abstract ID:14263

Main Author: Jonathan Smith

Author Organisation: Sheffield Children's Hospital

Co-Authors: Emily Hayes, Thejasvi Subramanian, Brendan O'Connor, Sonal Kansra, Elizabeth Gavens, Sean Marven

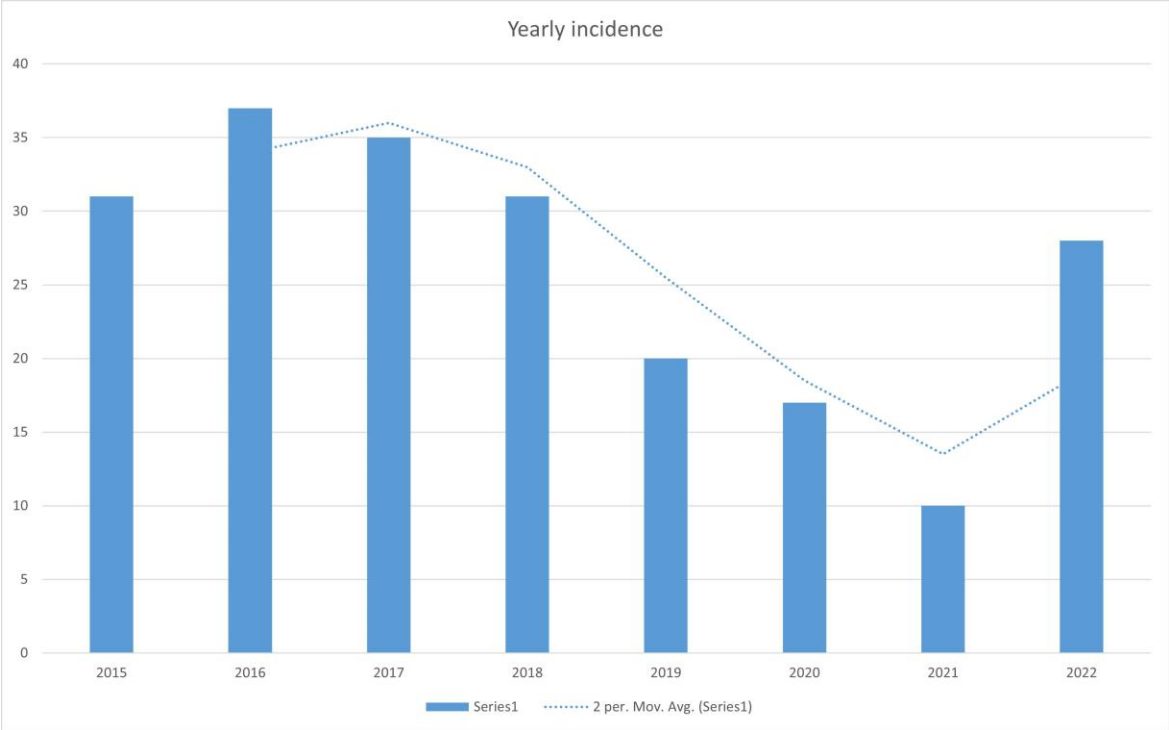
Presenting Author: Jonathan Smith

Introduction & Objectives: Restrictions instigated during the COVID-19 pandemic altered the epidemiology of respiratory infections in both anticipated and unexpected ways. The authors experienced an anecdotal reduction in the presentation of paediatric thoracic empyema during 2020-2021. This was followed by a perceived increase in 2022 as social interaction returned to pre-pandemic levels. Our aim was to objectively determine and compare the incidence for the past 8 years regionally.

Methods: We collated data retrospectively using our hospital coding system and electronic medical records for the years 2015-2021. Data for 2022 was collected prospectively, using a combination of electronic and paper notes and systems.Yearly incidence, alongside length of hospital stay were reported**.**

Results: Empyema incidence ranged from 10-37 cases per year. The lowest incidences occurred during 2020-2021 with 17 in 2020 and 10 in 2021. This was followed by a significant rebound in numbers to 28 in 2022, a significant proportion of which isolated invasive group A streptococcus in pleural fluid and/or blood culture.

Length of stay ranged from 10 to 21 days with a median of 13.5 days.



Conclusions: The global health restrictions brought about by the COVID-19 pandemic resulted in a reduction in the number of cases of paediatric thoracic empyema within our region. This led to a significant increase in the number of cases when social mixing returned to pre-pandemic levels. In addition, a substantial proportion of these were secondary to invasive Group A streptococcus and occurred during the Autumn/Winter period. This was outside of the usual expected peak in Group A streptococcus infections, typically seen during the Spring.

Topic: Infections / Epidemiology

Ultrasound diagnosis of pneumonia and its complications in children

Abstract ID:14202

Main Author: Gulnora Yusupalieva

Author Organisation: Tashkent Pediatric Medical Instiitute

Presenting Author: Gulnora Yusupalieva

Introduction & Objectives: The use of new technologies of medical imaging, among which ultrasonography (USG) takes the leading position in the diagnosis of pneumonia and its complications in children, is one of the promising directions in paediatrics. The study aimed to optimisation of pneumonia and its complications' diagnostics in children by USG in the complex examination of patients.

Methods: The study is based on the results of a complex clinical and instrumental-laboratory examination, carried out in the clinic of Tashkent Pediatric Medical Institute. Different clinical forms of pneumonia and its complications were detected in 182 children. Thoracic USG was performed 2-10 times depending on the dynamics of the disease course and treatment on ultrasound machines Sonoscape 5000 and Aplio 500 mainly by linear and, if necessary, by convex and sector probes with 3.5-5-7.5 MHz frequency.

Results: The lung lesion was bilateral in 158(86.8%) patients, right-sided pneumonia was in 18(9.8%) children, and left-sided pneumonia in 6(3.4%). 153(84%) children were diagnosed with focal, 8(4.5%) with segmental, 19(10.5%) with lobar, and 2(1%) with multilobar forms of pneumonia. Pulmonary complications of pneumonia were observed in 73(28.7%) patients. Pulmonary destruction and lung abscess were diagnosed in 29 children, exudative pleurisy and pyothorax in 29, and pneumothorax and pyopneumothorax in 15. The inflammatory pulmonary infiltrate was visualised as the parenchymatous hypoechogenic area with clear even outer contours. Intrapulmonary contours were indistinct due to air pulmonary parenchyma bordering the infiltrate. Airless foci of rounded and irregular shape with reduced echogenicity were visualised. Echographic findings were confirmed by minimally invasive interventions: puncture and drainage of a thoracic cavity under echographic control were done in 18 patients, bronchoscopy - in 19, bronchography - in 3 patients, 18 patients were operated on for abscesses and drained purulent pleurisy.

Conclusions: High sensitivity, specificity and diagnostic accuracy of USG at pleurisy (100%), abscesses (96.6±3.4%; 100.0%; 96.6±3.4%), inflammatory infiltrates (91.2±2.1%; 100.0%; 96.7±1.3%) were investigated, and results confirmed that USG is a highly informative medical imaging method for lung diseases. The accuracy of USG is lower than radiological data at pneumothorax and pyopneumothorax (85.0+8.0%). In the above complications of pneumonia, USG should be combined with the radiological examination.

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Topic: Lung Health / Public Health / COVID-19 Pandemic

An unusual Pulmonary complication of COVID -19 infection in a child - a case report

Abstract ID:14321

Main Author: Dr Sophia Sibthorpe

Author Organisation: Barking, Havering and Redbridge University Hospitals NHS Trust

Co-Authors: Dr Deepthi Chandran, Professor Jeewan Rawal

Presenting Author: Dr Sophia Sibthorpe

Introduction & Objectives: Pulmonary embolism is diagnosed less commonly in children than in adults.[1] The scarcity with which it is seen within the paediatric population makes its recognition a diagnostic challenge.[2] Its occurrence is more frequent in children hospitalised with COVID-19, as compared with earlier reports in hospitalised children in general. We report a case of an unvaccinated 15-year-old boy who presented with acute severe respiratory distress, two weeks following COVID-19 infection not needing hospitalisation, confirmed due to massive bilateral pulmonary embolism. This case report highlights the diagnostic dilemma and management approach of pulmonary embolism in paediatric populations occurring secondary to COVID-19 infection.

Methods: We used a case study approach outlined by the British Medical Journal (BMJ) Case Reports Checklist.[3]

Results: This case shows that diagnosing pulmonary embolism in children and young adults, can be nuanced compared to the classical presentation of adult pulmonary embolism.[4] Symptoms of severe chest pain out of proportion to or instead of chest tightness, haemoptysis alongside dyspnoea and hypoxia would call for further investigations for possible pulmonary embolism, especially if the patient is not responding to first asthma management. Treatment should follow routine guidance for paediatric pulmonary embolism.

Conclusions: This case highlights that one should strongly consider the possibility of a pulmonary embolism in a paediatric case presenting with acute respiratory distress after COVID-19 infection in presence of severe chest pain which is out of proportion to chest tightness or absence of chest tightness, haemoptysis alongside dyspnoea and hypoxia especially if the patient is not responding to initial asthma management. It reiterates the importance of taking a detailed history for symptoms of severe chest pain in the absence of chest tightness and presence of haemoptysis.

Awareness of this link between pulmonary embolism and COVID-19 in paediatric population is critical.

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Topic: Lung Health / Public Health / COVID-19 Pandemic

Community-Based Respiratory Health Measures in Children and Young People with Cerebral Palsy: a Scoping Review

Abstract ID:14269

Main Author: Rachel Knight Lozano

Author Organisation: University of Plymouth

Co-Authors: Jonathan Marsden, Harriet Shannon, Sian Goddard, Jonathan Gilby, Leanne Turner

Presenting Author: Rachel Knight Lozano

Introduction & Objectives: Respiratory illness is the primary cause of death worldwide in children and young people (CYP) with cerebral palsy (CP). It is also the prevailing reason to attend hospital and primary healthcare consultation, accruing significant health service costs and affecting quality of life for CYP and their families[1]. Outcome measures are essential in early assessment, to detect and monitor respiratory illness or impairment, supporting timely treatment decisions and early proactive management strategies. Outcome measures are also a key component in clinical trials research, to determine treatment effectiveness and inform high quality evidence-based practice. To date, there is considerable variation of respiratory health measurement in this population, both in research and practice[2, 3]. The study's purpose was to identify, map and present the outcome measurement instruments (OMI) used to assess respiratory health in CYP with CP, within a community setting.

Methods: A scoping review of primary research studies and protocols published up to August 2021 was performed. Eligibility criteria included studies implementing a respiratory health measure with CYP aged 1-18years with CP, including devices, performance-based measurements and patient or proxy reported outcome measures. Two independent reviewers systematically identified studies and extracted information. Eligible studies and relevant reviews underwent additional citation screening. Methodology was informed by the Johanna Briggs Institute and results presented narratively

Results: Searching identified 2989 articles, of which 75 full text articles were included, originating worldwide from 1970-2021. Twenty were experimental designs, of which 5 were protocols. The remaining studies were observational designs. There was proportionate representation of motor impairment severity, but under-representation of CYP with multi-comorbidities and learning disability. OMI's were mapped to 'Body Structure and Function (n=20), 'Activity and Performance' (n=23) and 'Participation and Quality of Life' (n=27), with a further 15 mapped to 'Health care resources'.

Conclusions: There is currently no consensus of 'what' or 'how' to measure respiratory health in CYP with CP. This scoping review raises new questions about which outcomes are important to stakeholders, with particular consideration of CYP with CP at increased risk of respiratory-related morbidity. Findings can inform a core outcome set for clinical research, to increase capacity for evidence synthesis and help determine effective respiratory health interventions for CYP in CP in practice.

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Topic: Lung Health / Public Health / COVID-19 Pandemic

Cytokine storm biomarkers and clinical presentation in children presenting with PIMS-TS – an observational cohort study

Abstract ID:14297

Main Author: Chloe Milton

Author Organisation: Anglia Ruskin Medical School

Co-Authors: Joshua Creese, Katrina Burrows, Carmel Moore, Karen Hayden, Jufen Zhang, Emily Kemp, Thomas Doggett, Jo-Anne Johnson

Presenting Author: Chloe Milton

Introduction & Objectives: Paediatric Inflammatory Syndrome Temporally associated with SARS-CoV2 (PIMS-TS), is a high inflammatory state in children which emerged during the COVID-19 pandemic. The primary aim of this retrospective observational cohort study was to describe the clinical and demographic profiles of children presenting to acute (non-ICU) paediatric services with PIMS-TS, focussing on cytokine storm biomarkers. Our secondary aim was to find whether specific clinical or demographic features were more likely to lead to severe disease progression.

Methods: Data was collected between May 2020 - November 2021. Inclusion criteria were; age 3 months - ≤16 years, presenting to 6 acute paediatric services (non-ICU) in the East of England with the following PIMS-TS symptoms; persistent fever, high CRP, and one or more additional features as per RCPCH guidelines (1). Children with a microbial cause other than SARS-CoV-2 were excluded. Collected data included biomarker levels, clinical information, hospital stay data, patient demographics, disease severity data and other investigation results. Descriptive data analysis was used to describe biochemical, clinical and demographic profiles. Children were divided into mild and severe disease groups using defined criteria (1). Comparative analysis was used to compare biomarker levels, other investigation findings, patient demographics, vaccination status, COVID-19 status, and co-morbidities in these groups.

Results: 39 patients were included; 20/39 (51.3%) developed severe PIMS-TS, and 14/20 (70%) required PICU admission. Patient characteristics are detailed in Table 1.

Table 1 – Patient demographics

Patient demographics	Frequency (%)
Sex	
Male	23 (59.0%)
Female	16 (41.0%)
Ethnicity	
White British	14 (35.9%)
Other White Background	8 (20.5%)
Black British	3 (7.7%)
Asian British	1 (2.6%)
Asian British Other	1 (2.6%)
Asian British (Pakistani)	1 (2.6%)
Multiple Ethnic Backgrounds	2 (5.1%)
White and Black Caribbean	1 (2.6%)
Did not state ethnicity	8 (20.5%)
Immunisation status*	
Fully up to date	36 (92%)
Not up to date	3 (7.7%)
Comorbidities	
Single Kidney	1 (2.6%)
Global Developmental Delay	1 (2.6%)
Crohn's disease	1 (2.6%)
Asthma	3 (7.7%)
Obesity	1 (2.6%)
Eczema	2 (5.1%)
Hypothyroidism	1 (2.6%)
Other	3 (7.7%)
No comorbidity reported	26 (66.7%)
Covid status	
Positive for COVID-19 (PCR or antibody)	22/39 (56.4%)

* Routine UK childhood vaccination status not including COVID-19 vaccinations (2)

From the cytokine storm biomarker data collected, the severe disease group had significantly higher ferritin levels ($p=0.02$). There was no difference between severe and non-severe groups regarding other cytokine storm biomarkers. Older children were more likely to have severe disease ($p<0.01$). There was no significant association between gender, ethnicity, vaccination status, COVID status, co-morbidities and severity of disease. Patients with severe disease were more likely to have higher haemoglobin levels ($p=0.03$), lower white cell counts ($p<0.01$), and higher creatinine ($p<0.01$) at presentation.

Conclusions: This research adds to the understanding of PIMS-TS in children, which is still poorly understood. The unique focus of this study on early disease presentation has illuminated the potential for use of early biochemical levels to detect children at risk of severe disease progression.

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Topic: Lung Health / Public Health / COVID-19 Pandemic

Evaluating Dyspnoea in Adolescents & Young Adults Using Combined ISAAC Questionnaire plus Dalhousie Pictorial Scale Survey

Abstract ID:14212

Main Author: Paolo Pianosi

Author Organisation: UMN

Co-Authors: Gage Alvernaz, John Holm, Ann Marie O'Connell

Presenting Author: Paolo Pianosi

Introduction & Objectives: Respiratory problems in connection with physical activity are common in adolescents, but the lone community-based survey concluded most subjects with exertional dyspnoea (EID) have no demonstrable cardiopulmonary disease. In a Swedish study of >2300 12-13 yr old athletes surveyed, 14% reported experiencing EID in the previous 12 months – more commonly among female and asthmatic participants. The researchers performed follow up surveys 5 years later which revealed the prevalence of EID doubled[1]. We were skeptical that respondents developed new onset cardiorespiratory disease *de novo*. Rather, we speculated that maturation and cognitive development merely allowed them to perceive and report EID symptoms more accurately. We thought it would be interesting to gain an understanding how differing age groups interpret symptoms during exercise, particularly between asthmatics and non-asthmatics.

Methods: A voluntary survey was prepared including the ISAAC questionnaire, Dalhousie Dyspnea Scales, and multidimensional dyspnea profile. The survey was conducted at the Minnesota State Fair in 2022 for all-comers age 12-24 years. Data were collected over 2, 8-hr shifts from a convenience sample of 63 participants. Participants were subsequently separated into two groups based on ISAAC questionnaire responses: asthmatic and non-asthmatic. Using the Dalhousie scales, we compared mean intensities reported for breathing effort, chest tightness and throat closure pictorials for asthmatics *vs* non-asthmatics at different ages.

Results: In general, subjects – asthmatic or not – identified *both* increased effort to breath and chest tightness as pictorial descriptors of their perceived dyspnoea. A negative value for the difference (Δ) indicates that non-asthmatics have a lower average value for the given scale than asthmatics. When comparing different ages, there was no statistical difference in responses between asthmatics vs non-asthmatics in the ≤17yo group but there was in the 18+yo group for both effort and chest tightness.

Construct (scale pict)	**All subjects**			**≥18 years old**			**12-17 years old**		
	Δ	***p*-value**	**N**	**Δ**	***p*-value**	**N**	**Δ**	***p*-value**	**N**
Effort	-1.73	<.001	62	-1.91	<.001	40	-1.11	0.11	22
Chest	-1.41	<.001	62	-1.85	<.001	40	0.22	0.76	22
Throat	-0.21	0.63	63	-0.31	0.57	40	0.37	0.66	23

Conclusions: The Dalhousie Dyspnea Scales showed statistically significant difference in responses between asthmatics *vs* non-asthmatics post-adolescence. This reinforces our concern that younger patients may be having EID but misperceive it due to developmental limitations. We suspect younger children experience dyspnoea but have difficulty conveying this perception. Care must be exercised when fitting the current construct of dyspnoea developed in adults to paediatric subjects.

Topic: Lung Health / Public Health / COVID-19 Pandemic

Evaluation of 'Providing Assessment and Treatment for Children at Home (PATCH)' service at Hillingdon Hospital for VIW and Asthma

Abstract ID:14276

Main Author: Yashasvi Rajeev

Author Organisation: Hillingdon Hospital

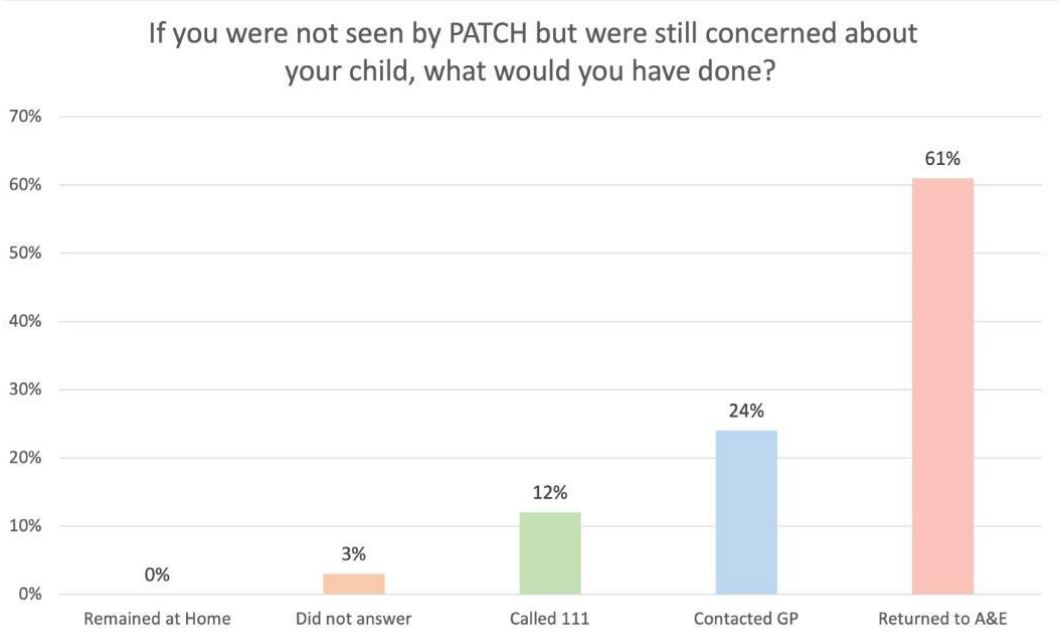
Co-Authors: Akhil Patel, Anthea Manuel, Madeline Tyrrell, Alison Summerfield, Shanmugapriya Palanivelu, Stephen Goldring

Presenting Author: Yashasvi Rajeev

Introduction & Objectives: Hillingdon Hospital has operated a "Providing Assessment and Treatment for Children at Home (PATCH)" service since May 2021. Clinically stable children who required observation or low-intensity treatments were discharged to our PATCH team of senior paediatric nurses who reviewed them in their own homes. If required, PATCH referred children back to the hospital for review by a paediatric registrar or consultant. We aim to describe our experience running our PATCH service for patients with acute asthma or Viral Induced Wheeze(VIW) and highlight its utility.

Methods: PATCH referral data from 1st May 2021 to 31st December 2022 was retrospectively collected and analysed.

Results: 252 children were referred to our PATCH team between 1 May 2021 and 31 December 2022 - 157 (62%) for VIW and 95 (38%) for asthma. 147 (58%) of these referrals were from A&E, 64 (26%) from our inpatient ward, 39 (15%) from PAU, and 1 from the community. The median age of children referred was 2.45 years, with 88% of children being between the ages of one and five, 3% under one, and 9% above five. The majority of referrals (59%) were made between September 2021 and March 2022 - September 2021 had the most referrals (33). Children referred to our PATCH team remained under their care for an average of 1.86 days. The mean number of telephone reviews and home visits per child were 1.07 and 0.68 respectively. 21(8.3%) children were asked to come back to the hospital for a review. There was a 1.5% hospital re-admission rate. Feedback received from parents was overwhelmingly positive (96%). Indeed, 61% of parents stated that, if concerned, they would have returned to A&E if it was not for our PATCH service, and 36% would have contacted their GPs or called 111, as shown in the graph.



Conclusions

Our data shows that PATCH is a safe alternative to hospital admission for observation and low-intensity treatments. The service undoubtedly ensures continuity of care and helps to support parents and carers during their child's illness. The low re-admission rate, potential reduction of repeat presentations to A&E or GP, and enormous positive feedback are a testament to this.

Topic: Lung Health / Public Health / COVID-19 Pandemic

Home oxygen reviews for children and young people

Abstract ID:14325

Main Author: Catherine Crocker

Author Organisation: University Hospitals Southampton NHS Foundation Trust

Co-Authors: Catherine Crocker, Amanda Harris, Steph Harper, Ali McEvoy

Presenting Author: Catherine Crocker

Introduction & Objectives: British Thoracic Society (BTS) guidelines for home oxygen in children (2009)[1] suggest that paediatric specialists should order home oxygen for children, rather than primary care, to ensure they have age-appropriate equipment and supplies that meet their needs. The guidelines also recommend regular home oxygen reviews for babies with chronic neonatal lung disease. However, they do not make the same recommendations for children and young people (CYP) who require oxygen for other reasons. CYP's oxygen requirements can remain static for more extended periods than babies. Still, the mode of oxygen delivery may need to change with life events such as going to school and becoming more independent. Home Oxygen Service – Assessment and Reviews (HOS-AR) are well established in adult services across the NHS but are less common for CYP. HOS-ARs have been shown to improve survival rates as patients are more likely to use their oxygen. They also achieve direct cost savings through more appropriate equipment provision and usage.[2] In our clinical practice, we noticed that some CYP had home oxygen for many years without any review of their needs or equipment.

Methods: The Paediatric Respiratory Nursing Team identified patients over the age of one year with home oxygen prescribed by a Southampton Children's Hospital clinical team and undertook telephone reviews. During the consultations, we discussed patients' current oxygen requirements, prescriptions, and equipment.

Results: The team carried out 67 reviews over 12 months. Outcomes (n=75 as some patients had more than one outcome) of the review included the removal of oxygen that was no longer in use and a decrease in equipment due to changes in oxygen requirements. All outcomes are shown in figure 1.

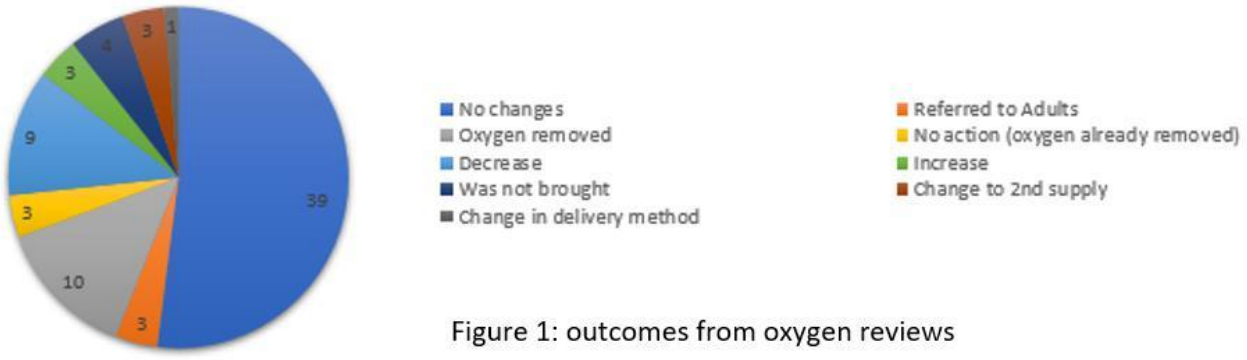


Figure 1: outcomes from oxygen reviews

Conclusions: The removal of unused oxygen will result in a cost saving for the NHS, as will streamlining the CYP's current equipment. It also enables the family to free up space in the home environment offering safety benefits. These reviews also facilitate appropriate referral to an Adult HOS-AR service, ensure a safe and smooth transition to adult services, and enable the YP to contact the team should their needs change.

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Topic: Lung Health / Public Health / COVID-19 Pandemic

Miliary but not TB (Tuberculosis)!

Abstract ID:14196

Main Author: Jui Prashant Andharia

Author Organisation: Bai Jerbai Wadia Hospital for Children, Mumbai, India

Co-Authors: Parmarth Chandane

Presenting Author: Jui Prashant Andharia

Introduction & Objectives: Tuberculosis (TB) is a major health problem in India. Indiscriminate use of anti-tubercular treatment (ATT) just based on radiological appearance will lead to increased drug resistance. Radiological appearance such as miliary pattern on chest radiograph (x-ray) does not always mean tuberculosis (TB). Many other pulmonary pathologies can present as miliary pattern on chest x-ray.

Objectives:

1. To increase awareness of differential diagnosis of miliary pattern on chest x-ray.

2. To avoid indiscriminate use of anti-tubercular treatment (ATT) based on radiological appearance.

Methods: We reviewed the proforma of children with miliary pattern on chest x-ray in whom the final diagnosis was not TB. To prove the final diagnosis in the above 19 cases following investigations were done: lung biopsy, genetic study, bronchoscopy with bronchoalveolar lavage(BAL), and other tests.

Results:

Investigation → Final Diagnosis ↓	Lung biopsy	Genetic study	Both (lung biopsy + genetic study)	Bronchoscopy with BAL	Other
Langerhans Cell Histiocytosis	4	-	-	-	-
Pulmonary Hemosiderosis	1	-	-	3	-
Surfactant dysfunction	-	1	2	-	-
Pulmonary alveolar microlithiasis	-	-	2	-	-
Niemann Pick Disease	-	2	-	-	-
SAVI	-	-	1	-	-
Pulmonary angiosarcoma	1	-	-	-	-
Pulmonary alveolar Proteinosis	-	-	-	1	-
SLE	-	-	-	-	1
Total	6	3	5	4	1 **Total = 19**

Conclusions

In countries like India, where drug resistant tuberculosis is a major concern, indiscriminate use of ATT can be more hazardous. Microbiological confirmation should always be sought before starting ATT. Further evaluation with bronchoscopy, bronchoalveolar lavage, genetic analysis, and/or lung biopsy should be done more as feasible.

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Topic: Lung Health / Public Health / COVID-19 Pandemic

Moving Consensus to Action: a strategy to improve respiratory care for children with cerebral palsy and neurodisability across the UK

Abstract ID:14317

Main Author: Madeline Pilbury

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Presenting Author: Madeline Pilbury

Introduction & Objectives: Respiratory infection is the leading cause of hospital admissions for children with cerebral palsy (CP)[1]. Children with CP and other neurodisabilities are at increased risk of respiratory infections due to swallowing difficulties, reflux leading to aspiration and poor secretion clearance. Restrictive lung disease, caused by weakness and chest wall deformity, exacerbates the problem [2]. Following the 2020 publication of Prevention and management of respiratory disease in young people with cerebral palsy [3], the Association of Paediatric Chartered Physiotherapists (APCP) respiratory committee committed to use the publication to drive change for this vulnerable patient group in the United Kingdom.

Methods: The APCP respiratory committee (specialist paediatric respiratory physiotherapists from around the UK) formed a working group consisting of committee members, paediatricians from the British Academy of Childhood Disability (BACD) and Speech and Language Therapists from the Paediatric Dysphagia Clinical Excellence Network (PDCEN). Engagement from Council for Disabled Children was sought to provide a voice of the child/ family. A three part strategy was agreed: 1) to update the 2017 APCP commissioning tool [4] to support community paediatric respiratory physiotherapy posts 2) To create an APCP screening checklist to identify children most at risk of respiratory compromise and 3) To disseminate the work with health care professionals across the UK A scoping questionnaire was sent to existing UK community respiratory physiotherapy services to gather information on provision, outcomes and screening procedures.

Results: Twenty four percent (24%) of the teams that responded to the questionnaire screened all children and young people (CYP) in their service for respiratory compromise. The services had a mix of inpatient, outpatient and community provision. Forty five percent (45%) of services were based at a district general hospital (DGH), 27% in the community and 27% at a tertiary centre. Several teams shared data demonstrating reduced hospital admissions and associated cost savings as well as positive feedback from families.

Conclusions: Screening methods and published literature will be reviewed by the working group, to develop an APCP screening checklist to support clinicians to identify those most at risk of respiratory compromise. Providing community respiratory physiotherapy to these children with neurodisability has been shown to reduce admissions and improve patient experience. The APCP intends to promote this across the UK.

References

[1] Hospital admissions in children with cerebral palsy, a data linkage study, Meehan et al, 2017

[2] Respiratory problems in children with neurological impairment, Seddon et al, 2003

[3] Prevention and management of respiratory disease in young people with cerebral palsy: consensus statement; Gibson et al, 2020

[4] Commissioning tool for community paediatric respiratory posts, APCP Respiratory Committee, 2017

Topic: Lung Health / Public Health / COVID-19 Pandemic

Perception of Dyspnea in Children

Abstract ID:14211

Main Author: Paolo Pianosi

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Introduction & Objectives: Our current understanding of dyspnea is based on neuromechanical dissociation, meaning a mismatch occurs between neural respiratory drive and consequent afferent neural traffic from the respiratory system. The latter includes, but is not limited to, chest wall and lung proprioception, airway reflexes, and chemoreflexes. This model is predicated on the brain "knowing" what constitutes "expected" afferent feedback, implying that perception of dyspnoea depends on developmental changes in the behaviour of sensors implicated in dyspnoea. Moreover, the experience of dyspnea involves the interaction of physiological, psychological, and expressive linguistic variables in a complex fashion, further implying a degree of cognitive function is a prerequisite for expression of this sensation. How children and adolescents communicate this is poorly understood.

Methods: 60 subjects between the ages of 5 and 17 years old who presented for spirometry after referral to a tertiary care Chest Clinic completed questionnaires regarding their physical, emotional, and narrative experience of dyspnea on a 5-point scale from “not at all” to “a lot”. Subjects comprised a convenience sample referred to Chest Clinic for evaluation of various respiratory concerns. Questionnaires were analyzed for responses that were selected at a rate greater than expected by chance as well as for differences in responses according to age or sex, irrespective of ultimate diagnosis which was unknown then.

Results: Subjects were reliable in reporting at least “a little bit” of sensation across physical (chest, throat, and body) and narrative categories but were unlikely to endorse stronger sensations such as “a lot” of chest tightness. Subjects reported a wide range of physical sensations, endorsing 75% of prompts in “throat” and “body” and 62.5% of prompts in “chest”. Of these, the most common responses were “winded feeling in chest”, “tight chest”, and “dry throat”. Subjects did not endorse specific affective responses associated with dyspnoea at rates above chance. Age was not a factor in choice of descriptors, but females were more likely than males to rate experiential sensations as "quite a bit" or "a lot".

Conclusions: Children and adolescents who experienced respiratory symptoms such as cough, wheeze, or perceived breathlessness reliably endorse mild experiential descriptors of dyspnoea in terms of physical sensations spread broadly across their chest, throat, and body. They also reliably endorse cognitive descriptors such as “I feel my health is bad”; whereas their endorsement of emotional descriptors is haphazard and less reliable. Perception of greater degrees of sensation associated with dyspnea was uncommon but females are more likely to do so than males, indicating sex differences in perception of dyspnoea appear early in life.

Topic: Neonatal Pulmonology / Bronchoscopy / Congenital Malformations / Respiratory Intensive Care and Airways Physiology / Sleep / NIV

Evaluation of Longitudinal Changes in Pulse Oximetry Indices in Healthy Preterm and Term Infants

Abstract ID:14224

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Co-Authors: Jemima Clarke, Zara Howarth, Olivia Falconer, Hazel Evans

Presenting Author: Bethany McDermott

Introduction & Objectives: Nocturnal pulse oximetry is used to guide supplemental oxygen prescription. There is a lack of evidence surrounding normative oxygen saturation indices in neonates, which has led to wide variation in clinical practice. Age-appropriate reference ranges are needed to ensure safe maintenance of oxygen saturations and minimal adverse outcomes. This study aims to determine patterns of longitudinal changes in pulse oximetry indices over the first 5 weeks of life and establish if there are differences between healthy preterm and **term infants.**

Methods: Healthy infants born ≥32 weeks gestation underwent weekly nocturnal pulse oximetry for the first 5 weeks of life. These infants were divided into a preterm group (born 32^{+0}–36^{+6} weeks gestation) and a term group (born 37^{+0}–42^{+0} weeks gestation). The outcomes measured were mean oxygen saturation (SAT50), the number of >3% and >4% oxygen desaturations per hour (ODI3 and ODI4 respectively), and the percentage of time spent with oxygen saturation <90%. Results were compared between the two groups and between adjacent weeks using the Mann-Whitney U test.

Results: 99 pulse oximetry recordings from 20 infants were analysed. This included 10 preterm infants (median gestation 34.72 weeks) and 10 term infants (median gestation 40.36 weeks). Overall, the median SAT50 was 95.65% (95% CI 95.17–96.52%) in preterm infants and 96.12% (95% CI 95.85–96.67%) in term infants (p=0.272). Between weeks 1 and 2, the median SAT50 decreased from 95.88% to 95.06%. This involved a change of -0.66% saturation in preterm infants and -0.62% saturation in term infants (p=1.00). Between weeks 2 and 5, the median SAT50 progressively increased to 95.62%. The corresponding results for ODI3 are shown in ***Table 1*****.**

Table 1 A table showing the 3% Oxygen Desaturation Index (ODI3) in preterm and term infants at each of the first 5 weeks of life (as well as a median value for weeks 1-5). P-values produced using the Mann-Whitney U test to compare values between preterm and term infants are displayed. Significant differences (p<0.05) are indicated using an asterisk (*****).

Time of Recording	ODI3 in Preterm Infants	ODI3 in Term Infants	P-Value
Week 1	73.05	33.55	0.750
Week 2	79.82	35.28	**0.009***
Week 3	59.56	26.48	0.052
Week 4	36.58	23.98	**0.035***
Week 5	32.32	26.20	0.367
All Recordings	**45.20**	**28.11**	**<0.001***

Conclusions: Healthy preterm and term infants experience similar mean oxygen saturations, but preterm infants have significantly higher oxygen desaturation indices. We hypothesise that preterm infants are more susceptible to desaturations due to the impact of ventilatory instability on lower lung volumes. Additionally, pulse oximetry indices appear to worsen over the first 2 weeks of life before gradually recovering, which could be related to postnatal changes in metabolic demand.

Topic: Neonatal Pulmonology / Bronchoscopy / Congenital Malformations / Respiratory Intensive Care and Airways Physiology / Sleep / NIV

Occult Foreign Body Aspirations in Pediatric Patients: 20-years of Experience

Abstract ID:14315

Main Author: Bo Liu

Author Organisation: Children's Hospital of Chongqing Medical University

Co-Authors: Fengxia Ding, Yong An, Yonggang Li, Zhengxia Pan, Gang Wang, Jiangtao Dai, Hongbo Li,Chun Wu

Presenting Author: Bo Liu

Introduction & Objectives: The purpose of our study was to assess the frequency of occult foreign body aspiration (FBA) and to evaluate the diagnostic difficulties and therapeutic methods for these patients.

Methods: Between May 2000 and May 2020, 3557 patients with the diagnosis of FBA were treated in our department. Thirty-five patients with occult FBA were included in this study. A retrospective analysis of medical records was performed.

Results: Twenty-three male patients (65.7%) and 12 female patients (34.3%) were hospitalized due to occult FBA. The average age was 3.60 years (range 9 months-12 years). Most of the patients were younger than 3 years old (n=25, 71.4%). Coughing (n=35, 100%) and wheezing (n=18, 51.4%) were the main symptoms and signs. All the patients were found to have a FBA under the fiberoptic bronchoscope. The most common organic foreign bodies were peanuts (n=10) and the most common inorganic foreign bodies were pen caps (n=5). The extraction of foreign bodies under rigid bronchoscopy was applied successfully in 34 patients. Only one patient needed a surgical intervention.

Conclusions: Occult FBA should always be considered in the differential diagnosis of chronic or recurrent respiratory diseases that are poorly explained, even in the absence of a previous history of aspiration.

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Topic: Neonatal Pulmonology / Bronchoscopy / Congenital malformations / Respiratory Intensive Care and Airways Physiology / Sleep / NIV

Very large congenital lobar emphysema with mediastinal shift

Abstract ID:14223

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Presenting Author: Cecilia Stewart

Introduction & Objectives: Congenital lobar emphysema (CLE) is a rare congenital abnormality with prevalence of 1 per 30,000 deliveries with a male predominance [2]. The pathophysiology involves over aeration of one or more lobes of the lung (most commonly the left upper lobe). This results in compression atelectasis od other lobes and thus presents as respiratory distress in infancy [3]. CLE is usually diagnosed in the neonatal period with 1/3rd of cases being symptomatic at birth and almost all are diagnosed by 6 months old [1]. Prenatal sonography should suspect CLE in the presence of hyper-echogenic lung segments, however, prenatal sonography commonly misses CLE diagnoses in utero, mainly due to difficulty discerning the hyper-echogenicity, or the lower prevalence of CLE in utero [2]. Definitive management for CLE is a lobectomy, however controversy exists around the role for conservative management which is typically recommended for mild, moderate, or asymptomatic patients and close follow-up for these patients may lead to lobectomy if symptoms progress [1].

Case presentation: Male term baby with NVD and no abnormalities detected on antenatal scans. First presentation was at 3 weeks with symptoms suggestive of bronchiolitis, initial Chest X-Ray (CXR) was unremarkable. At 5 weeks he re-presented with a similar episode of shortness of breath (SOB) and RSV positive swabs. CXR revealed left upper lobe hyperinflation and CT scanning confirmed the presence of left upper lobe congenital emphysema. From 6 weeks onwards there was persistent SOB, feeding difficulties and an eventual failure to thrive, requiring an increased frequency of hospital admissions. CXR at 10 weeks revealed further hyperinflation of the left upper lobe, causing compression of surrounding lobes and significant right-sided mediastinal shift. Urgent referral was made to a cardiothoracic unit where a lobectomy was performed at 11 weeks of age. Follow-up has shown a complete resolution of symptoms and weight gain improved with resolution of radiological complication seen pre-operatively.

Discussion: This case illustrates a severe presentation of CLE missed on routine antenatal scans. It demonstrates the progression of symptoms and shift from conservative to urgent active management; with corresponding intensified CXR findings.

References

Reference 1 - Omer D, Hangul M & Kose M (2019) Congenital lobar emphysema: diagnosis and treatment options, International Journal of Chronic Obstructive Pulmonary Disease, 14:, 921-928, DOI: 10.2147/COPD.S170581

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Topic: Physiology / Sleep / NIV

Case Report: Personalising Sleep Study Architecture for Paediatric Patients to reach Optimal Pressures during Overnight Titrations.

Abstract ID:14322

Main Author: Tatenda Samuels

Author Organisation: Royal London Hospital

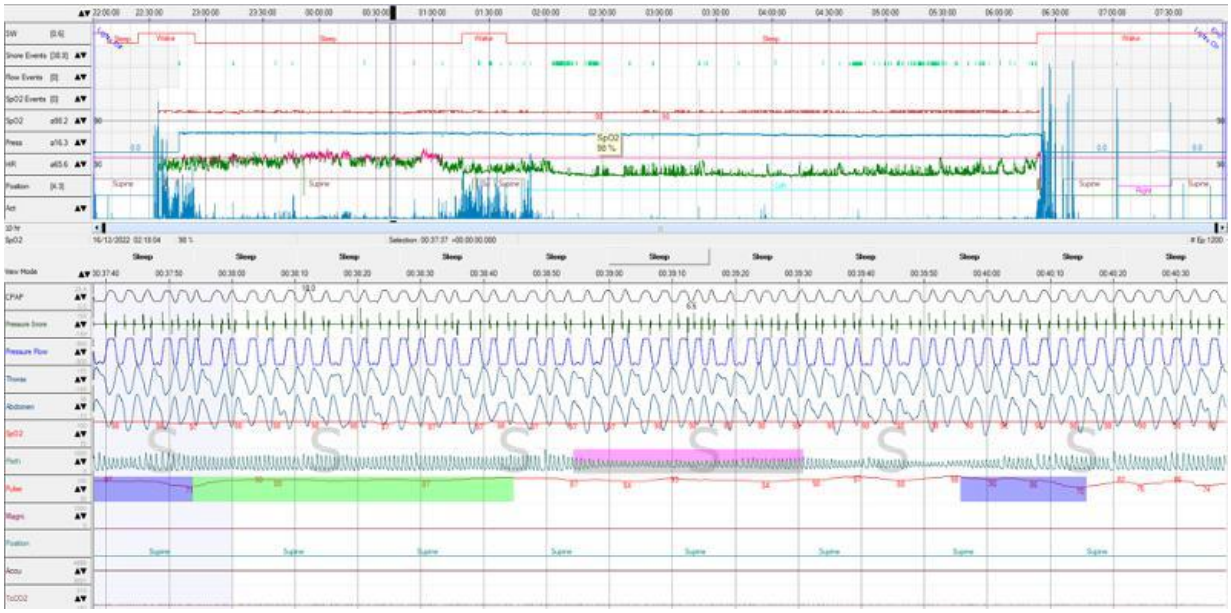
Co-Authors: Rasheda Choudhury,Suren Thavagnanam

Presenting Author: Tatenda Samuels

Introduction: The success of performing overnight sleep studies and carrying out procedures such as ventilation titrations for paediatric patients depends on sleep physiologists maximising their time in a typically 12-hour shift, hoping that patients have normal sleep cycles. However, conditions such as delayed-sleep wake phase disorder and poor sleep hygiene can result in inconclusive sleep studies/a reduction in possible interventions due to time restrictions. Particularly, reduction of ventilation pressures can serve as a sign of the clinical improvement of a patient and can also assist in improving ventilation adherence[1].

Aim: This case report highlights the importance of flexibility/ co-ordination within the multi-disciplinary team (MDT) when conducting overnight sleep studies; to maximise total recording time and to ensure that ventilated patients are discharged on optimal pressures.

Case Report: A 12-year-old boy with X-linked Myotubular Myopathy attended for a follow-up Bilevel Positive Airway Pressure (BiPAP)cardiorespiratory sleep study (CRSS) via tracheostomy. This patient had a previous sleep study in October 2021 on BiPAP settings 22/10cmH2O, displaying hypoventilation (%TST>50mmHg:27%).
Patient attended in December 2022 for a follow up BiPAP titration on their current pressures of 20/10cmH2O.
Patient was set up for the BiPAP CRSS at 01:00 as per usual routine, sleep onset was delayed at 02:00. Following in-house titration protocol; Titration 1 (04:15) to 19/9cmH2O and Titration 2 (05:31) to 18/8cmH2O. Physiologist handed over complete BiPAP CRSS to ward nurses from 06:31, allowing it to continue recording until 08:40. This increased total sleep time (TST) on final pressures from 60minutes to 189minutes. A follow up unattended CRSS on 18/8cmH2O was performed the following day (Figure 1). Normal results achieved where no respiratory events shown and mean transcutaneous carbon dioxide (TcCO2) levels were 45mmHg when asleep. Patient discharged on 18/8cmH2O on their BiPAP machine.



(Figure 1) Follow up sleep study on lower pressures of 18/8cmH2O during unattended sleep study.

Conclusions

This case report illustrates the need for overcoming time limitations in making safe and effective clinical decisions for patients. Future plans:

- Improve methods of communication between parents/ guardians, physiologists and MDT to effectively plan for sleep studies; more thorough pre-sleep study questionnaire preceding titration follow up studies.
- Improve training for nursing staff across departments, to maximise unattended sleep studies in the absence of overnight physiologists.
- Actigraphy to pre-determine sleep study complexities.

References:

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Topic: Physiology / Sleep / NIV

Methodological variability in diagnosing sleep disordered breathing (SDB) in children

Abstract ID:14310

Main Author: Sreeja Kiran

Author Organisation: Royal London hospital

Co-Authors: Geezette Gulpo, Surendran Thavagnanam, Rasheda Choudhury

Presenting Author: Sreeja Kiran

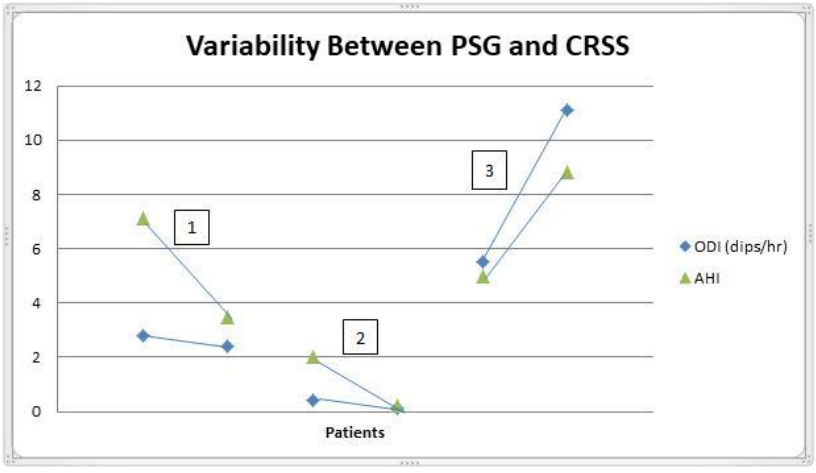
Introduction & Objectives: Sleep disordered breathing (SDB) is common in patients with neuromuscular, cranio-facial, obesity and genetic conditions. These patients are usually referred for a sleep study (SS) to assess the severity of SDB. Full polysomnography (PSG) is considered as the gold standard, however, cardiorespiratory sleep studies (CRSS) is also used to diagnose SDB due to various factors such as availability of experienced staff, longer setup and analysis time, as well as the tolerability in children. Tan *et al* (2013) demonstrated a disparity between PSG and CRSS which may impact clinical decisions, however we decided to do the same following the personal experiences. The aim of this study is to understand and compare the accuracy of PSG with limited channels electroencephalogram(frontal montage),electrooculogram and electromyogram versus CRSS in children with SDB.

Methods: Three studies were analysed between Dec 2022 and Feb 2023 at the paediatric sleep centre, Royal London Hospital. All studies were recorded using the sleep equipment (Somnotouch) and analysed using Domino software. A minimum total sleep time (TST) of 240 minutes met the inclusion criteria for data collection (Table). Studies were analysed according to the paediatric AASM guidelines for Obstructive Sleep Apnoea (OSA) and classified using Apnoea-Hypopnoea Index (AHI) as 1-5 events/hr is mild, 5-10 events/hr is moderate, >10 events/hr is severe. The oxygen desaturation index(ODI) of <7dips/hr is classified as normal. The study was first analysed and reported as PSG and then reanalysed as CRSS by same physiologist and verified by senior sleep physiologist. The AHI, ODI (>3% desaturation) and TST between both studies were compared.

Results: There were significant differences in calculated AHI resulting in reclassification of OSA severity in 2 cases. In the third study, TST, Central apnoea index (CnAHI) and ODI was overestimated in CRSS.

Diagnosis/Age	PSG	CRSS	Change in classification
Foetal Alcohol Syndrome 5 years	TST:377 minutes AHI:7.1(MOAHI:5.1,CnAHI:1.7) ODI:2.8dips/hr	TST:368 minutes AHI:3.5(MOAHI:3.5evs/hr) ODI:2.4dips/hr	Moderate OSA(PSG) to Mild OSA(CRSS)
Obesity 12 years	TST:424 minutes AHI:2.0evs/hr (MOAHI:2.0evs/hr) ODI:0.4dips/hr	TST:410 minutes AHI:0.2evs/hr (CnAHI 0.2ev/hr) ODI:0.1dips/hr	Mild OSA(PSG) to Normal study(CRSS)
SHOX Deficiency Disorder 10 Years	TST:247 minutes AHI: 5.0evs/hr (CnAHI:4.7evs/hr,MOAHI:0.3evs/hr) ODI:5.5dips/hr	TST:286 minutes AHI:8.8evs/hr (CnAHI:8.6evs/hr,MOAHI:0.2evs/hr) ODI:11.1dips/hr	CnAHI index (CRSS) is elevated than PSG.

Table: PSG: Polysomnography study, CRSS: cardiorespiratory sleep study, TST: total sleep time, AHI: Apnoea hypopnoea index, ODI: oxygen desaturation index, CnAHI: central apnoea hypopnoea index, MOAHI: mixed obstructive apnoea hypopnoea index.



Conclusions: All children tolerated PSG set up well despite their age and medical complexities. Despite a small study sample, a clear disparity noted between PSG and CRSS results, which can influence clinical management plans. TST was more accurately analysed with PSG compared to CRSS.

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Topic: Physiology / Sleep / NIV

The Impact of Sleep Stages on Cerebral Perfusion in Neonates

Abstract ID:14281

Main Author: Jemima Clarke

Author Organisation: University Hospital Southampton Child Health

Co-Authors: Zara Howarth, Jonathan James, Beth McDermott, Brigitte Vollmer, Hazel Evans

Presenting Author: Zara Howarth

Introduction & Objectives: Near Infrared Spectroscopy (NIRS) is increasingly used on neonatal intensive care units to guide treatment for infants with hypoxic ischaemic encephalopathy (HIE). Currently, reference ranges from adults are used to guide clinical management, due to the paucity of data in neonatal cohorts. Healthy neonates have demonstrated brief hypoxic events in pulse oximetry traces (Evans et al, 2018) secondary to respiratory instability (Brockman et al, 2017). Respiratory events, such as these, have been evidenced to impact cerebral perfusion (Tamanyan et al, 2019), potentially leading to adverse neurocognitive outcomes. Our aim is to determine whether cerebral perfusion is impacted by clustered desaturations that occur in pulse oximetry defined active sleep cycles when compared to quiet sleep.

Methods: Healthy term neonates were recruited from Princess Anne hospital, Southampton and monitored using nocturnal pulse oximetry (NPO) and NIRS weekly at 7, 14, 21 +/- 3 days postnatal age. NPO was used to identify periods of active and quiet sleep. These were mapped to cerebral perfusion indices, the percentage change in regional oxygen saturation (rSO_2) from baseline and the mean ODI3 values were compared between quiet and active sleep.

Results: Pilot data is presented from 3 term infants who each completed 3 NIRS recordings. In total, 48 sleep intervals were extracted; 28 periods of active sleep and 20 of quiet sleep. The mean ODI3 value for active sleep was 33.37 (SD = 28.206), and for quiet sleep it was 13.53 (SD= 24.883) ($p<0.001$). The mean lowest percentage rSO_2 drop from baseline, in active sleep, was -16.143 (SD = 14.99) and in quiet sleep was -6.500 (SD = 7.99) ($p=0.002$).

Conclusions: Active sleep is associated with a greater fall in rSO_2 from baseline. It can be theorised that this is after intermittent hypoxia that neonates experience during active sleep. The hypoxic events could be attributed to immature respiratory control and/or increased metabolic demand. Neonates spend up to 50% of sleep in the active stage, making these findings important for clinical management. Further research is required as NIRS reference ranges in adults are not applicable to neonates.

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