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S74 IS BRONCHOSCOPY NEEDED IN CHILDREN WITH PERSISTENT BACTERIAL BRONCHITIS?

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Introduction and Objectives Persistent bacterial bronchitis (PBB) is increasingly recognised as a cause of chronic cough in young children but there is lack of consensus about investigation and treatment. At UHNS, children with a wet cough for >6 weeks unresponsive to oral antibiotics prescribed by the GP are investigated with CXR, baseline immune function and flexible bronchoscopy with bronchoalveolar lavage (FB-BAL). Patients with confirmed PBB are then treated with a prolonged course of an appropriate antibiotic. Some centres reserve FB-BAL for those who do not respond to blind treatment with co-amoxiclav or clinically relapse. The objective was to review bronchoscopic findings and immune function in children with chronic cough to determine which investigations are necessary.
Methods A retrospective case note review of all children investigated for chronic cough between May 2011 and June 2013.
Results The notes of 44 children with chronic cough were reviewed. BAL samples were taken from 6 lobes in every patient. Median (IQR) age at bronchoscopy was 3.3 (1.8–4.4) years. Positive BAL cultures were obtained from 35 patients (80%). Ten patients (23%) isolated ≥2 organisms. *Haemophilus influenza* was identified in 20 (46%), *Moraxella catarrhalis* in 11 (25%), *Staphylococcusl aureus* in 10 (23%) and *Streptococcus pneumoniae* in 6 (14%). *Candida albicans*, *Group A Streptococcus*, *Haemophilus parainfluenzae* and a *gram negative bacillus* were each identified in 1 patient (2%). In 13 (30%) at least 1 organism was isolated that was unlikely to respond to co-amoxiclav. If the right middle lobe (RML) had been the only lobe sampled (as per ERS guidance) organisms would have been missed in 14 patients (32%). Suboptimal functional antibodies to *Haemophilus influenza* or *Pneumococcus* were identified in 7 patients (16%). Appropriate antibiotics were prescribed for all patients with a positive culture. Co-amoxiclav was the most commonly prescribed antibiotic and was used in 20 patients (57%). Treatment duration varied between 4 and 8 weeks.
Conclusions FB-BAL is a useful investigation to aid the diagnosis and guide treatment in PBB. The best time to perform FB-BAL is not known. In PBB a number of organisms will be missed if BAL is only taken from the RML.

S75 THE DEVELOPMENT AND VALIDATION OF A CLINICAL SEVERITY SCORE FOR INFANTS WITH BRONCHIOLITIS

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Introduction and Objectives Bronchiolitis is a viral lower respiratory tract infection of infancy.[1] 1–3% of all infants are admitted to hospital with 3% of hospitalised infants requiring critical care.[2]
Objective To develop and validate a scoring instrument for use by health care professionals (HCPs) in infants with bronchiolitis which has clinical utility.
Methods Psychometric methods were used to develop the scoring instrument and to test the instrument for validity and reliability in a variety of clinical locations.
Results *Item generation, reduction & instrument development:* 101 items were identified from the literature and focus group workshops (families & HCPs). Consensus for importance was achieved for 45 items (Table 1) following a Delphi survey of 195 HCPs. A scoring instrument with 12 domains was developed.

Abstract S75 Table 1. Signs, symptoms & risk factors.

Respiratory Symptoms	Risk Factors & Miscellaneous symptoms	Level of Consciousness	Hydration & Perfusion
1. Respiratory rate	21. Day of illness	31. Alertness	37. Feeding
2. Grunting	22. Personal concerns / 'gut' feeling	32. Irritability	38. Urine output
3. Nasal flare	23. Parental concerns	33. Drowsiness	39. Central capillary refill time measured
4. Recession	24. General condition	34. Responds to pain	over a given time
5. Accessory muscle use	25. Chronic lung disease	35. Unresponsive	40. Peripheral perfusion
6. Dyspnoea	26. Congenital heart disease	36. AVPU scale (alert, verbal,	41. Mottled appearance
7. Tracheal tug	27. HIV/ immunodeficiency	pain, unresponsive)	42. Sunken eyes
8. Respiratory pattern	28. Gestational age (<37 weeks)		43. Sunken fonatanelle
9. $PaCO_2$ on blood gas analysis	29. Low birth weight		44. Heart rate
10. Ph on blood gas analysis	30. Bacterial or viral co-infection		45. Pallor
11. Apnoea			
12. Stridor			
13. Head bobbing			
14. Using stomach to breathe			
15. Cyanosis			
16. Effort of breathing			
17. Air entry			
18. Oxygen requirements			
19. Oxygen saturation			
20. See saw chest motion			

Content validity: The scoring instrument was applied to infants (n = 115) by HCPs who were asked to rate each item/domain for clinical relevance. All items/domains were assessed as relevant. However there were substantial missing data for two domains (chest auscultation/blood gas analysis) as certain HCP groups could not undertake these procedures. These two domains were consequently removed.

Cognitive interviewing: HCPs (n = 15) were interviewed in order to assess comprehension, interpretation and how they arrived at their responses for each item/domain in the scoring instrument. Understanding of medical vocabulary was assessed. 'Sub-sternal recession' was removed and 'anuric' changed to 'not passed urine'.

Construct validity & paediatrician inter-rater reliability: HCPs applied the scoring instrument to infants (n = 128) whilst two senior doctors assessed whether the infant had 'mild', 'moderate' or 'severe' bronchiolitis. Cut points within the score have now been established for 'mild', 'moderate' and 'severe' bronchiolitis.

Conclusions We have developed and partially validated a clinical severity score for infants with bronchiolitis. Criterion and reliability testing of the score is planned for the 2013/14 bronchiolitis season. Responsiveness to change will be assessed in a future clinical trial.

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S76 NON-INVASIVE POSITIVE PRESSURE VENTILATION TO REDUCE CHILDHOOD MORTALITY FROM ACUTE RESPIRATORY FAILURE IN RURAL GHANA

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Introduction and Objectives Acute respiratory failure (ARF) is a major cause of mortality in the developing world, exacerbated by resource limitation. Non-invasive positive pressure ventilation (NIPPV) is a potential simple way to reduce mortality, and whilst established in adults, evidence in children is lacking.

Methods The study was conducted in Tumu District Hospital in Northern Ghana, which serves a catchment of 56,000 and has an under-5 Mortality of 142 per 1000 live births. Two Nippy Junior paediatric pressure controlled portable ventilators, chosen for ease of use and robustness, were used along with finger monitors to measure oxygen saturation and heart rate. Training of nurses, the nurse anaesthetist and the doctor was achieved with interactive lectures, hands-on workshops and competency assessment over 3 days in November 2011 and April 2012. Laminated guides attached to each machine outlined criteria to commence, escalate and wean NIPPV. Criteria for commencing NIPPV were based on respiratory rate, oxygen saturation, intercostal recession and expiratory grunting.

Results In the initial 4 months of NIPPV use, 657 children under 5 were admitted with 11 deaths, of whom 84 received NIPPV with 3 deaths. In the subsequent 9 months, NIPPV was used in 46 children and 11 adults, with no deaths. Of 140 patients ventilated in 2012, 106 (76%) were under five and 60 (43%) under the age of two. There were 2 deaths from malaria/sepsis with an overall mortality of 1.4% (1.9% <5 years). Primary diagnoses by age as best available are displayed in figure 1. No complications were reported apart from discomfort in some patients. Patients were ventilated for shorter periods than usual in the developed world. Ventilation times were notably shorter in malaria patients. Those with respiratory tract infections and pneumonia tend to be ventilated longer and were often more comfortable with ventilation for longer periods at a time.

Conclusions This feasibility study shows NIPPV for ARF in children in a rural setting can be delivered safely with minimal training and appears to impact significantly on mortality in those under 5.

Diagnosis	0-5 years n = 106	5-16 years n = 23	>16 years n = 11
Malaria	40 (38%)	10 (43%)	0
Septicaemia	27 (25%)	4 (17%)	0
Pneumonia/Bronchiolitis	16 (15%)	3 (14%)	4 (36%)
Gastroenteritis	11 (10%)	0	0
Anaemia	10 (9%)	3 (14%)	0
Asthma	2 (2%)	1 (4%)	5 (45%)
Other		2 (8%)	2 (19%)

Abstract S76 Figure 1.

S77 BENCHMARKING STANDARDS IN PAEDIATRIC PLEURAL INFECTION MANAGEMENT

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Introduction and Objectives In our centre patients are managed using a protocol-driven integrated-care pathway. Intra-pleural urokinase is administered via a fine bore chest-drain as primary therapy for significant pleural disease. We analysed patient outcomes with this approach to benchmark standards of care whilst examining patterns of disease severity with introduction of the pneumococcal conjugate vaccine. In addition we aimed to identify factors associated with failure of fibrinolytic therapy, defined as the need for a second intervention, (second chest-drain, VATS or thoracotomy).

Methods Medical case-records were reviewed on all children managed at a tertiary centre from Jan 2006-Dec 2012. We examined outcomes on all patients including those with significant medical comorbidities. Data were analysed using binary logistic regression in order to try to identify factors associated with therapy failure, (SPSS Version 20). The effect of; age, comorbidities, number of days of intravenous antibiotics prior to drainage, number of doses of urokinase given and whether initial imaging, (plain radiograph, ultrasound or CT), showed evidence of necrotising disease.

Results A total of 242 children were treated; age range 4 months-19 yrs; median 4 yrs. We observed a decreasing number of children presenting year-on-year with complicated pleural infection, (Figure 1). The vast majority of children were managed without surgery using either antibiotics alone (28%), or a fine-bore chest-drain and urokinase (70%), with good outcome. Only 2% children required a primary thoracotomy whilst 14.6% failed fibrinolytic therapy and required a second intervention. The only factor that appeared to predict failure was the suspicion of necrotising disease on initial imaging (p = 0.01, OR 0.11). Median length-of-stay for all children, including those with medical co-morbidity, was 10 days (range 1–118 days).

Conclusions We have observed a decreasing incidence of complicated pleural infection at this centre since 2006. Good patient