Journal club

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DETECTION OF BACTERIAL PATHOGENS IN PATIENTS WITH COVID-19: ROLE FOR RAPID MULTIPLEX PCR

Patients admitted to intensive care with COVID-19 have high rates of secondary bacterial infection, but few data exist on the usefulness of multiplex PCR in this population. Karolyi *et al* (Central Eur J Med 2021:doi.org/10.1007/s00508-021-01990-0) conducted a single-centre retrospective observational study in Austria to analyse which pathogens were detected by a commercial PCR system (Pneumonia Panel (PP)), from tracheal aspirates and bronchoalveolar lavages of patients admitted to critical care with COVID-19 with suspected hospital-acquired pneumonia (HAP) or ventilator-associated pneumonia (VAP). The PP can detect a range of common bacterial and viral pathogens within 2 hours and can detect some antibiotic resistance genes. The study recruited 60 patients, of whom 12 (20%) had suspected HAP and 48 (80%) VAP. In total, 75% of patients had either a positive PP and/or culture result, with PP positive in 63.3% (38/60) and culture positive in 66.6% (24/36). The most common pathogens that were detected by PP were *Staphylococcus aureus* (13/60, 21.7%), *Klebsiella pneumoniae* (12/60, 20%) and *Haemophilus influenzae* (9/60, 15%). No resistance genes were detected. Samples for conventional microbiological culture were obtained concomitantly in 36 patients, with a similar spread of bacteria identified compared with PP. PP was negative in 22/60 (36.7%) and culture was negative in 12/36 (33.3%), The PP and culture were non-concordant, partially concordant and completely concordant in 13.9%, 30.6% and 55.6% of the samples, respectively. In this small sample, PP demonstrated the ability to rapidly identify organisms in patients with COVID-19 and suspected HAP or VAP with potential for a higher diagnostic yield by combining with microbiological culture.

RISK FACTORS FOR SEVERE BRONCHIOLITIS: MAJOR IMPACT OF POOR HOUSING AND CIGARETTE SMOKE EXPOSURE

Bronchiolitis, typically caused by respiratory syncytial virus (RSV), is an important cause of hospitalisation in infants<12 months old. Nguyen *et al* (Int J Pediatrics 2021; doi.org/10.1155/2021/9704666) single-centre descriptive cross-sectional study in Vietnam examined the risk factors for and clinical features of severe bronchiolitis. A total of 377 children diagnosed with bronchiolitis caused by RSV, using standard diagnostic criteria, were included in the study over a 1-year period. RSV was confirmed using rapid direct immunofluorescence of nasopharyngeal swab samples. Most children were aged under 6 months (215/377, 57%) and 69% were male (261/377) with 12.5% (47/377) categorised, using Modified Cincinnati Bronchiolitis Score, with severe bronchiolitis. The highest number of admissions were in January–March (122, 32%). Tachypnoea, runny nose and cough were present in all patients. The most common reason for admission to hospital was wheeze in 261 patients (69.2%). The most significant risk factors for severe bronchiolitis were low birth weight (OR=13.3; 95% CI=4.15 to 42.77; p<0.01), exposure to cigarette smoke (OR=7.4; 95% CI=1.45 to 37.96; p<0.01), history of mechanical ventilation (OR=10.14; 95% CI=2.19 to 46.8; p<0.01) and poor living condition (OR=9.4; 95% CI=3.03 to 29.5; p<0.01). Sex was not significantly associated with severe bronchiolitis (OR=1.34; 95% CI=0.67 to 2.69; p>0.05), in contrast with previous studies. The study confirms the importance of modifiable risks in determining the severity of bronchiolitis and focus should remain on public health initiatives to combat these areas.

LIVE ATTENUATED INFLUENZA VACCINE IN CHILDREN FROM LOW ECONOMIC COUNTRIES: IMPACT ON PNEUMOCOCCAL COLONISATION AND DENSITY APPEARS SMALL

Previous research in murine models and high-income countries has shown that the live attenuated influenza vaccine increases *Streptococcus pneumoniae* colonisation densities. Peno *et al* (Lancet Microbe 2021;2:e656) present this randomised controlled trial evaluating the effect of LAIV on nasopharyngeal pneumococcal colonisation and density in 330 healthy, LAIV naïve children aged 2–5 years, in a low-income to middle-income country (LMIC). Groups were assigned randomly to receive LAIV either on day 0 (intervention) or day 21 (control group). Nasopharyngeal samples were taken at day 0, 2, 7 and 21. PCR was used to identify and quantify pneumococcal loads. There were no significant differences between the two groups at baseline; baseline pneumococcal carriage prevalence was high at 74.9%. There was a within group increase in the prevalence of colonisation at day 7 (p=0.042) and day 21 (p=0.0037) compared with day 0 in the LAIV group, but no change in the control group or between groups. Similarly, there was no difference in pneumococcal density between groups at each time point, but a mixed-effect model demonstrated a significant increase in pneumococcal density at day 21 in the LAIV group (p=0.0082) but not in the control group. This increase in density was much less (1.78 times the original density by day 21) than the sixfold increase demonstrated in a study in the UK. These findings are reassuring for the use of LAIV in LMICs in populations with high pneumococcal carriage.

HOST INFLAMMATORY RESPONSE TO TUBERCULOSIS (TB): IDENTIFYING TARGETS FOR NEW THERAPIES

High pretreatment host inflammatory responses to mycobacterium tuberculosis (MTB) results in more severe lung damage and reduced recovery post-treatment, prompting interest in host-directed therapies. However, which immune cell subtypes and mediators are proinflammatory or anti-inflammatory during active TB (ATB) is uncertain. Muefong et al (Front Immunol 2021;12:740933) evaluated the role of neutrophil-derived mediators in inflammatory response to ATB and any correlation with lung pathology in 107 HIV-negative adults with confirmed drug-sensitive TB managed with 6 months of anti-TB treatment (ATT). They were categorised into 'mild pathology' and 'severe pathology' at baseline and 6 months, based on GeneXpert bacterial load (Ct values) and X-ray of the chest Ralph scores, which determine severity using the percentage of lung fields affected by known ATB features. Neutrophil-derived mediators in plasma and sputum samples were analysed at baseline, 2 and 6 months; these were then correlated with severity of lung pathology and evaluated over time to determine changes with treatment and any correlation with recovery. Plasma metalloproteinase-8 and sputum tumour necrosis factor levels were positively associated with poor recovery post ATT (p=0.039 and p=0.038, respectively). Additionally, sputum myeloperoxidase (MPO) correlated negatively with lung damage (p=0.018) and MTB burden (p=0.0043) at baseline. Patients with good lung recovery post ATT had higher baseline sputum MPO (p=0.047) compared with those with poor recovery. This suggests that MPO could dampen the inflammatory response in ATB and be protective against TB progression and lung damage.

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