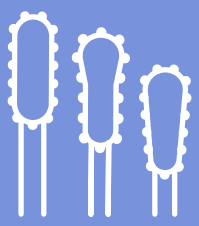
Scientific Booklet

Respiratory Infections



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Acknowledgments:

We would like to express our gratitude to the authors whose works have been arranged in this booklet: their insights and expertise greatly assisted this prime selection.

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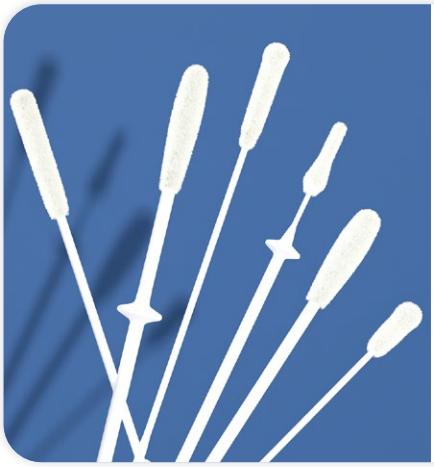

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BMC Infect Dis. 2018 Mar 12;18(1):122

Respiratory Infections

Molecular Epidemiology and Virulence Characteristics of *Staphylococcus aureus* Nasal Colonization in Medical Laboratory Staff: Comparison Between Microbiological and Non-Microbiological Laboratories

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Keywords

eSwab®	*Staphylococcus aureus*	Nasal Colonization	Antimicrobial Susceptibility

Abstract

Background: Medical laboratory staff are a high-risk population for colonization of Staphylococcus aureus (S. aureus) due to direct and dense contact with the pathogens; however, there is limited information about this colonization. This study sought to determine the prevalence and molecular characteristics of nasal colonization by S. aureus in medical laboratory staff in Guangzhou, southern China, and to compare the differences between microbiological laboratory (MLS) and non-microbiological laboratory (NMLS) staff.

Methods: S. aureus colonization was assessed by Copan eSwab® nasal swab cultures from 434 subjects, including 130 MLSs and 304 NMLSs from 33 hospitals in Guangzhou. All S. aureus isolates underwent the antimicrobial susceptibility test, virulence gene detection and molecular typing.

Results: The overall prevalence of S. aureus carriage was 20.1% (87/434), which was higher in MLSs than in NMLSs (26.2% vs. 17.4%, $P < 0.05$), while the prevalence of Methicillin-resistant S. aureus (MRSA) was similar. Living with hospital staff was associated with S. aureus carriage. The majority of the isolates harboured various virulence genes, and those in MLSs appeared less resistant to antibiotics and more virulent than their counterparts. A total of 37 different spa types were detected; among these, t338, t437, t189 and t701 were the most frequently encountered types. T338 was the main spa type contributing to nasal colonization Methicillin-sensitive S. aureus (MSSA) (13.0%), and t437-SCCmec IV was predominant in MRSA isolates (40%).

Conclusions: These findings provide insight into the risk factors, molecular epidemiology and virulence gene profiles of S. aureus nasal carriage among the medical laboratory staff in Guangzhou.

J Clin Microbiol. 2019 Jan 30;57(2):e01482-18

Respiratory Infections

Multicenter Clinical Evaluation of the Automated Aries Group A Strep PCR Assay from Throat Swabs

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Keywords

eSwab®	*Group A streptococcus*	*Streptococcus pyogenes*	Throat Swab

Abstract

Group *A Streptococcus* (GAS) is one of the leading causes of bacterial pharyngitis. Early GAS diagnosis is critical for appropriate antibiotic administration that reduces the risk of GAS sequelae and limits spread of the infection. The Aries Group A Strep (GAS) assay (Luminex, Austin, TX) is a fully automated PCR assay for direct detection of GAS in Copan eSwab® throat swab specimens in less than 2 h with minimum hands-on time. This multicenter prospective study evaluated the clinical performance of the Aries GAS assay compared to that of *Streptococcus pyogenes* culture. Subjects with symptoms consistent with pharyngitis were enrolled across four sites in the United States, and a throat swab in liquid Amies medium was obtained. Aries and reference testing was performed within 72 and 48 h after sample collection, respectively. Of 623 throat swab specimens from patients with pharyngitis (93.6% 18 years old, 54.3% female), the reference method yielded valid results for 618 specimens. Reference and Aries assay testing showed GAS-positive results for 160 (25.9%) and 166 (26.9%) specimens, respectively. Compared to the reference method, Aries assay sensitivity was 97.5% (95% confidence interval [CI], 93.7% to 99.0%), specificity was 97.8% (95% CI, 96.0 to 98.8%), positive predictive value was 94.0% (95% CI, 89.3% to 96.7%), and negative predictive value was 99.1% (95% CI, 97.7% to 99.7%). There were 10 false-positive and four false-negative detections with the Aries assay. Discrepant analysis with bidirectional sequencing yielded concordant results with the Aries assay for nine of 14 discordant samples. The Aries assay had high sensitivity and specificity for qualitative detection of group A Streptococcus from patients with pharyngitis.

J Cyst Fibros. 2019 Jun; 18: S107

Respiratory Infections

Detection of Respiratory Viruses in Cystic Fibrosis: Comparison of Nasal FLOQSwabs® and Sputum Using the FilmArray® Platform

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Keywords

SL Solution™	Cystic Fibrosis	Respiratory Viruses	Sputum

Abstract

This Prospective observational study had two aims: To measure the prevalence of respiratory viruses in people with CF when clinically stable and at onset of CF exacerbation. To compare results from paired Nasal FLOQSwabs® and sputum using the FilmArray real time PCR respiratory panel. Individuals were included at the clinically stable time point if well, and a minimum of 4 weeks since last intravenous antibiotics. Individuals were included at the exacerbation time point within 24 hours of commencing intravenous antibiotics for CF exacerbation. Nasal FLOQSwabs® were collected and frozen in Universal Transport Medium™ (UTM® RT) at - 80degreeC. 200 mul aliquot of raw sputum was frozen at -80degreeC until thawed and homogenized in 200 mul of Copan SLSolution™. Both samples were analysed using the FilmArrayrespiratory panel. Of the 83 paired nasal and sputum samples 84% had concordant results. However, 16% of results were discordant with 15% negative for viral infection on nasal swab but positive in sputum. CF Sputum was processed using COPAN SLSolution™ on the FilmArray platform and these results suggest that sputum may be a more sensitive method for detecting respiratory viruses in CF.

Laryngoscope. 2021 Jan;131(1):158-164

Respiratory Infections

Identification of Viruses in Patients with Postviral Olfactory Dysfunction by Multiplex Reverse-Transcription Polymerase Chain Reaction

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Keywords

UTM®	Olfaction Disorders	Nasopharyngeal Swab	FLOQSwabs®

Abstract

Objectives/Hypothesis: To investigate causative viruses in patients with postviral olfactory disorders (PVOD).
Methods: One hundred fifty-one consecutive patients diagnosed with PVOD were enrolled, and samples from 38 patients who visited the doctor within 3 months of symptom onset were collected and analyzed. Thirty-two individuals who underwent surgery for nasal septal deviation during the same time period were collected as the control group. The Sniffin' Sticks psychophysical olfactory test was used to evaluate olfactory function. Olfactory cleft specimens were collected using nasopharyngeal flocked swabs (COPAN FLOQSwabs®). Eighteen viruses were tested for with the Luminex xTAG RVP FAST v2 Assay Kit.
Results: Out of the 38 patients with PVOD, rhinoviruses were detected in 13 patients, and coronavirus OC43 was detected in one patient. The frequency of positive virus detection in the patients with anosmia was higher than in those with hyposmia (58.8% vs. 19.0%, P = 0.018). In control group, rhinovirus was identified in one patient (3.1%). Nasal obstruction was the most common symptom and was experienced by 71.0% of patients.
Conclusions: Rhinovirus and coronavirus are more commonly identified in PVOD. Our methods represent an approach to screen for viruses that may be involved in PVOD.

J Clin Microbiol. 2015 Sep;53(9):2970-6

Respiratory Infections

Isothermal Detection of *Mycoplasma pneumoniae* Directly from Respiratory Clinical Specimens

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Keywords

UTM®	LAMP Assay	Respiratory Specimens	*Mycoplasma pneumonie*

Abstract

Mycoplasma pneumoniae is a leading cause of community-acquired pneumonia (CAP) across patient populations of all ages. We have developed a loop-mediated isothermal amplification (LAMP) assay that enables rapid, low-cost detection of *M. pneumoniae* from nucleic acid extracts and directly from various respiratory specimen types collected in Copan UTM®. The analytical sensitivity of the assay was determined to be 100 fg by testing serial dilutions of target DNA ranging from 1 ng to 1 fg per reaction, and no cross-reactivity was observed against 17 other Mycoplasma species, 27 common respiratory agents, or human DNA. We demonstrated the utility of this assay by testing nucleic acid extracts (n 252) and unextracted respiratory specimens (n 72) collected during *M. pneumoniae* outbreaks and sporadic cases occurring in the United States from February 2010 to January 2014. The sensitivity of the LAMP assay was 88.5% tested on extracted nucleic acid and 82.1% evaluated on unextracted clinical specimens compared to a validated real-time PCR test. Further optimization and improvements to this method may lead to the availability of a rapid, cost-efficient laboratory test for *M. pneumoniae* detection that is more widely available to primary care facilities, ultimately facilitating prompt detection and appropriate responses to potential M. pneumoniae outbreaks and clusters within the community.

PLoS One. 2018 Mar 30;13(3):e0194823

Respiratory Infections

Increased Carriage of Non-Vaccine Serotypes with low Invasive Disease Potential Four Years After Switching to the 10-Valent Pneumococcal Conjugate Vaccine in The Netherlands

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Keywords

Pneumococcal vaccine	*Streptococcus pneumoniae*	Culture Analysis	FLOQSwabs®

Abstract

The 7-valent pneumococcal conjugate vaccine (PCV7) was introduced in The Netherlands in 2006 and was replaced by PHiD-CV10 in 2011. Data on carriage prevalence of *S. pneumoniae* serotypes in children and invasive pneumococcal disease (IPD) in children and older adults were collected to examine the impact of PCVs on carriage and IPD in The Netherlands. Pneumococcal carriage prevalence was determined by conventional culture of nasopharyngeal swabs in 24-month-old children in 2015/2016. Data were compared to similar carriage studies in 2005 (pre-PCV7 introduction), 2009, 2010/2011 and 2012/2013. Invasive pneumococcal disease isolates from hospitalized children 65 years (2004–2016) were obtained by sentinel surveillance. The overall pneumococcal carriage rate was 48% in 2015/2016, lower than in 2010/2011 (64%) and pre-vaccination in 2005 (66%). Serotypes 6C, 23B and 11A have high carriage prevalence in children, but show low invasive disease potential. Serotype 8 is the main causative agent for IPD in older adults (11.3%). In conclusion, 10 years after the introduction of pneumococcal vaccination in children in The Netherlands shifts in carriage and disease serotypes are still ongoing. Surveillance of both carriage and IPD is important to assess PCV impact and to predict necessary future vaccination strategies in both children and older adults.

Eur J Clin Microbiol Infect Dis. 2018 Apr;37(4):711-714

Respiratory Infections

Evaluation of the Copan Myco-TB kit for the Decontamination of Respiratory Samples for the Detection of Mycobacteria

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Keywords

Myco-TB™	Mycobacteria	Decontamination	Fluidization

Abstract

The purpose of this study was to test a newly developed decontamination and fluidization kit for processing respiratory specimens for the detection of mycobacteria: the Myco-TB™ procedure (developed by Copan Brescia, Italy). This technique was compared with the Zephiran decontamination method in use in our hospital. Respiratory specimens (n = 387: 130 endotracheal/bronchial aspirates, 172 bronchoalveolar lavages and 55 sputa) submitted to the University Hospital of Brussels between January 2016 and March 2017 were included. All samples were divided into two aliquots: one was subjected to the Myco-TB™ method and one to the Zephiran technique prior to culture. The sensitivities for culture for the Zephiran technique on solid media, the Myco-TB™ method on solid media and Myco-TB™ combined with the MGIT™ system were respectively 67%, 87% and 89%. The contamination rates were 22% with both the Zephiran and Myco-TB™ method on solid media and only 4% with the Myco-TB™ kit combined with the MGIT™ system. For direct microscopy, the sensitivities of the Zephiran method and the Myco-TB method were equal (40%) when the centrifugation time was 20 min. The Myco-TB™ decontamination method is easy and rapid to perform. It is more sensitive for culture as compared to the Zephiran method and gives lower contamination levels when combined with the MGIT™ technique. When increasing the centrifugation step to 20 min, the sensitivity of direct microscopy is equal to the Zephiran method.

Virol J. 2018; 15: 91

Respiratory Infections

The Role of Human Metapneumovirus Genetic Diversity and Nasopharyngeal Viral Load on Symptom Severity in Adults

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Keywords

Human Metapneumovirus	Nasopharyngeal Swab	FLOQSwabs®

Abstract

Background: Human metapneumovirus (HMPV) is established as one of the causative agents of respiratory tract infections. To date, there are limited reports that describe the effect of HMPV genotypes and/or viral load on disease pathogenesis in adults. This study aims to determine the role of HMPV genetic diversity and nasopharyngeal viral load on symptom severity in outpatient adults with acute respiratory tract infections.
Methods: Association between the fusion and glycoprotein genes diversity, viral load (quantified using an improved RT-qPCR assay), and symptom severity were analyzed using bivariate and linear regression analyses.
Results: Among 81/3706 HMPV-positive patients, there were no significant differences in terms of demographics, number of days elapsed between symptom onset and clinic visit, respiratory symptoms manifestation and severity between different HMPV genotypes/sub-lineages. Nasopharyngeal viral load did not correlate with nor predict symptom severity of HMPV infection. Interestingly, at 3–5 days after symptom onset, genotype A-infected patients had higher viral load compared to genotype B (4.4 vs. 3.3 log10 RNA copies/μl) ($p = 0.003$).
Conclusions: Overall, HMPV genetic diversity and viral load did not impact symptom severity in adults with acute respiratory tract infections. Differences in viral load dynamics over time between genotypes may have important implications on viral transmission.

J Clin Microbiol. 2019 Feb 27;57(3):e01281-18

Respiratory Infections

Clinical Impact of Rapid Point-of-Care PCR Influenza Testing in an Urgent Care Setting: a Single-Center Study

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Keywords

UTM®	Influenza	Point-of-Care Testing	Urgent Care

Abstract

Seasonal influenza virus causes significant morbidity and mortality each year. Point-of-care (POC) testing using rapid influenza diagnostic tests (RIDTs), immunoassays that detect viral antigens, are often used for diagnosis by physician offices and urgent care centers. These tests are rapid but lack sensitivity, which is estimated to be 50 to 70%. Testing by PCR is highly sensitive and specific, but historically these assays have been performed in centralized clinical laboratories necessitating specimen transport and increasing the time to result. Recently, Clinical Laboratory Improvement Amendments (CLIA)-waived, POC PCR influenza assays have been developed with 95% sensitivity and specificity compared to centralized PCR assays. To determine the clinical impact of a POC PCR test for influenza, we compared antimicrobial prescribing patterns of one urgent care location using the Cobas LIAT Influenza A/B assay (LIAT assay; Roche Diagnostics, Indianapolis, IN) to other urgent care centers in our health system using traditional RIDT, with negative specimens being reflexed to PCR. Antiviral prescribing was lower in patients with a negative LIAT PCR result (2.3%) than in patients with a negative RIDT result (25.3%; P 0.005). Antivirals were prescribed more often in patients that tested positive by LIAT PCR (82.4%) than in those testing positive by either RIDT or reflex PCR (69.9%; P 0.05). Antibacterial prescriptions for patients testing negative by LIAT PCR were higher (44.5%) than for those testing negative by RIDT (37.7%), although the difference was not statistically significant. In conclusion, having results from a PCR POC test during the clinic visit improved antiviral prescribing practices compared to having rapid results from an RIDT.

J Clin Microbiol. 2019 Jan 2;57(1):e00716-18

Respiratory Infections

PCR Detection of Respiratory Pathogens in Asymptomatic and Symptomatic Adults

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Keywords

FLOQSwabs®	Respiratory Pathogens	Nasopharyngeal Swab

Abstract

The frequency of viral respiratory pathogens in asymptomatic subjects is poorly defined. The aim of this study was to explore the prevalence of respiratory pathogens in the upper airways of asymptomatic adults, compared with a reference population of symptomatic patients sampled in the same centers during the same period. Nasopharyngeal (NP) swab samples were prospectively collected from adults with and without ongoing symptoms of respiratory tract infection (RTI) and analyzed for respiratory pathogens by a PCR panel detecting 16 viruses and four bacteria. Altogether, 444 asymptomatic and 75 symptomatic subjects completed sampling and follow-up (FU) at day 7. In the asymptomatic subjects, the detection rate of viruses was low (4.3%), and the most common virus detected was rhinovirus (3.2%). Streptococcus pneumoniae was found in 5.6% of the asymptomatic subjects and Haemophilus influenzae in 1.4%. The only factor independently associated with low viral detection rate in asymptomatic subjects was age 65 years (P 0.04). An increased detection rate of bacteria was seen in asymptomatic subjects who were currently smoking (P 0.01) and who had any chronic condition (P 0.01). We conclude that age influences the likelihood of virus detection among asymptomatic adults, and smoking and comorbidities may increase the prevalence of bacterial pathogens in the upper airways.

J Clin Microbiol. 2019 Sep; 57(9): e00723-19

Respiratory Infections

Molecular Subtyping of Human Rhinovirus in Children from Three Sub-Saharan African Countries

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Keywords

FLOQSwabs®	UTM®	Flexible Minitip	Human Rhinovirus

Abstract

The pathogenesis of human rhinovirus (HRV) during severe respiratory disease remains undefined; thus, we aimed to explore the relationship between the HRV molecular subtyping results obtained during severe and asymptomatic childhood infections. Nasopharyngeal/oropharyngeal swabs from children (1 to 59 months of age) hospitalized with pneumonia and from age-frequency-matched controls were collected between August 2011 and August 2013. Swabs were tested for respiratory pathogens, including HRV, using quantitative real-time PCR assays. HRV-positive samples were sequenced for phylogenetic analysis by targeting the 5= noncoding region (5=NCR). Our data showed that there were no differences in the prevalence of HRV detection among cases and controls (21% versus 20%, P 0.693); however, among children 13 to 59 months old, HRV detection was more often case associated (21% versus 16%; P 0.009), with the results mainly driven by HRV-C (12% versus 7%; P 0.001). Overall, there were no differences in the results of molecular subtyping of the HRV species prevalence among cases (for HRV-A, 48%; for HRV-B, 7%; for HRV-C, 45%) and controls (for HRV-A, 45%; for HRV-B, 10%; for HRV-C, 45% [P 0.496]). Those with pneumonia and HRV-C were older (12.1 versus 9.4 months, P 0.033) and more likely to present with wheeze (35% versus 25%, P 0.031) than those with HRV-A cases.

New Microbiol. 2020 Jan;43(1):13-16

Respiratory Infections

Comparison of MycoPrep and the new MYCO-TB™ kit: Rapid and Efficient Digestion and Decontamination of Respiratory Specimens for the Detection of Mycobacteria

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Keywords

Myco-TB™	Mycobacteria	Decontamination	Fluidization

Abstract

The long incubation time required for Mycobacteria detection may allow cultures to become overgrown by contaminating organisms. Therefore, samples need to be decontaminated before solid and liquid culture. MYCO-TB™ is a ready-to-use digestion and decontamination kit with single-sample formulation developed by Copan. Sample processing time (3 minutes) is shorter than that of other commercial kits. The aim of this study was to compare the performance of MYCO-TB™ with MycoPrep. We tested 162 respiratory samples: the overall proportions of contamination of both liquid and solid media were 1.8% for MYCO-TB™ and 1.8% for MycoPrep. Samples decontaminated with MYCO-TB™ were suitable for molecular assays such as Xpert MTB/RIF Ultra and GenoType CMdirect. Extending decontamination times (up to 10 minutes) with MYCO-TB™ of 20 Mycobacteria-positive specimens did not produce any difference in TTP in liquid culture or in Ultra IS1081/IS6110 probe Ct values. In conclusion, the MYCO-TB™ kit proved to be effective for the rapid digestion and decontamination of respiratory materials for the detection of Mycobacteria, making it possible to reduce the manual skills required and lower the risk of contamination. Longer decontamination time could be used for samples with a high level of contamination, such as those from cystic fibrosis patients.

Heliyon. 2020 Apr 21;6(4):e03814

Respiratory Infections

Resveratrol Plus Carboxymethyl-β-Glucan in Infants with Common Cold: A Randomized Double-Blind Trial

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Keywords

eNAT®	Resveratrol	Rhinovirus	Common Cold Symptoms

Abstract

Objectives: To evaluate effectiveness of a nasal resveratrol/carboxymethyl-β-glucan solution compared to nasal saline solution: a) on common cold symptoms by means of a validated measure scale (CARIFS score), b) on Rhinovirus infection and CCL2, CCL5, IL8, IL6, CXCL10 and TLR2 expression in nasal swabs, c) on frequency of relapses after 30 days of follow-up.
Methods: 89 infants with respiratory infection symptoms were randomly assigned to receive either a nasal resveratrol/carboxymethyl-β-glucan solution or nasal saline solution. All patients were evaluated with CARIFS score at enrollment, after 48 h, 7 and 30 days by physicians and parents. Nasal swabs were obtained at enrollment, after 48 h and after one week. Results: CARIFS score improved in both groups. Episodes of sneezing and cough were fewer in study group after 7 days of follow-up ($p < 0.05$). No significant differences were found on nasopharyngeal swabs in Rhinovirus detection and cytokines expression after 48 h, nor in 30 days relapses. TLR2 expression was significantly higher in Rhinovirus infected children of the study group. No adverse effects occurred.
Conclusions: These data suggest that a solution containing resveratrol plus carboxymethyl-β-glucan might have a positive impact on both clinical and socio-economic burden due to infant common cold.

Scientific Reports volume 9, Article number: 1015 (2019)

Respiratory Infections

A Pilot, Open Labelled, Randomised Controlled Trial of Hypertonic Saline Nasal Irrigation and Gargling for the Common Cold

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Keywords

eNAT®	Mid-turbinate Swab	Nasal Irrigation	Upper Resp. Tract Infection

Abstract

There are no antivirals to treat viral upper respiratory tract infection (URTI). Since numerous viruses cause URTI, antiviral therapy is impractical. As we have evidence of chloride-ion dependent innate antiviral response in epithelial cells, we conducted a pilot, non-blinded, randomised controlled trial of hypertonic saline nasal irrigation and gargling (HSNIG) vs standard care on healthy adults within 48 hours of URTI onset to assess recruitment (primary outcome). Acceptability, symptom duration and viral shedding were secondary outcomes. Participants maintained a symptom diary until well for two days or a maximum of 14 days and collected 5 sequential Copan mid-turbinate swabs to measure viral shedding. The intervention arm prepared hypertonic saline and performed HSNIG. We recruited 68 participants (2.6 participants/week; November 2014-March 2015). A participant declined after randomisation. Another was on antibiotics and hence removed (Intervention:32, Control:34). Follow up data was available from 61 (Intervention:30, Control:31). 87% found HSNIG acceptable, 93% thought HSNIG made a difference to their symptoms. In the intervention arm, duration of illness was lower by 1.9 days ($p=0.01$), over-the-counter medications (OTCM) use by 36% ($p=0.004$), transmission within household contacts by 35% ($p=0.006$) and viral shedding by ≥0.5 log10/day ($p=0.04$). We hence need a larger trial to confirm our findings.

J Breath Res. 2019 Mar 1;13(2):021001

Respiratory Infections

Use of an Innovative and Non-Invasive Device for Virologic Sampling of Cough Aerosols in Patients with Community and Hospital Acquired Pneumonia: a Pilot Study

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Keywords

eNAT®	Pneumonia	Cough	Rapid Diagnostic Test

Abstract

The aetiology of lower respiratory tract infections is challenging to investigate. Despite the wide array of diagnostic tools, invasive techniques, such as bronchoalveolar lavage (BAL), are often required to obtain adequate specimens. PneumoniaCheck™ is a new device that collects aerosol particles from cough, allowing microbiological analyses. Up to now it has been tested only for bacteria detection, but no study has investigated its usefulness for virus identification. Methods: In this pilot study we included 12 consecutive patients with pneumonia. After testing cough adequacy via a peak flow meter, a sampling with PneumoniaCheck™ was collected and eluted in Copan eNAT® medium; in addition, a BAL was performed in each patient. Microbiological analyses for virus identification were performed on each sample and concordance between the two techniques was, taking BAL results as reference. Results: BAL was considered adequate in 10 patients. Among them, a viral pathogen was identified by PneumoniaCheck™ 6 times, each on different samples, whereas BAL allowed to detect the presence of a virus on 7 patients (14 positivities). Overall, the specificity for PneumoniaCheck™ to detect a virus was 100%, whereas the sensitivity was 66%. When considering only herpes viruses, PneumoniaCheck™ showed a lower sensitivity, detecting a virus in 1/4 of infected patients (25%). Conclusions: In this pilot study PneumoniaCheck™ showed a good correlation with BAL for non-herpes virologic identification in pneumonia patients, providing excellent specificity. Further studies on larger population are needed to confirm these results and define its place in the panorama of rapid diagnostic tests for lower respiratory tract infections.

Fam Pract. 2020 Jul 23;37(3):332-339

Respiratory Infections

Relationship Between Microbiology of Throat Swab and Clinical Course Among Primary Care Patients with Acute Cough: a Prospective Cohort Study

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Keywords

eNAT®	Oropharyngeal Swab	ALRTIs

Abstract

Background: Acute lower respiratory tract infections (ALRTIs) account for most antibiotics prescribed in primary care despite lack of efficacy, partly due to clinician uncertainty about aetiology and patient concerns about illness course. Nucleic acid amplification tests could assist antibiotic targeting.
Methods: In this prospective cohort study, 645 patients presenting to primary care with acute cough and suspected ALRTI, provided throat swabs at baseline. These were tested for respiratory pathogens by real-time polymerase chain reaction and classified as having a respiratory virus, bacteria, both or neither. Three hundred fifty-four participants scored the symptoms severity daily for 1 week in a diary (0 = absent to 4 = severe problem).
Results: Organisms were identified in 346/645 (53.6%) participants. There were differences in the prevalence of seven symptoms between the organism groups at baseline. Those with a virus alone, and those with both virus and bacteria, had higher average severity scores of all symptoms combined during the week of follow-up than those in whom no organisms were detected. There were no differences in the duration of symptoms rated as moderate or severe between organism groups.
Conclusions: Differences in presenting symptoms and symptoms severity can be identified between patients with viruses and bacteria identified on throat swabs. The magnitude of these differences is unlikely to influence management. Most patients had mild symptoms at 7 days regardless of aetiology, which could inform patients about likely symptom duration.

Clin Microbiol Infect. 2019 Jan;25(1):107.e1-107.e7

Respiratory Infections

Prevalence and Clinical Significance of Respiratory Viruses and Bacteria Detected in Tuberculosis Patients Compared to Household Contact Controls in Tanzania: a Cohort Study

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Keywords

eNAT®	Nasopharyngeal Swab	Respiratory Viruses	Tuberculosis

Abstract

Objectives: To describe the prevalence of respiratory pathogens in tuberculosis (TB) patients and in their household contact controls, and to determine the clinical significance of respiratory pathogens in TB patients.
Methods: We studied 489 smear-positive adult TB patients and 305 household contact controls without TB with nasopharyngeal swab samples within an ongoing prospective cohort study in Dar es Salaam, Tanzania, between 2013 and 2015. We used multiplex real-time PCR to detect 16 respiratory viruses and seven bacterial pathogens from nasopharyngeal swabs.
Results: The median age of the study participants was 33 years; 61% (484/794) were men, and 21% (168/ 794) were HIV-positive. TB patients had a higher prevalence of HIV (28.6%; 140/489) than controls (9.2%; 28/305). Overall prevalence of respiratory viral pathogens was 20.4% (160/794; 95%CI 17.7e23.3%) and of bacterial pathogens 38.2% (303/794; 95%CI 34.9e41.6%). TB patients and controls did not differ in the prevalence of respiratory viruses (Odds Ratio [OR] 1.00, 95%CI 0.71e1.44), but respiratory bacteria were less frequently detected in TB patients (OR 0.70, 95%CI 0.53e0.94). TB patients with both respiratory viruses and respiratory bacteria were likely to have more severe disease (adjusted OR [aOR] 1.6, 95%CI 1.1 e2.4; p 0.011). TB patients with respiratory viruses tended to have more frequent lung cavitations (aOR 1.6, 95%CI 0.93e2.7; p 0.089).
Conclusions: Respiratory viruses are common for both TB patients and household controls. TB patients may present with more severe TB disease, particularly when they are co-infected with both bacteria and viruses

Sultan Qaboos Univ Med J. 2020 Aug;20(3):e287-e294

Respiratory Infections

Nasopharyngeal Isolates from a Cohort of Medical Students with or without Pharyngitis

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Keywords

eNAT®	Nasopharyngeal Swab	Pharyngitis Symptoms

Abstract

Objectives: Few studies have investigated pharyngeal colonisation in the United Arab Emirates (UAE). This study aims to identify the pharyngeal organisms present in a cohort of medical students with and without symptomatic pharyngitis.

Methods: This study was conducted between September 2016 and June 2018. Nasopharyngeal swabs were collected from preclinical and clinical medical students attending the college during the study period. The specimens were tested for 16 viral and nine bacterial pathogens using a real-time polymerase chain reaction assay.

Results: A total of 352 nasopharyngeal swabs were collected from 287 students; of these, 22 (7.7%) had pharyngitis symptoms. Overall, the most common isolates were human rhinovirus, *Streptococcus pneumoniae* and *Haemophilus influenzae*, with no significant differences in terms of gender, year of study or stage of study. The prevalence of *S. pyogenes* in asymptomatic and symptomatic students was 1.1% and 0%, respectively. A Centor score of ≥2 was not associated with *S. pyogenes*-positive samples. Six pathogens were isolated from symptomatic students including H. influenzae. Fusobacterium necrophorum was not detected in any of the samples.

Conclusion: The diagnosis and management of pharyngitis should be tailored to common pathogens in the region. This study found that *S. pyogenes and F. necrophorum* were not detected among students with symptoms of pharyngitis; moreover, Centor scores of ≥2 were not associated with the presence of *S. pyogenes*. This cut-off score therefore should not be employed as an empirical measure to initiate penicillin therapy in this population.

J Clin Microbiol. 2021 Feb 17;JCM.03073-20

Respiratory Infections

Comparable Specimen Collection from both Ends of at-Home Mid-Turbinate Swabs

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Keywords

UTM®	Mid-Turbinate	Respiratory Viruses	Home-Collection

Abstract

Unsupervised upper respiratory specimen collection is a key factor in the ability to massively scale SARS-CoV-2 testing. But there is concern that unsupervised specimen collection may produce inferior samples. Across two studies that included unsupervised at-home mid-turbinate specimen collection, ~1% of participants used the wrong end of the swab. We found that molecular detection of respiratory pathogens and a human biomarker were comparable between specimens collected from the handle of the swab and those collected correctly. Older participants were more likely to use the swab backwards. Our results suggest that errors made during home-collection of nasal specimens do not preclude molecular detection of pathogens and specialized swabs may be an unnecessary luxury during a pandemic.

nfect Control Hosp Epidemiol. 2019 Dec;40(12):1356-1360

Respiratory Infections

Respiratory Viruses on Personal Protective Equipment and Bodies of Healthcare Workers

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Keywords

FLOQSwabs®	Virus Contamination	Healthcare Workers

Abstract

Objective: To characterize the magnitude of virus contamination on personal protective equipment (PPE), skin, and clothing of healthcare workers (HCWs) who cared for patients having acute viral infections. Participants: A total of 59 HCWs agreed to have their PPE, clothing, and/or skin swabbed for virus measurement.
Methods: The PPE worn by HCW participants, including glove, face mask, gown, and personal stethoscope, were swabbed with Copan FLOQSwabs®. After PPE doffing, bodies and clothing of HCWs were sampled with Copan swabs: hand, face, and scrubs. Preamplification and quantitative polymerase chain reaction (qPCR) methods were used to quantify viral RNA copies in the swab samples.
Results: Overall, 31% of glove samples, 21% of gown samples, and 12% of face mask samples were positive for virus. Among the body and clothing sites, 21% of bare hand samples, 11% of scrub samples, and 7% of face samples were positive for virus. Virus concentrations on PPE were not statistically significantly different than concentrations on skin and clothing under PPE. Virus concentrations on the personal stethoscopes and on the gowns were positively correlated with the number of torso contacts ($P < .05$). Virus concentrations on face masks were positively correlated with the number of face mask contacts and patient contacts ($P < .05$).
Conclusions: Healthcare workers are routinely contaminated with respiratory viruses after patient care, indicating the need to ensure that HCWs complete hand hygiene and use other PPE to prevent dissemination of virus to other areas of the hospital. Modifying self-contact behaviors may decrease the presence of virus on HCWs.

Jpn J Infect Dis. 2019 Nov 21;72(6):394-398

Respiratory Infections

Laboratory Evaluation of Rapid Antigen Detection Tests for More-Sensitive Detection of Respiratory Syncytial Virus Antigen

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Keywords

FLOQSwabs®	Respiratory Syncytial Virus	Point-of-Care Testing	Rapid Antigen Detection

Abstract

We evaluated two currently available rapid antigen detection tests (RADTs) for Respiratory syncytial virus (RSV), Sofia® RSV FIA and BinaxNOW RSV Card (BinaxNOW). Between November 2017 and February 2018, 395 nasopharyngeal Copan FLOQSwabs® were collected from children diagnosed with acute respiratory infections. The swabs were evaluated using the aforementioned RADTs, the reverse transcription-quantitative real-time polymerase chain reaction (RT-qPCR), and the direct immunofluorescence assay (DFA). The sensitivity of Sofia® RSV FIA (80.82%) was significantly higher than that of BinaxNOW (53.42%) when RT-qPCR was used as the standard. This was confirmed with DFA. The sensitivities of Sofia® RSV FIA (85.4% [41/48]) and BinaxNOW (58.3% [28/48]) were higher for RSV A than for RSV B (69.6% [16/23] and 43.5% [10/23], respectively). The optimal critical cycle threshold (Ct) values on RT-qPCR that correlated with Sofiav RSV FIA and BinaxNOW were 24 and 22, respectively. The kappa value for Sofia® RSV FIA and RT–qPCR was 0.962 in patients who were two years old or younger, but 0.648 in those who were more than two years old. Thus, Sofiav RSV FIA is more sensitive than BinaxNOW; its results were affected by the RSV viral strain and load. Sofia® RSV FIA is more effective in children who are 2 years old than in those who are > 2 years old.

BMC Res Notes. 2018 Jul 20;11(1):495

Respiratory Infections

Detection of Human Bocavirus-1 in Both Nasal and Stool Specimens from Children Under 5 Years Old with Influenza-Like Illnesses or Diarrhea in Gabon

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Keywords

FLOQSwabs®	Nasal Swab	Human Bocavirus-1

Abstract

Human bocavirus (HBoV) is a viral pathogen which causes respiratory tract diseases and acute gastroen teritis world-wide. This virus mainly afected children under 5 years old. There is little information on HBoV in Gabon. Two first studies were conducted to determine the prevalence of respiratory and enteric viruses in children under 5 years old who visited health centers for infuenza-like illness (ILI) or diarrhea in Gabon from March 2010 to June 2011. However, HBoV was not included in the screening. The aim of this retrospective study was to evaluate the prevalence and the HBoV genotype in children under 5 years old with ILI or diarrhea in Gabon. A total of 810 nasal swabs and 317 feces samples collected during the two frst study were analyzed among which 32 (4.4%) and 7 (2.2%) were positive for HBoV respectively. While there were no signifcant differences in preva lence between age groups in children with ILI, all children with diarrhea were under 12 months of age. Moreover, 84.4 and 42.8% were diagnosed in co-infections with at least one other respiratory virus, or enteric viruses respectively. Finally, HBoV subtype 1 has been detected in both respiratory and gastrointestinal tracts with very low variability.

Eur J Microbiol Immunol (Bp). 2019 Dec 25;9(4):131-137

Respiratory Infections

Liquid and Dry Swabs for Culture- and PCR-Based Detection of Colonization with Methicillin-Resistant *Staphylococcus aureus* during Admission Screening

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Keywords

MSwab®	eSwab®	*Staphylococcus Aureus*	MRSA

Abstract

Rapid detection of methicillin-resistant Staphylococcus aureus (MRSA) colonization status facilitates isolation and decolonization and reduces MRSA infections. Liquid but not dry swabs allow fully automated detection methods. However, the accuracy of culture and polymerase chain reaction (PCR) using liquid and dry swabs has not been analyzed. We compared different swab collection systems for routine nasal–throat MRSA screening in patients admitted to a tertiary care trauma center in Germany. Over 3 consecutive months, dry swabs (month 1), eSwab® (month 2), or MSwab® (month 3) were processed using Cepheid GeneXpert, Roche cobas and BD-MAX™ MRSA tests compared to chromogenic culture. Among 1680 subjects, the MRSA detection rate using PCR methods did not differ significantly between dry swabs, eSwab®, and MSwab® (6.0%, 6.2%, and 5.3%, respectively). Detection rates using chromogenic culture were 2.9%, 3.9%, and 1.9%, using dry, eSwab®, and MSwab®, respectively. Using chromogenic culture as the "gold standard", negative predictive values for the PCR tests ranged from 99.2–100%, and positive predictive values from 33.3–54.8%. Thus, efficient and accurate MRSA screening can be achieved using dry, as well as liquid eSwab® or MSwab®, collection systems. Specimen collection using eSwab® or MSwab® facilitates efficient processing for chromogenic culture in full laboratory automation while also allowing molecular testing in automated PCR systems.

BMC Infect Dis. 2017 Dec 13;17(1):767

Respiratory Infections

Performance Of The Alere I Rsv Assay for Point-Of-Care Detection of Respiratory Syncytial Virus in Children

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Keywords

MSwab®	RSV	POC Testing	Alere I RSV Assay

Abstract

Background: Respiratory syncytial virus (RSV) is the most important cause of severe acute respiratory tract infection in young children. Alere i RSV is a novel molecular rapid test which identifies respiratory syncytial virus in less than 13 min.
Methods: We evaluated the clinical performance of the Alere i RSV assay in a pediatric point-of-care setting during winter season 2016 / 2017. Test results from 518 nasopharyngeal swab samples (Copan MSwab®) were compared to a real-time reverse transcription PCR reference standard.
Results: The overall sensitivity and specificity of the Alere i RSV test assay was 93% (CI95 89% – 96%) and 96% (CI95 93% – 98%), respectively. Alere i RSV performed well in children of all age groups. An optimal sensitivity of 98% (CI95 94% - 100%) and specificity of 96% (CI95 90% - 99%) was obtained in children < 6 months. In children ≥ 2 years, sensitivity and specificity remained at 87% (CI95 73% – 96%) and 98% (CI95 92% – 100%), respectively. False negative Alere i RSV test results mostly occurred in samples with low viral load (mean CT value 31.1; CI95 29.6 – 32.6). The Alere i RSV assay is easy to use and can be operated after minimal initial training. Test results are available within 13 min, with most RSV positive samples being identified after approximately 5 min.
Conclusion: The Alere i RSV assay has the potential to facilitate the detection of RSV in pediatric point-of-care settings.

Am J Clin Pathol. 2017 Aug 1;148(2):119-127

Respiratory Infections

Performance of the cobas MRSA/SA Test for Simultaneous Detection of Methicillin-Susceptible and Methicillin-Resistant Staphylococcus aureus From Nasal Swabs

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Keywords

MSwab®	Nasal Swab	*Staphylococcus Aureus*	Cobas MRSA/SA

Abstract

Objectives: Health care–associated methicillin-resistant Staphylococcus aureus (MRSA) and Staphylococcus aureus (SA) infections are continuing problems. Rapidly determining the MRSA colonization status of a patient facilitates practice to reduce spread of MRSA clinical disease. Sensitive detection of all SA prior to surgery, followed by decolonization, can significantly reduce postoperative infection from this pathogen. Our goal was to validate a new automated assay for this testing.
Methods: We compared performance of the cobas MRSA/SA Test on the cobas 4800 System to direct and enriched chromogenic culture using Copan MSwab® nasal swabs collected from patients at six United States sites.
Results: Compared to direct and enriched culture, the sensitivity for MRSA and SA was 93.1% and 93.9%, and the specificity was 97.5% and 94.2%, respectively. After discrepancy analysis, the sensitivity for MRSA and SA was 97.1% and 98.6%, and the specificity was 98.3% and 95.5%, respectively. Compared to direct culture, sensitivity for detecting any SA was 99.6%.
Conclusions: The cobas MRSA/SA Test is an effective tool to simultaneously perform surveillance testing for nasal colonization of both MRSA and MSSA.

Note

Note

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