A COMPARISON OF MID-TURBINATE FLOCKED SWAB SPECIMENS WITH NASOPHARYNGEAL ASPIRATES FOR THE DETECTION OF RESPIRATORY VIRUSES BY DIRECT FLUORESCENT ANTIBODY TECHNIQUE

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Abstract

Respiratory syncytial virus, influenza A and B viruses, parainfluenza vIruses 1-3, and adenoviruses represent the largest portion of respiratory viruses in children. Nasopharyngeal aspiration is considered the best method to collect NPS; however, it requires special training and equipment and it is very uncomfortable for patients. The present study was designed to compare the mid-turbinate FLOQSwab from Copan Diagnostics, Inc. with nasopharyngeal aspirate for virus detection by direct fluorescent antibody (DFA) using the D3 UltraRespiratory kit from Diagnostic Hybrids, Inc. All children admitted to the Women and Children's Hospital of Buffalo with acute respiratory symptoms and who were screened for respiratory viruses were enrolled. A nasopharyngeal aspirate was obtained through one nasal canal and an age-appropriate FLOQSwab was used to collect a specimen from the other nasal canal. Both specimens were transported to the lab in UTM media (Copan Diagnostics, Inc.) and processed for DFA in the same manner. All DFA-negative specimens were placed into culture on R Mix TooTM (DHI) cells. From January 5, 2010 to March 11, 2010 the laboratory processed 153 respiratory screens. Respiratory syncytial virus was identified in 47 specimens, parainfluenza virus in 1, adenovirus in 1 and human metapneumovirus in 25; thus, viruses were detected in 49% by DFA. Among the 79 specimens that were negative by DFA, RSV alone was detected in 1 by culture. The DFA results obtained with mid-turbinate FLOQSwab specimens agreed with the NP aspirate in 150 of 153 tests, 71 0f 74 positive tests and 55 of 55 negative tests. Culture of negative tests detected virus, RSV, in only 1. These data demonstrate that mid-turbinate flocked swabs and NP aspirates yielded comparable results with the DFA technique. While NP aspirate remains the best specimen for respiratory viruses, a mid-turbinate FLOQSwab is reliable in a DFA test when performed by well trained personnel.

Introduction

Respiratory viral infections are the most common infections seen in childhood. Respiratory syncytial virus (RSV), influenza A and B virus (IFV), parainfluenza viruses 1, 2 and 3 (PIFV), adenoviruses (AdV), and human metapneumovirus (hMPV) represent the largest proportion of viral infections in childhood. RSV and IFV are responsible for most of the respiratory viral infections requiring hospitalization.

In a hospital setting, the optimal specimen, a nasopharyngeal aspirate (NPA), is not easy to obtain and requires special equipment and training. The Copan Diagnostics' nasopharyngeal FLOQSwab has compared favorably to NPA in the diagnosis of respiratory viruses by culture, direct fluorescent antibody (DFA) and polymerase chain reaction (PCR); however, it is uncomfortable for the patient (1,2). The mid-turbinate FLOQ Swab by Copan Diagnostics has compared favorably to NPA (3) and NP swab (4, 5) in the diagnosis of respiratory viruses by culture (3,4), antigen detection (4) and PCR (5).

Women and Children's Hospital of Buffalo has been using NPA and DFA as their primary method to diagnose respiratory viruses for 32 years. The present study was designed to compare NPA and Copan Diagnostics' mid-turbinate FLOQSwab in the detection of respiratory viruses by DFA (DHI).

Methods

Children admitted to WCHOB between 1/5/2010 and 3/11/2010 comprised the evaluati on group.

The NPA was collected through one nostril and the mid -turbinate FLOQ Swab (Copan Inc.) was inserted in the other nostril. Both specimens were transported to the lab in UTM by Copan Diagnostics. One ml aliquots were removed and saved for culture on R-Mix Too (DHI) for all negative DFA tests. Direct fluorescent antibody was performed for RSV, IFV, PIFV, Adv, and hMPV using D3 -UltraRespiratory screening ID kit (DHI).

FLOQSwab for Two Years of Age and Younger

FLOQSwab for Over Two years of Age

Results

Specimens were collected from 153 children.

Respiratory viruses were detected in 74 (48.6%)

RSV 47 (30%)

hMPV 25 (16.3%)

PIFV 1 (0.7%)

AdV 1 (0.7%)

IFA 0 (0.0%)

2009 H1N1 IFV A was not detected at WCHOB after 11/28/2009

Results

Comparison of NPA and FLOQSwab by DFA

Virus Detected	NPA	FLOQ Swabs
RSV	47	43
hMPV	2	24
AdV	1	1
PIFV	1	1
None	79	84

Cohen's Kappa Coefficient of Agreement=0.94 (95% CI:0.88-0.99), p<0.00001

FLOQSwab: sensitivity=0.93 (95% CI:0.85-0.98); specificity=1.00

Conclusion

The Copan Diagnostics Mid-turbinate FLOQSwabs were comparable to NPA in the detection of respiratory viruses, especially RSV and hMPV, in the DFA assay.

Recommendations

NPA remains the optimal collection system for respiratory specimens in hospitalized infants.

The Copan Diagnostics Mid-turbinate FLOQSwab provides an alternative to NPA for children in the outpatient setting and for adults, especially the elderly, in long term care facilities.

References

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