

Comparative study of nasopharyngeal aspirate and nasal swab specimens for detection of influenza

Terho Heikkinen, Aimo A Salmi, Olli Ruuskanen

Department of Paediatrics, Turku University Hospital, FIN-20520 Turku, Finland

Terho Heikkinen
specialist in paediatric infectious diseases

Olli Ruuskanen
professor of infectious diseases

Department of Virology, University of Turku
Aimo A Salmi
professor of virology

Correspondence to:
T Heikkinen
terho.heikkinen@utu.fi

BMJ 2001;322:138

The neuraminidase inhibitors zanamivir and oseltamivir have been shown to be effective in the treatment of influenza A and B viral infections. Both of these drugs are ineffective against respiratory infections caused by other microbes. Although the onset of influenza is often abrupt with prominent systemic features, the clinical spectrum of this disease is extremely broad and it cannot be reliably distinguished from other respiratory infections on clinical grounds alone.¹ To help them decide which patients will benefit from the new treatments for influenza doctors therefore need rapid and sensitive point of care tests to verify the cause of the infection.

A nasopharyngeal aspirate is generally considered the best specimen for detection of influenza viruses,² but there are few comparative studies of the effect of sample type on detection of influenza.³⁻⁴ Collection of a nasopharyngeal aspirate is unpleasant for the patient and requires a suction device, making it unfeasible in many clinical situations. We conducted a prospective study comparing the detection rates of influenza in nasal swabs and nasopharyngeal aspirates obtained at the same time.

Participants, methods, and results

The study was carried out during the influenza epidemic of 1998-9 at the department of paediatrics, Turku University Hospital, Finland. A total of 101 children admitted to hospital with an upper respiratory tract infection were enrolled. The median age of the children was 13 months (range 2 weeks to 15 years); 53 of them were girls. The study protocol was approved by the ethics committee of Turku University Hospital, and oral informed consent was obtained from the parents of the children.

A nasal swab was obtained from one nostril with a sterile cotton swab, which was then placed in a dry sterile vial. The nasopharyngeal aspirate was obtained with a disposable catheter (Pennine Healthcare, Derby) connected to a mucus extractor (Maersk Medical, Denmark). The catheter was inserted into the opposite nostril to a depth of 5-7 cm and drawn back while applying gentle suction with an electric suction device. Both specimens were obtained without instillation of any solution into the nostrils. The specimens were transported to the laboratory at room temperature and tested for influenza A and B antigens by time resolved fluoroimmunoassay as described earlier.⁵

Of the 101 children enrolled, 23 had influenza viruses detected in the nasopharyngeal aspirate specimens (table). The nasal swab specimens showed influenza in 21 of these 23 children, giving a sensitivity of 91% (95% confidence interval 73% to 98%) compared with the aspirate specimens. No child had influenza detected in only the nasal swab (specificity 100%; 86% to 100%).

Detection of influenza viruses in nasopharyngeal aspirate and nasal swab specimens

Swab	Aspirate			Total
	Influenza A	Influenza B	Neither	
Influenza A	19	0	0	19
Influenza B	0	2	0	2
Neither	2	0	78	80
Total	21	2	78	101

Comment

Testing of nasal swabs detected influenza in 21 of the 23 children who were found to have the virus in nasopharyngeal aspirate specimens. Nasal swab specimens are easy and painless to collect and require no additional devices. When used with point of care antigen detection tests,⁴ nasal swab specimens could therefore help optimise the use of anti-influenza drugs in everyday clinical practice. Further studies are needed to determine the usefulness of this approach in adults and with different viral diagnostic methods.

Contributors: TH and OR conceived the study, identified the patients, and organised the collection of the samples. AAS was responsible for the laboratory detection of viruses. TH analysed the data and wrote the paper. OR is the guarantor.

Funding: This work was supported by the Academy of Finland.

Competing interests: None declared.

- 1 Carrat F, Tachet A, Rouzioux C, Housset B, Valleron AJ. Evaluation of clinical case definitions of influenza: detailed investigation of patients during the 1995-1996 epidemic in France. *Clin Infect Dis* 1999;28:283-90.
- 2 Zambon M. Laboratory diagnosis of influenza. In: Nicholson KG, Webster RG, Hay AJ, eds. *Textbook of influenza*. Oxford: Blackwell Science, 1998:291-313.
- 3 Schmid ML, Kudesia G, Wake S, Read RC. Prospective comparative study of culture specimens and methods in diagnosing influenza in adults. *BMJ* 1998;316:275.
- 4 Covalciuc KA, Webb KH, Carlson CA. Comparison of four clinical specimen types for detection of influenza A and B viruses by optical immunoassay (FLU OIA test) and cell culture methods. *J Clin Microbiol* 1999;37:3971-4.
- 5 Nikkari S, Halonen P, Kharitonov I, Kivivirta M, Khristova M, Waris M, et al. One-incubation time-resolved fluoroimmunoassay based on monoclonal antibodies in detection of influenza A and B viruses directly in clinical specimens. *J Virol Methods* 1989;23:29-40.

(Accepted 11 September 2000)

Endpiece Examinations

Examinations are formidable even to the best prepared, for the greatest fool may ask more than the wisest man can answer.

Charles Colton (1780?-1832), *Lacon*

Submitted by John Haworth,
retired general practitioner, Carlisle