Posterior oropharyngeal salivafor the detection of SARS-CoV-2

Marie Pierre Otto, MD[1]
Chrystelle Darles, MD[1]
Elodie Valero, PharmD[1]
Patrick Benner, MD[2]
Fabien Dutasta, MD[3]
Frédéric Janvier, Pr, MD, MSci[1,4]

[1] Microbiology and infection control unit, Military Instruction Hospital Sainte Anne, Toulon, France
[2] Emergency unit, Military Instruction Hospital Sainte Anne, Toulon, France
[3] Internal medecine unit, Military Instruction Hospital Sainte Anne, Toulon, France
[4] School of Val-de-Grâce, Paris, France.

Corresponding author:

Frédéric Janvier, Pr, MD, MSci
Head of microbiology and infection control unit, Military Instruction Hospital Sainte Anne, Toulon, France

Dear Editor:

We read with interest the study by Wong and colleagues [1] evaluating posterior oropharyngeal saliva (POPS) for detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which confirms POPS as an alternative to nasopharyngeal specimen (NPsp) for real-time ploymerase chain reaction (RT-PCR) detection. Despite NPsp being recommended, collection of samples is operator dependent, painful and exposes healthcare workers during sampling. For theses reasons we conducted a prospective study in April 2020. POPS and NPsp were both collected and tested from 92 outpatient adults attending the coronavirus disease-19 (COVID-19) consultation unit. All patients presented symptoms compatible with COVID-19 infection but none had a productive cough. NPsp were collected by experienced and trained physicians in viral medium transport (VMT) and POPS was collected by asking the patient to perform a coughing effort while keeping their surgical mask and then collect saliva themselves into a sterile container, without VMT. Samples were immediately transferred to the laboratory and subjected to an inactivation procedure with 10µL of proteinase K (25mg/mL) into 200µL of specimen at 65°C during 10 minutes. Total nucleic acid extraction was then achieved by MagNA pure compact (Roche, Switzerland) or GenoXtract (Biocentric, France). RT-PCR assay targeting the IP2 and IP4 regions of RdRp gene of SARS-CoV-2 was performed according to the French National Center protocol in a Light-Cycler 480 Real-Time PCR System (Roche, Switzerland).

Among the 92 patients, 43 were negative on both NPsp and POPS, 45 were positive on both specimens and 4 were positive on POPS (Cp values from 28.25 to 35.28) but remained negative on NPsp. None was positive on NPsp and negative on POPS. Four patients who had symptoms for less than a week, were diagnosed with POPS while the NPsp were negative. This mismatch, also highlighted by Wong et al, underlines that SARS-CoV-2 viral load is probably higher in POPS than in the NP during the first week after symptom, as previously described [2].

Unlike Wong and al, agreement between tests was excellent in our study with overall kappa value to 0.9132 (SD 0.0351; 95% 0.8445-0.9819). Cp values in NPsp and POPS specimens were compared with a Mann-Whitney test using XLSTAT and no difference was found (p= 0,101) (Figure 1).

Positive specimens were then classified into three groups, according to the time since onset of symptoms: 0-6 days (N=28), 7-13 days (N=13) and >13 days (N=3). As expected, Cp values increase (corresponding with decrease of viral load) was concordant with delay after symptoms onset (Figure 1).

Our prospective study confirms, like Wong study, that POPS is an alternative to NPsp to detect SARS-Co-V-2. The prospective nature of our study, the standardization of our saliva sample collection and the absence of dilution in VMT could explain the excellent correlation between NPsp and POPS. Due to the non-inferiority of POPS, greater patient acceptability, less exposure of the healthcare workers, this self-collection method could easily be applied to general population but also to mass screening in penitentiary, military or elderly establishments, which would encourage the carrying out of RT-PCR.

Acknowledgments

We thank Maryline Vial, Elodie L'hermitte, Julie Top for technical support and Dr Gan Ludivine for statistical support.

Funding

This work was supported by Service de Santé des Armées (France).

Conflict of interest

None.

References

1. Wong Y, Tse H, Siu HK,et al. Posterior oropharyngeal salivafor the detection of SARS-CoV-2. Clin Infect Dis 2020 Jun 21:ciaa797. doi: 10.1093/cid/ciaa797. [Online ahead of print]

2. To KK, Tsang OT, Leung WS, et al. Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study. Lancet Infect Dis. 2020 Mar 23. doi: 10.1016/S1473-3099(20)30196-1. [Epub ahead of print]

Figure Legend :

(A) Cp values in NPsp and POPS specimens in 45 positive samples; (B) Cp values in NPsp and POPS specimens according to the time since onset of symptoms.

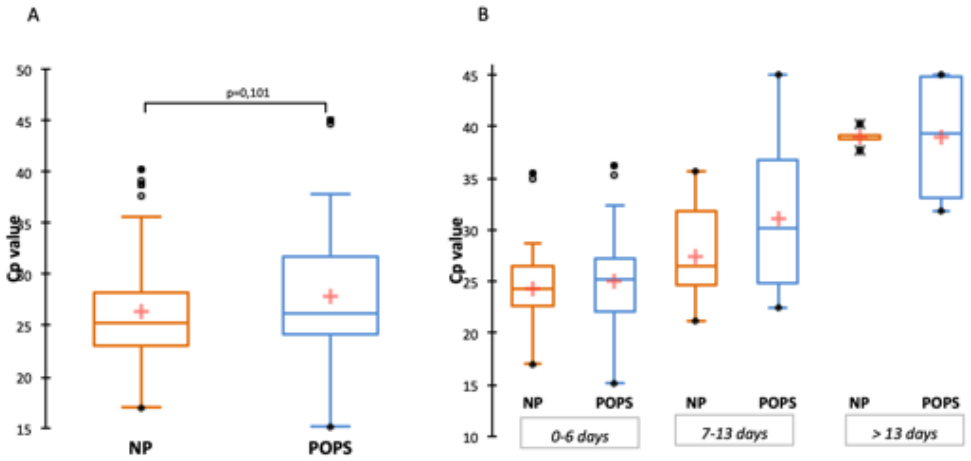

Figure 1 : (A) Cp values in NPsp and POPS specimens in 45 positive samples; (B) Cp values in NPsp and POPS specimens according to the time since onset of symptoms.