

LETTERS

Nose-pharyngeal swabs as a screening test for SARS-CoV-2 infection in patients with scheduled elective surgery: the experience of the Hygiene Service of the Local Health Authority Roma 1

Tamponi naso-faringei quali test di screening di infezione da SARS-CoV-2 in pazienti con intervento chirurgico in elezione: l'esperienza del Servizio di Igiene e Sanità Pubblica della ASL Roma 1

Dear Editor,

Proactive case investigation and contact tracing, testing, home isolation (1), in parallel with systematic home care for patients with mild symptoms (2) have served as cornerstones of a territorial response strategy, where an established network of public health and primary care services existed (3). The Italian National Health Service (NHS) entrusts many management competences to the Regions, with the result of a different management of the Covid-19 epidemic between the Regions and sometimes even among the Local Health Authorities (LHAs - in Italian: Aziende Sanitarie Locali) (4).

In Italy, the Department of Prevention (DP) plays a pivotal role in structuring the collaboration between territorial health services, hospitals and all the network of the NHS (5). DP is the technical structure of LHA, with the task of promoting health, preventing the onset of disease and improving the quality of life of the population (6). The Covid-19 pandemic has had a considerable impact on the DPs, which have necessarily had to reorganize their services in a very short time in order to provide an appropriate response to the renewed health concerns (3).

In order to deal with the Covid-19 emergency, the Lazio Region has implemented the national legislation, providing for the evaluation of possible measures to suspend non-urgent, postponable outpatient services, and to reduce or suspend elective surgery provided by the Regional Health Service (RHS) facilities (7, 8). The LHA Roma 1 (ASL Roma 1), in implementation of the Lazio Region Note No. 214875 of March 3rd, 2020 (9), with Provisions No. 1 of March 7th, 2020 and No. 9 of March 13th, 2020, suspended both the elective surgical and non-urgent, postponable outpatient services on its territory to "ensure the full functionality of the facilities in relation to new welfare needs" generated by the pandemic. These measures lasted until June 3rd, 2020 (10), when the Lazio Region prepared the 'Phase V Action Document' by which it authorized the public and private health structures to 'adopt a plan for the recovery of interventions and the planning of new hospitalizations to be shared within the "territorial group for Covid-19 emergency" (11). The lockdown in fact was responsible for a considerable delay in the provision of health services, with an expected, significant impact on waiting lists: a recent market research estimated that 75% of scheduled surgical procedures have been postponed (12). The need to restart with the programming and carrying out of surgery therefore clashes with the changed safety requirements.

The detection of SARS-CoV-2 performed by reverse transcription polymerase chain reaction (RT-PCR) on nose-pharyngeal swab (NPS) collected material is characterized by a good specificity and sensitivity between 66 and 88% when used as a diagnostic test. Its accuracy when used as a screening test is still unclear (13). However, its use for the identification of asymptomatic close contacts, contact-tracing and epidemiological investigations is currently well accepted (14). The Lazio Region, in the note of June 1st, 2020, indicated the need to perform a NPS prior to the scheduled admission, no later than 48 hours before, and this should be accompanied by isolation of the patient in the 14 days prior to admission and a telephone triage for the identification of signs/symptoms of SARS-CoV-2 infection (15). According to this note, the patient can access the NPS at drive-in stations by dematerialized prescription of the general practitioner/family pediatrician. Even before the issue of this note, the Public Health Service (PHS – in Italian: Servizio di Igiene e Sanità Pubblica) of the LHA Roma 1 had already started to carry out pre-hospitalization (pre-H) NPSs, in compliance with the requests of the public hospital facilities in the territory of competence.

Table 1 - Pre-hospitalisation NPSs according to requesting facility and ward.

Facility	Ward	n. NPSs	Mean age (SD)	% male
Ophthalmic Hospital	Total Ophthalmic Hospital	25	72.5 (11.0)	40.0%
	Oftalmology	25	72.5 (11.0)	40.0%
Sant'Anna Treatment Centre	Total Sant'anna Tretment Centre	111	39.8 (11.3)	1.8%
	General Surgery	8	52.9 (12.3)	25.0%
	Gynecology	9	43.8 (11.2)	0.0%
	Plastic Surgery	8	51.7 (8.2)	0.0%
	Gynecology	65	38.2 (10.1)	0.0%
	Gynaecology Day Surgery	17	31.3 (6.8)	0.0%
	Gynecology Pma	4	39.3 (6.4)	0.0%
San Filippo Neri Hospital	Total San Filippo Neri	460	58.4 (17.5)	48.0%
	Cardiology	58	64.3 (15.3)	70.7%
	Emergency Surgery	28	55.0 (15.3)	67.9%
	General Surgery	34	62.6 (13.2)	29.4%
	General Oncology Surgery	15	62.5 (11.8)	33.3%
	Gynecology	2	42.2 (21.0)	0.0%
	Maxillofacial Surgery	17	46.9 (19.9)	52.9%
	Plastic Surgery	20	67.4 (19.1)	45.0%
	Vascular Surgery	43	72.1 (10.9)	88.4%
	Medically Assisted Procreation	3	41.3 (1.9)	0.0%
	Neurosurgery	42	56.5 (12.8)	47.6%
	Orthopedics	33	67.1 (13.7)	39.4%
	Obstetrics/Gynecology	94	40.6 (12.8)	3.2%
	Otorhinolaryngology	20	55.6 (14.6)	55.0%
	UROLOGY	51	70.0 (11.0)	84.3%
Grand Total		596	55.7 (18.1)	39.1%

We here report the results of the pre-H NPSs collected by the PHS of LHA Roma 1 from May 5th, 2020 (first day of this activity) to July 5th, 2020 and analyzed at the microbiology laboratory of San Filippo Neri Hospital: the microbiology and virology laboratory of San Filippo Neri was in charge of analyzing all the samples related to the hospital facilities directly belonging to the LHA Roma 1. San Filippo Neri is part of the network of regional laboratories in charge of the activities related to the diagnosis of Covid-19 (COROnet) since March 13th, 2020 (http://www.regione.lazio.it/binary/rl_main/tbl_documenti/SAN_NO_223664_13_03_2020.pdf). All the laboratories belonging to the cornet network use tests that follow the standards indicated by the Reference Laboratories Regional according to the indications of the National Reference Laboratory for Influenza at the Italian National Institute of Health (NIH in Italian: Istituto Superiore di Sanità or ISS), with particular reference to the U.S. CDC protocol and to the protocol developed by Charité, Berlin, Germany (7,16). A descriptive analysis was carried out for the following items: sex and age of the subjects on whom the NPS was performed; hospitals and requesting wards; date of sample collection; outcome. We then carried out an exploratory inferential analysis to highlight any differences in the average age of the subjects subjected to pre-H NPS in May compared to June/July.

The PHS programmed 691 pre-H NPSs during the period of interest; we could retrieve information about the execution and reporting of 596 of these NPSs, that represent 86.3% of the initial sample, and that we here describe. The mean age of the patients was 55.7 ± 18.1 years, with significant differences depending on the department and the requesting hospital; 39.1% NPSs were performed on male subjects (Table 1). 460 NPSs (77.2%) were performed for pre-H at San Filippo Neri, 111 (18.6%) NPSs were performed for the Sant'Anna Treatment Center, and 25 (4.2%)

for the Ophthalmic Hospital of LHA Roma 1 (Table 1). Table 2 shows detail of the changes relating to the individual requesting wards across the considered months.

Only one NPS (0.17%), taken on June 22nd, 2020 from a 68-year-old, male patient, who had to undergo maxillofacial surgery, was positive for SARS-CoV-2; another NPS (0.17%) taken on July 1st, 2020 from a 18-year-old female patient, who was scheduled for gynaecological surgery, was reported as presumably positive; the following day the patient carried out a serological examination, with negative results.

Table 2 - Pre-hospitalisation NPSs according to the requesting ward and the month they were performed.

Ward	May	June	Δ June vs May	July	Δ 1 to 5 July vs 1-5 June	Total
Cardiology	25	24	-4.0%	9	+50.0%	58
Emergency Surgery	10	16	+60.0%	2	+0.0%	28
General Surgery	14	21	+50.0%	7	Na	42
General Oncological Surgery	7	6	-14.3%	2	+100.0%	15
Gynecological Surgery	8	3	-62.5%	0	-100.0%	11
Maxillofacial Surgery	4	11	+175.0%	2	+0.0%	17
Plastic Surgery	21	7	-66.7%	0	-100.0%	28
Vascular Surgery	18	22	+22.2%	3	+50.0%	43
Gynecology	0	45	Na	20	Na	65
Gynecology Day Surgery	5	12	+140.0%	0	-100.0%	17
Gynecology Pma	1	4	+300.0%	2	Na	7
Neurochurgy	14	22	+57.1%	6	+100.0%	42
Ophthalmology	0	0	Na	25	Na	25
Orthopedics	8	20	+150.0%	5	+150.0%	33
Obstetrics/Gynecology	34	44	+29.4%	16	+100.0%	94
Otorhinolaryngology	12	6	-50.0%	2	+100.0%	20
Urology	16	30	+87.5%	5	+150.0%	51
Grand Total	197	293	+48.7%	106	+178.9%	596

It was observed in a recent study conducted in Tuscany, Italy (17) that the median age of patients who underwent surgical interventions was significantly higher in March 2020 than in March 2019, and so it was the rate of patients with Charlson comorbidity index ≥ 2 . We considered using the average age as an indirect indicator of the severity of the

Table 3 - Comparison of the average age of patients subjected to pre-H NPSs per ward.

Ward	Mean age - May	Mean age - June, July	P-value*
Cardiology	62.1	66.0	0.34
Emergency Surgery	50.9	57.3	0.30
General Surgery	64.8	58.7	0.17
General Oncological Surgery	62.2	62.7	0.93
Maxillofacial Surgery	63.9	41.6	<0.05
Vascular Surgery	69.4	74.1	0.16
Gynecology	32.6	37.0	0.33
Neurochurgy	55.0	57.3	0.60
Orthopedics	67.0	67.1	0.98
Obstetrics/Gynecology	43.0	39.3	0.18
Otorhinolaryngology	51.5	61.7	0.13
Urology	70.9	69.6	0.72

*student's 2-sides t-test

disease and urgency in performing surgery. In this sense, we would have expected a gradual reduction in the average age of patients over the course of the months, while moving from more urgent to more postponable interventions. However, despite the fact that the average age of patients undergoing NPSs actually decreased by about 3 years from May to June, this result was not significant ($p=0.07$), and the trend did not seem to be confirmed in the first days of July, perhaps also due to the high average age of ophthalmology patients (72 years). Even investigating, when possible, the differences in average age considering the individual wards, there were no significant differences, except in maxillo-facial surgery ($p<0.05$) (Table 3).

Discussion and Conclusions

Pre-H NPSs led to the identification of only one confirmed Covid-19 case out of 596 people sampled in the considered period. The use of the swab for pre-H increased over time, probably due to the gradual reopening of surgical activity in elective surgery, which had been suspended during the Covid-19 epidemic peak period. The increased number of NPSs performed has fortunately not translated into an increase in identified positive cases. The pre-H NPSs activity implementation was characterised by some operational difficulties related to the programming of the NPSs, as well as problems related to the need to provide the NPSs results and to carry out the hospital admission within 48 hours after the sample collection.

A recent analysis has estimated an annual need of about 836,000 NPSs (2,290 per day) for the Lazio Region to cope with hospitalization activities, of which 61.7% for ordinary hospitalizations, 29.3% for day hospital/day surgery, 4.3% for rehabilitation; to these should be added all discharge NPSs (data unpublished).

Despite the optimism related to the results on low viral circulation, in this context, considering the impact of the disease on the individual and on both health- and socio-economic systems (18), pre-H NPSs remain fundamental in order to identify asymptomatic or unknown cases and to contain the epidemic, at least until an effective vaccine will cover a sufficiently large part of the population. Even one unidentified Covid-19 case can lead to devastating consequences for the community and the whole country in a short time, and the spread of SARS-CoV-2 from the community to health facilities has a significant impact on the ability of the NHS to operate.

The NPS is in addition to, and not a substitute for, all the universal precautionary measures which must in any case be ensured, and a negative NPS must not make us let our guard down, given the possibility of false-negative results (13). Further investigation is needed to assess at what level of viral circulation it is worthwhile to add NPSs to the preventive measures that need to be put in place. This could be debated especially for some types of services with a low risk of creating hospital clusters (e.g. day care ophthalmic surgery). The need to mitigate the risk of operating during the Covid-19 pandemic must be accompanied by a plan to restore surgical activity and recover cancelled procedures (19).

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