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Usefulness of the Lumiradx™ SARS-COV-2 antigen test in nursing home☆

Utilidad del test de antígenos SARS-COV-2 de LumiraDx™ en centros residenciales

The detection of viral ribonucleic acid (RNA) by reverse transcriptase-polymerase chain reaction (RT-PCR) is the reference method for the detection of SARS-CoV-2, but its high price and the overburdening of many laboratories made it necessary to implement techniques that offer fast and reliable results outside the laboratory, such as rapid antigen tests. Their approval for the diagnosis of this infection has meant a change in the strategy against COVID-19[1] due to their great usefulness in detecting infectious individuals and reducing the spread of the virus[1]. Their speed and simplicity, as well as it being it possible to perform them at the point of care, have led to them playing an important role in centres outside the hospital environment, such as nursing homes.

The LumiraDx™ SARS-CoV-2 antigen test is a rapid microfluidic immunofluorescence assay that, through the use of test strips, allows direct and qualitative detection of the viral nucleocapsid protein in nasal and nasopharyngeal samples. The usefulness of this technique is based on its high sensitivity and specificity (97.6% and 96.6%, respectively)[2]. In addition, in symptomatic patients, the concordance with RT-PCR in the first 12 days after the onset of symptoms is 100%. The time to result of this test is about 12 min and the result is interpreted by a reading instrument, eliminating the inter-individual interpretation bias of the observer.

The objective of this study was to evaluate the sensitivity and specificity of the LumiraDx™ antigen test in care homes. To do this, a nasal sample was collected from each participant with symptoms compatible with COVID-19 or who were close contacts of patients with COVID-19 in order to perform the LumiraDx™ antigen test (LumiraDx™ Limited, London, United Kingdom) and a nasopharyngeal sample was collected to perform an RT-PCR test, using Allplex™ SARS-CoV-2 reagents (Seegene, Seoul, South Korea). In order to assess whether the negative results obtained using this technique can be used as a criterion when discontinuing isolation, samples were collected from asymptomatic patients already diagnosed with COVID-19 and who had completed the isolation period.

In 46 cases, the antigen test was used for diagnostic purposes. Its sensitivity and specificity were 87.5% and 100%, respectively, with a positive predictive value of 100% and a negative predictive value of 88%. In the symptomatic cases, the sensitivity was 93.33%. In the three cases in which there was discordance (positive RT-PCR and negative antigen), the RT-PCRs showed cycle threshold (Ct) values >33 (Table 1). Previous studies have shown a sensitivity of antigen tests of between 82.2% and 97.6%[3–7], figures similar to those reported by the test analysed in this study. In addition, a recent study indicates the LumiraDx™ antigen test to be one of the most sensitive antigen tests[3].

In our study, this test was used in a small sample (24 cases) to assess its usefulness in deciding to end isolation. The sensitivity was 52.63% and the specificity 100%. Both tests coincided in 15 cases: 10 positive and five negative. In the nine cases in which there was disagreement, RT-PCR showed a Ct value >31 after a mean of 16.66 days of infection. Although its sensitivity was low, it should be noted that the antigen test was negative when the RT-PCR showed an elevated Ct value, which, according to the available evidence, would be equivalent to a non-infectious viral load[1,8]. Therefore, a negative result could support the end of isolation together with compliance with the days of isolation and the absence of symptoms in this vulnerable group, in which access to molecular tests is more difficult.

In short, the LumiraDx™ rapid antigen test has high specificity and good sensitivity in nasal samples from symptomatic and asymptomatic patients. It is an optimal diagnostic tool for SARS-CoV-2 infection and it may be interesting to assess its use in other situations in subsequent studies, such as when deciding to end isolation.

Table 1
LumiraDx™ rapid antigen test compared with RT-PCR for the diagnosis of SARS-CoV-2 according to the reason for performing the test.

		RT-PCR				TOTAL
		Positive		Negative		
		Symptomatic	Close contact	Symptomatic	Close contact	
LumiraDx™ Ag	Positive	14	7	0	0	21
	Negative	1	2	4	18	25
TOTAL		15	9	4	18	46

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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Multidrug resistant bacteria in a neurological rehabilitation hospital☆

Microorganismos multirresistentes en un hospital monográfico de rehabilitación neurológica

The Institut Guttmann (IG) is a centre dedicated to neurological rehabilitation, where patients affected by spinal cord injury (SCI), brain damage and other neurological diseases are treated. As in all health centres, the control of multidrug-resistant organisms (MDROs) is a challenge, increased by the peculiarities of this type of centre (admissions from other hospitals, therapeutic activities in common spaces, personal contact due to patients' dependence, limitation of rehabilitation treatment). The IG has an MDRO control programme that includes screening on admission, isolation of affected patients, hand hygiene and an optimisation programme for the use of antibiotics.[1]

In order to describe the MDROs presented by patients on admission to the IG, as well as the MDRO infections they suffer during their stay and related factors, we carried out a prospective longitudinal cohort study of the 502 patients admitted for rehabilitation treatment during 2019. Demographic data (age and sex) was collected, along with details of the cause and date of acquisition of the neurological injury, functional level at admission (functional independence measure[2]) and length of stay in the IG. Regarding MDROs, we compiled the results of the screening performed on admission (<48 h from the date of admission), which included nasal smears, rectal smears, urine cultures, cultures of skin wounds, and cultures of tracheal aspirates in the case of tracheostomy. Cultures were performed in the microbiology laboratory following the recommendations of the Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica [Spanish Society of Infectious Diseases and Clinical Microbiology].[3] Throughout hospitalisation, infections caused by MDROs occurring 48 hours after admission were recorded, including details of their aetiology and site. The diagnosis of infection was made based on the presence of suggestive symptoms together with radiological criteria (respiratory infection), laboratory tests and positive culture, taking into account the characteristics of the patients (neurogenic bladder, permanent or intermittent bladder catheterisation, tracheostomy).

The statistical analysis performed and the results are summarised in Table 1 and highlight that MDROs were detected in 31% of the patients on admission and 6.6% suffered some MDRO infection during their stay in the IG.

The most frequent MDROs isolated on admission were extended spectrum beta-lactamase (ESBL)-producing *Enterobacteriaceae* and methicillin-resistant *Staphylococcus aureus* (MRSA), as has been described in the few similar studies published, but we differed in finding multiresistant *Pseudomonas aeruginosa* (*P. aeruginosa*), but not vancomycin-resistant *Enterococcus spp*. This variability is due to methodological differences and/or differences in the prevalence of MDROs, depending on the geographical area.[4–6] MDRO infections in neurorehabilitation centres have hardly been described in the literature. Our results coincide, in terms of the most common site (urological) and aetiology (ESBL *Enterobacteriaceae*, MRSA), with the Estudio de Prevalencia de Infecciones Nosocomiales en España [Prevalence Study of Nosocomial Infections in Spain] for the rehabilitation specialty.[7] We highlight the presence of infections by multiresistant *P. aeruginosa* and not

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