



## COVID in 2022. Clinical risk management of sars-cov-2 positive patients admitted to an internal medicine ward

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Dear Editor,

Following the mass vaccination campaign in Italy which has involved more than 90% of the population and which protects against the most severe clinical forms of COVID-19 [1], the characteristics of the pandemic have changed, sometimes taking on new forms. In January 2022, thanks to the spread of the Omicron variants which affected half of the European population, the type of patients admitted to Internal Medicine wards changed. In fact, patients testing positive for Sars-CoV-2 are no longer affected by a more or less severe disease with a prevalent respiratory component, but have infections with mild symptoms, mostly characterized by the involvement of the upper respiratory airways and which, in most cases, does not require hospitalization [2]. However, sometimes symptomology can be associated with a high clinical complexity, determined by the exacerbation of multiple underlying diseases, which needs to be managed in different clinical care settings. Therefore, due to vaccination and the simultaneous use of personal protective equipment, in particular the use of FFP2 masks, we have witnessed, with some limitations, the restart of normal work, school, and social-recreational activities. Consequently, the population has started to go to hospitals (starting the diagnostic work-up in patients such as those with chronic heart, liver and oncological diseases) and emergency rooms (e.g., for heart attacks, trauma, poisonings, hemorrhages) again,

leading to an increase in requests for healthcare services compared to the previous two years.

Nowadays, these complex patients with acute pathologies or who need to undergo diagnostic procedures, which incidentally have tested positive for Sars-CoV-2, represent about a third of those who access our hospitals, and almost all patients admitted to Internal Medicine COVID Units. In 2022, these patients accessing emergency rooms for acute pathologies and health issues not directly related to COVID-19 are those mainly hospitalized with COVID-19, as well.

Aiming to have a clear snapshot of the typical patient admitted to an Internal Medicine COVID ward during the 2022 wave of the pandemic, we investigated all patients admitted to our Internal Medicine COVID ward during the 1<sup>st</sup> trimester of 2021 and compared them with those admitted during the 1<sup>st</sup> trimester of 2022. One hundred-six patients admitted with respiratory symptoms of varying severity (mild to moderate) due to COVID-19 during the 2021 were compared with two-hundred-nineteen admitted during the same period of 2022, with a COVID-19 positive swab but without respiratory symptoms.

For each group of patients divided by year (2021 vs 2022), we compared: age, sex, length of hospitalization (LoH), expressed in number of days, disease severity through the calculation of the 4C Mortality Score and the Pneumonia Severity Index (PSI) (see table), and main comorbidities (cirrhosis, type 2 diabetes mellitus, stroke, ischemic heart disease, atrial fibrillation, arterial hypertension, peripheral vasculopathy, solid and/or hematological neoplasms). Exitus, transfers to intensive and sub-intensive care units, as well as incoming transfers from non-COVID departments were also evaluated, as were so-called “epidemic outbreaks” as well.

According to our analysis, patients admitted in 2022 were older ( $p < 0.02$ ) than those admitted in 2021; the LoH, expressed in days, was significantly lower in 2022, as expected, ( $p < 0.0001$ ), as was respiratory failure

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( $p < 0.0001$ ), in comparison to 2021. Although patients were more affected by respiratory symptoms in 2021, PSI ( $p < 0.0001$ ) and C4 ( $p < 0.03$ ) were slightly higher in 2022 than in 2021. This was likely due to the older age of patients admitted in 2022, as age weighs heavily on patients' individual scores. Regarding the analysis of individual comorbidities, none were statistically significant, with the exception of ischemic stroke ( $p < 0.002$ ), perhaps due to the effect of the Omicron BA.5 variant, as recently showed by the increase of cardio and cerebrovascular disease in COVID-19 patients affected by this variant [3]. In addition, from the data obtained, it has been reported that, in 2021, most patients were admitted with severe pneumonia and were often transferred to ensure better respiratory care in high-intensity care departments such as intensive ( $p < 0.0001$ ) and sub-intensive care units (ICUs) [4, 5]. On the contrary, in 2022, there has been a greater number of incoming transfers following numerous outbreaks of epidemics in non-COVID departments ( $p < 0.0001$ ), related to the greater diffusivity of the Omicron variants. Finally, from our data it is possible to deduce that, in 2022, even though the number of admissions was greater (219 vs 126), this was due to the fact that the overall respiratory burden was milder and therefore LoH was shorter, so as to guarantee a higher turnover of patients in the COVID ward.

Similar data emerges from the reports of the FIASO (Italian Federation of Healthcare and Hospitals, <https://www.fiaso.it/>) regarding admissions to the COVID areas of six large hospitals in northern (Lombardy, Piedmont), central (Emilia-Romagna, Lazio), and southern Italy (Campania, Apulia). However, looking more closely at our case series, who are these patients? The vast majority are those suffering from a decompensation of chronic clinical conditions such as diabetes (36.1%), cardiovascular (26.5%), neurological (16.9%), oncological (11%), or peripheral vascular (12.3%) diseases. These data could be attributable to the average age of patients admitted to our Unit during 2022, representing a more fragile slice of the population that has a greater number of comorbidities that, during the previous year, thanks to isolation, had been better controlled. Another small percentage of patients is represented by those who need to undergo an urgent and non-postponable surgery even though they test "positive", for example, urgent coronary angiography or myocardial infarction, bone fractures, neurosurgical procedures, and so on.

A sizable portion of the patients who entered the Internal Medicine COVID Unit are those who were previously hospitalized in other departments to start a diagnostic-work up in oncology or cardiology or surgical fields and who, unfortunately, thanks to the exceptional contagiousness of the BA.5 Omicron variant of Sars-CoV-2, contracted the infection in a hospital outbreak. In fact, within the group of patients admitted in 2022, those coming from

other departments to the Internal Medicine COVID ward were 28.8%, compared to 11.1% in 2021. Furthermore, the number of patients who accessed the ER only for Sars-CoV-2 infection was significantly reduced because of the possibility of undergoing oral antiviral therapy at home.

From this scenario, it emerges that the persistence of the Sars-CoV-2 pandemic has determined a new type of hospitalization in which the infection, even if indolent, certainly causes greater severity and a worsening of the patient's basic clinical condition, leading to the risk of more rapid death. Therefore, taking note of this, in order to avoid having patients with a high clinical risk admitted to the departments of COVID Medicine when suffering from other pathologies, such as neurosurgical or cardiac surgery patients, it would be appropriate to establish "paths" or strengthen "dedicated areas" within these other departments in order to provide adequate specialist assistance. Therefore, even in a non-COVID ward, it would be necessary to ensure "adequate paths" for patients who eventually become positive in order to immediately guarantee isolation and dedicated medical, nursing, and para-sanitary staff. The creation of "paths" dedicated to COVID patients is necessary, not only within hospitals but also across the local area since, currently, the pathological load of COVID is low, especially if compared to the high load of comorbidities which, unfortunately, determine patient outcomes. Further, in these areas, also a better management of prescription of oral antivirals, could help to prevent the re-exacerbation or decompensation of chronic clinical conditions due to COVID-19, and thus to improve the impact of comorbidities. Complex disease management, as already debated above, has become a major health challenge during COVID, that underwent a tangible limitation, especially for these procedures requiring obligate access to healthcare facilities for diagnostic and therapeutic purposes. Clinical strategies to perform medical consultations, diagnostic evaluations, and digital telehealth solutions should be implemented to better deal with this probably long-term situation [6].

In the near future, as recently suggested, in addition to "dedicated areas" it may be useful to create an organizational model for integrated transversal areas in which doctors who take care of patients also contribute to their care paths, adapting specialist services and, above all, minimizing the clinical risk of patients who, up to that moment, had been managed by many specialists who were not always suitable for managing the dominant pathology. Thus, in order to activate this highly competent, multidisciplinary clinical organizational model, an increase in health and para-sanitary personnel, which to date has been totally insufficient, would be needed (Table 1).

**Table 1** Analysis of clinical features of 345 patients admitted at our COVID-Internal Medicine Unit during the 1<sup>st</sup> trimester of 2021 compared with the 1<sup>st</sup> trimester of 2022

	2021 N=126	2022 N=219	P<
Age	64.6±16.7	69.4±15.7	0.02
Sex (male, %)	59 (46.5%)	136 (69.1%)	0.005
Length of hospitalization (IQR)	20.1(9–26.2)	12.5(6–16)	0.003
Disease severity			
- C4 Mortality Score *	10.2±4.9	11.4±4.4	0.03
- PSI **	2.8±1.1(103)	3.45±0.9 (105)	0.0001
Outbreaks of epidemics	14 (11.1)	63 (28.8)	0.0001
Exitus	16 (12.7)	42 (19.2)	Ns
Pneumonia	99 (78)	104 (47.5)	0.0001
O2	75 (59.5)	91 (41.6)	0.002
Hospitalization for COVID-19	117 (92.9)	86 (39.3)	0.0001
Comorbidities			
Cirrhosis	7 (5.6)	13 (5.9)	Ns
Type 2 Diabetes	38 (30.2)	79 (36.1)	Ns
Stroke	7 (5.6)	37 (16.9)	0.002
Ischemic heart disease	21 (16.7)	58 (26.5)	0.05
Hypertension	68 (54)	130 (59.4)	Ns
Atrial Fibrillation	23 (18.3)	55 (25.1)	Ns
Peripheral vascular disease	4 (3.2)	27 (12.3)	Ns
Solid neoplasms	9 (7.1)	24 (11)	Ns
Hematological neoplasms	2 (1.6)	17 (7.8)	0.02
Transfer to sub-ICU	24 (19%)	14 (6.4%)	0.0001
Transfer to ICU	19 (7.9)	4 (1.8)	0.01
Transfer to other Units	30 (23.6)	64 (29.3)	Ns

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## Declarations

**Competing interests** The authors declare no competing interests.

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