Can Reasoned Mass Testing Impact on Covid-19 Hard Outcomes in Wide Community Contexts? An Evidence-based Opinion

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Short Report

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Abstract

We provide data of Covid-19 epidemic in two geographically contiguous Italian regions, Lombardy and Veneto, which were the first and simultaneously hit by SARS-2-Cov in Italy but showed markedly different disease outcome in terms of case fatality rate, mortality and hospitalization.. We discuss similarities and differences in the regional context and conclude that Covid-19 better outcome in Veneto was due, at least in part, to the adoption of a strategy of active search of asymptomatic SARS-2-CoV infections (Reasoned Mass Testing;) instead of a strategy strictly based on detection of symptomatic cases.SARS.

Introduction

The importance of active search of asymptomatic SARS–2-CoV infections (hereafter referred to as Reasoned Mass Testing; RMS) for an effective control of Covid–19 epidemic in closed institutional settings (e.g. skilled nursing facilities and hospitals) has been highlighted (1,2). It may seem intuitive that whenever RMS is feasible it could provide a real, additional advantage over the classical symptom-based case detection (SBCD) strategy. Whether and to what extent RMS strategy has helped this control in a wide regional community remains, however, unproven. Although very instructive, the results of the two surveys made in the small Italian city of Vò Euganeo, where contact tracing and reconstruction of the transmission chains revealed the critical role of asymptomatic subjects in SARS–2-CoV transmission, cannot be simply translated into a much wider regional context (3).

We believe a good case for testing whether RMS provides better epidemic control than SBCD is the comparison of Covid–19 mortality indicators in two geographically-contiguous Italian regions, Lombardy and Veneto, which were simultaneously hit by SARS–2-CoV on February 21st,2020, when Covid–19 epidemic started in Italy, and were rapidly swept by rampant accumulations of critically-ill patients (3,4). The same day, both regions started an active disease surveillance, attempting identification of all SARS–2-CoV-infected subjects and their prompt isolation (4). However, four days after, Lombardy adopted a stringent Symptom-based Case Detection (SBCD) strategy, likely based on the assumption that only Covid–19 fully symptomatic patients could efficiently transmit infection, while Veneto continued the initial approach and actually strengthened the search of potentially contagious, asymptomatic subjects by extensive SARS–2-CoV testing. Here, we compare two hard outcome indicators of the epidemic course in the two regions along three months of Covid–10 spread in Italy, inclusive of pre- and post-national lockdown periods. We discuss the different outcomes in the context of various regional factors possibly affecting Covid–19 containment strategy. We conclude that the much lower Covid–19 mortalities in Veneto support our opinion that RMS strategy can better contain Covid–19 also in a wide regional community.

Methods

Data were extracted from official reports of the Italian Ministry of Health (available at <https://www.salute.gov.it>). We calculated the following outcome indicators: 1. the CFR, as described by

Baud et al. (5). and normalized as reported by Pachetti et al (6); 2. the overall Covid–19 -attributable mortality in the regional population. We also measured the ratio of hospitalized to non-hospitalized subjects. The time intervals considered were from February 21st, when the epidemic started in the two regions, to March 28th, when the two different regional strategies were closely followed, and March 29th to May 31th when, following national lockdown and WHO call for enhancement of diagnostic testing, Lombardy loosened SBCD strategy and markedly increased SARS–2-CoV testing.

Results

As shown in Table 1, at the first timepoint measurement, there was about 15 times lower lethality and 7.5 lower Covid–19—attributable mortality in Veneto than in Lombardy. There was also 2.5 lower rate of hospitalization in Veneto than in Lombardy (not shown). The above mortality differences were reduced (to about half values) but not eliminated at the second timepoint, suggesting that SBCD loosening with increased SARS–2-Cov testing in Lombardy, ameliorated the mortality outcomes though not reaching the particularly low Veneto's values.

Discussion

The largest and most significant difference of Covid–19 hard outcome indicators between Lombardy and Veneto was in the pre-lockdown CFR (Table 1). This indicator has been recently discussed for uncertainties about the real denominator (number of infected subjects), particularly in the initial epidemic period (5,7). The markedly high CFR in Lombardy is likely explained by the low denominator. resulting from the SBCD strategy that can be biased toward detection of more severe clinical cases, as also suggested by the high hospitalization rate in that region. When SBCD was loosened and intense testing for SARS–2-Cov infection was implemented, leading to increased identification and isolation of milder cases and asymptomatic infections (post-lockdown period), the CFR became more reasonable owing to the higher denominator. Notably, Veneto's CFR, at both timepoints, is remarkably low (below 1%), close to that assumed to be the “real world” lethality under optimal case detection conditions, efficient contact tracing, quarantine and lack of confounders factors (7). This interpretation is supported by the data of the hospitalization ratio if we assume that a higher number of asymptomatic or minimally symptomatic subjects would not require hospitalization..

It is important putting the above differences in the regional context, and ask as to which of the main regional factors has favoured or hindered RMS strategy. As shown in Table 2, there are important, Covid–19- relevant, similarities between the two regions: both are highly industrialized, with similar average personal income, median population age and life expectancy. However, there are also important differences which could have played a role both in the choice of control strategy and their implementation. In particular the lower population density and the greater number of hospital-integrated territorial health services (8), have certainly favoured RMS implementation in Veneto while making it more difficult to apply in Lombardy, at least in the initial epidemic period when this region may have suffered shortage of testing capability (9). However, the reduction of mortality gap with Veneto when Lombardy

increased SARS–2-CoV testing would suggest that RMS implementation was indeed possible also in Lombardy if chosen as suitable strategy at the beginning of the epidemic, and tools for extensive SARS–2-CoV testing had made available. Finally, worse disease outcomes in Lombardy could also be contributed to by a particularly high burden of unrecognized Covid–19 cases before the first official one (9), but this remains undetermined until comparative seroprevalence studies clarify the matter. We are aware that other unknown factors might have played a role, but all this considered, the rather impressive Covid–19 outcome differences between the two regions supports our opinion that RMS strategies, if early implemented, can help control Covid–19 epidemic also in a wide regional context as it does in closed institutional settings or small communities (1–3). Data and considerations made here can help identify and implement the most suitable strategy for the control of present Covid–19 outbreaks in Italy and allow a more effective preparedness for expanded testing, contact tracing and quarantine to control a possible second wave of infections in case specific anti-SARS–2-CoV therapeutics and vaccines are not available.

Declarations

The Authors declare no conflict of Interest

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Tables

Due to technical limitations, Tables 1-2 are provided in the Supplementary Files section.

Supplementary Files

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- [Tables.docx](#)