Journal of Family Medicine

Open Access

Austin Publishing Group

Research Article

The Hidden Capacity of Private Medical Laboratories in Detection Patients Suspected to COVID-19

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Received: April 24, 2024
Accepted: May 27, 2024
Published: June 03, 2024

Abstract

Background: The rapid spread of SARS-CoV-2 infection with its high mortality rate has caused fear among the world's population. Hospitals capacity may not be able to scope of patients and suspected cases to COVID-19 in each wave of attack. There is an ability in private medical laboratories to screen suspected COVID-19 patients and to pick actual patients. This helpful capacity can help health care providers to better and more urgently manage patients suspected of having COVID-19. Here, we wanted to show that private medical laboratories would help to minimize the surge of SARS-CoV-2 offenders being sent to hospitals.

Material and Methods: Two private medical laboratories, who had engaged with detection of suspected individuals with COVID-19, selected. Among 78 suspected cases who referred to these medical laboratories, 38 patients had COVID-19. The result of screening individuals suspected of having COVID-19 were collected during the period 1 March 2020 to 5 April 2020. The results of performed tests for detection CARS-Cov-2 have reported in details.

Results: About half of cases who referred to private medical laboratories were positive SARS-CoV-2. Private medical laboratories have the perceptible capacities to screen and detect patients with COVID-19.

Conclusion: In the growing outbreak of this infection, this neglected potential capacity can improve official healthcare provider networks to better screen suspected COVID-19 patients. It is recommended that health provider systems would make use of private medical laboratories to rapidly detect SARS-CoV-2 infection.

Keywords: Capacity of Private Medical Laboratories; Coronavirus; COVID-19; Outpatient; Suspected patient; SARS-CoV-2; Health system

Introduction

Unstoppable spread of the coronavirus disease 2019 (COVID-19) resulted in an pandemic of COVID-10 infection [1]. Total number of affected cases until April 20, 2021 reached to 143,577,735 cases with 3,058,230 deaths the World Health Organization (WHO). It has been reported from all countries worldwide. Based on a case series of 72 314 cases on February 11, 2020 from China, only 62% (44 672 cases) were confirmed with qRT-PCR on throat swab samples [2]. The sampling of throat and carry out qRT-PCR may not available in many countries including developing one for all patients. According to the recommendation of WHO, the decision on performance a test for a patient suspected to COVID-19 should be based on the clinical picture and epidemiological variables. Asymptomatic persons and patients with mild symptoms who had a contact with a known COVID-19 patient can do a PCR test [3]. According to a report from Wuhan among 425 patients, the mean incubation time for COVID-19 was 5.2 days. The incubation time can be different between various individuals [4,5].

A growing awe from COVID-19 has been penetrated through all communities in the world [6]. This fear has reflected in many regions. A wave of awe has been reported from mainlanders of southeastern or southern of Asia [7]. Home isolation was recommended by many health provider systems to prevent the outbreak of COVID-19 [8]. Although, it is a meticulous step in prevention of COVID-19, but is associated with fear of transmission of infection between members of the families with a quarantined patient. This phobia is seen in our region by huge refereeing of fear persons to private medical laboratories to check screening test for COVI-19. This fear has grown in our region secondary to the new round of sanctions against the country that includes medicine and medical equipment. It is like that

Citation: Mansouritorghabeh H, Pourreza A, Shahroudian M. The Hidden Capacity of Private Medical Laboratories in Detection Patients Suspected to COVID-19. J Fam Med. 2024; 11(5): 1367.

our health system swims with hands tied [9]. The number of patients who referred tertiary hospitals to test status of SARS-CoV-2 has increased globally. On the other hand, the capacity of tertiary hospital for acceptance of patients with COVID-19 is limited. Here, we retrospectively collected some demographic findings and laboratory variables of suspected patients to COVID-19 who had referred to two private medical laboratories in Mashhad, Iran.

Patients and Methods

After obtaining approval of regional ethic committee in Mashhad University of Medical Sciences (Approval number 7889404), the suspected cases to COVID-19 were established by following criteria: 1- Self-declaration of case who requested for doing primary screening tests for COVID-19. They included the cases who had an infected patient with COVID-19 in the family or had contact with a person who has demonstrated to have COVID-19 infection letter. 2- Referral from general physicians or internists with alarm to medical laboratories that referred case is associated with high risk of COVID-10 infection. This study was done as a cross-sectional prospective study. The duration of the study includes March 1, 2020 till April 5, 2020. Among 74 patients who referred to these 2 private medical laboratories, 38 patients had complete needed data.

A questionnaire form designed to mine some demographic finding ie. age, sex, and main complaint(s) of the included patients and results of the common tests, which is done routinely for detection of SARS-CoV-2 in these patients in our region. These tests included Complete Blood Count (CBC), erythrocyte sedimentation rate (ESR), C-Reactive Protein (CRP), Serum Glutamic-Oxaloacetic Transaminase (SGOT), Serum Glutamic Pyruvic Transaminase (SGPT), Activated Partial Prothrombin Time (aPTT), Prothrombin Time (PT), and Lactate Dehydrogenase (LDH). All cited diagnostic tests were done according to routine laboratory procedures.

Results

Overall, during March 1- April 5, 2020, 74 cases had referred to two private medical laboratories (Danesh and Arsalan) in Mashhad, Northeastern Iran. Among them, 38 cases had positive screening tests that emphasized needed to be checked fully. They included 16 males (42%) and 22 females (57.9%). The minimum and maximum age of them was 4 and 86 years old respectively. The median of age was 44.4 ± 1.7 years old. The common main complaints of the cases were fever 6 (15.8%), fatique 2 (5.3%), cough 1 (2.6%), crump 1 (2.6%), headache 1 (2.6%). Moreover, some cases had multiple complaints that included headache+chilling 2 (5.3%), fever+cough+shortness of breath 2 (5.3%), fever+cough+diarrhea 2 (53%), fever+cough+stomach ache 2 (5.3%), fever+stomachachea 2 (5.3%), fever+ diarrhea 1 (2.6%), cough+ shortness of breath 1 (2.6%), fever+cough+chilling+ 1 (2.6%), and fever+cough+nose congestion 1 (2.6%). Overall, 16 cases (42.1%) had experienced fever alone or with other symptoms. Nine cases (23.6%) had cough alone or with other symptoms. Among 37 cases, 6 cases (15.8%) had private order of test without referring from any physician, 23 cases (60.5%) referred by a general physician, and 9 cases (23.7%) referred from an internist.

CBC was the most requested tests 37 (97.3%). The range of white blood cells varied from 3.1 -16.87 × 10^3/µl with mean 7.346 ± 2.8 × 10^3SD cell. The minimum and maximum of red blood cell count was 3.9 × 10^6 - 6.73 × 10^6/µl with mean 5 ± 6.38 × 10^6 SD cell. The range of platelet count was 162 × 10^3- 450 × 10^3/µl with mean 210 ± 1.13 × 10^3 cells. Among various types of WBC, lymphocyte had the most fluctuation. The minimum and maximum count of lymphocytes were 4 and 41 × 10^3/µl respectively. The mean of lymphocyte count was 25 ± 9.4 10^3 cells. Other types of WBC have not remarkable fluctuations.

CRP carried out in 33 cases. The minimum was 1 and the maximum was 96 mg/ml. The mean of CRP was 20.9 ± 2.67 mg/ml. Among them, 19 cases had CRP above 6 mg/ml. ESR carried out in 20 cases. The minimum and maximum level of ESR were 11 and 90 mm/h respectively. The mean of ESR was 33 ± 2.43 mm/h. Among them, 19 cases had ESR above 10 mm/h. Other ordered or requested tests, including assay for levels of SGOT, SGPT, LDH, PT, and aPTT were in the reference range and ordered at very low amounts.

Discussion

In the current pandemic of COVID-19, health systems suddenly encounter with huge number of suspected patients with COVID-19. Shortage of protective facilities, unfamiliarity of global health systems with the new virus, lack of therapeutic protocol and drugs, shortage of diagnostics facilities and tests encounter the health systems to a big challenge. Nearly, at the first weeks of the beginning of the infection, the health systems did not scope of referred patients with and suspected to COVID-19 in many regions. There is a potential capacity in private medical laboratories and private clinics to help official health system providers to scope needs of screening patients and suspected cases to COVID-19 in the general population. The usage of the capacities of private medical laboratories will accelerate responding the referred cases, save the budget of families, and reserve diagnostics kits.

It seems, according to the current survey, fever and cough were the most common symptoms of the cases suspected to COVID-19. Moreover, CBC (including lymphocyte count), CRP, ESR were the most influenced tests that increased in the cases suspected to COVID-19. Our findings show there is no protocol for ordering medical tests for suspected patients to COVID-19 in our region. Diversity of the ordered tests in this survey emphasis on this point. There is an urgent need to develop a standard profile for ordering medical tests for a suspected case to COVID-19. It seems these tests can be considered as a suggested profile of screening test for detection of COVID-19 infection. By carrying out the current profile, lower cases need to do CT-scan or qRT-PCR for COVID-19 infection at the first stage.

In the current survey, we encountered with some limitations. First, we were not aware of definitive result of suspected outpatients who referred to us. Second, our sample size was limited.

Anyway, these findings can easily show the potential power of private medical laboratories to help official health system providers in our region. Since in many developing countries the capacities of health systems are limited and cannot scope huge number of patients with COVID-19, private medical laboratories can play a pivotal role in screening the outpatients.

Private medical laboratories can easily screen outpatients with COVID-19 and refer high-risk people to tertiary hospitals. Hence, health provider systems do not encounter with huge referred peoples and merely serve patients with COVID-19 without crowded.

Author Statements

Acknowledgment

The authors would like to Regional Ethics Committee at Mashhad University of Medical Sciences for approval of this contribution.

Funding

There was no fund for the current report.

Conflict of Interest

The authors declare no conflict of interest.

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