Letter to the Editor

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The effect of COVID-19 pandemic on biochemistry laboratory test consumption numbers and variety

[COVID-19 salgınının biyokimya laboratuvarı test tüketim sayıları ve çeşitliliği üzerine etkisi]

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Dear Editor,

Coronavirus disease 2019 (COVID-19) pandemic caused by a new coronavirus (SARS-CoV-2) has rapidly spread all over the world. The first COVID-19 case was defined on 11 March 2020 in our country, and the epidemic has continued to increase its impact until the beginning of May. According to the Ministry of Health data, the number of people infected with SARS-CoV-2 is 127,659 on 4 May 2020 and 3,461 people have lost their lives because of the epidemic [1, 2]. Measures taken to contain the epidemic and decrease the loss of life are also applied with discipline in our country as with the rest of the world.

COVID-19 pandemic has largely changed our lives and work styles. Restrictions implemented to decrease the risk of contagion, scheduled working practices in workplaces with decreased work intensity, social distancing, and isolation rules have affected the course of routine services. Together with the pandemic, central clinical laboratories have shown the necessary adaptation in a short time and

have gained great experience during the process. According to the national and international algorithms, laboratory tests used in the patients are primarily whole blood count, CRP, ferritin, D-dimer, blood gases, and when necessary, procalcitonin, troponin, prothrombin time and routine biochemical tests [3, 4]. Limited tests used in the diagnosis and monitoring of COVID-19, delay of non-urgent health issues because of the pandemic and decrease in the number of patients due to concern of contagion have led to a drop in test numbers. This paper aims to investigate the patient based decrease in laboratory test groups and the change in requests for tests caused by the COVID-19 pandemic.

We reviewed the biochemistry laboratory test consumption statistics of April 2019 and the first 4 months of 2020 using the Probel software (Probel, İzmir, Turkey) which is the hospital information system (HIS). The test consumption statistics of April 2020 when COVID-19 patients were dense were compared with those of April 2019 and the first 3 months of the year. The changes in the test groups were expressed in percentages. The number of patients and the biochemistry laboratory tests were markedly decreased in April 2020 when the pandemic reigned compared with April of the previous year (Table 1). The changes in the most common five tests performed in biochemistry laboratories in April 2019 and 2020 are presented in Table 2. Although the order of the first five tests did not change, the mean reduction in the number of requests was 68.3%.

In contrast to the other tests, the requests for procalcitonin, D-dimer, and fibrinogen tests were highly increased during the COVID-19 pandemic (Table 3). The request for all the tests other than these three tests was reduced. The number of monthly patients and the total number of monthly biochemistry tests of the first 4 months

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Table 1: Test consumptions, patient numbers and mean tests requested per patient based on groups in April 2019 and April 2020.

	Biochemistry	Whole blood count	Coagulation	Hormone	Urinalysis	Blood gas	ESR	Patient	Test/patient ratio
April 2019	532,853	47,659	26,695	85,776	10,101	12,281	10,013	216,595	3.35
April 2020	171,733	16,067	18,701	21,942	2,118	6,551	1,483	50,861	4.69
Change (%)	-67.77	-66.29	-29.95	-74.42	-79.03	-46.66	-85.19	-76.52	40.07

ESR: Erythrocyte sedimentation rate.

Table 2: The most common five tests performed in April 2019 and 2020 and changes in percentages.

	April 2019	April 2020	Change (%)
1 Whole blood count	47,659	Whole blood count 16,067	-66.29
2 Creatinine	46,576	Creatinine 15,140	-67.49
3 BUN	42,605	BUN 14,721	-65.45
4 AST	39,736	AST 14,340	-63.91
5 Glucose	39,009	Glucose 12,378	-68.27

BUN: Blood urea nitrogen, AST: Aspartate transaminase.

of the year 2020 are presented in Table 4. As a result of working as a pandemic hospital in the second half of March and in April, the number of patients and tests decreased at a monthly base and the number of tests performed per patient increased.

İzmir Kâtip Çelebi University Atatürk Training and Research Hospital is one of the largest hospitals in the Aegean region. With the first COVID-19 patient seen, it was designated as a pandemic hospital and the necessary organizations were made. Admission of non-COVID-19 patients continued but the number of patients decreased because of gradually implemented measures of restrictions in leaving the house and intercity travel, delayed control of patients who could wait, and isolation due to concern for contagion. The number of laboratory tests decreased with a decrease in the number of patients. As a result of identification, diagnosis, and monitoring of both outpatient and inpatient COVID-19 patients, follows up with laboratory tests increased, and the test ratio per patient increased. The reason for less decrease seen in the coagulation test group compared with other groups and patient numbers is the

marked increase in requests for D-dimer and fibrinogen tests in COVID-19 patients (Table 2). As with CRP and procalcitonin, these two parameters have been widely used by the clinicians in the monitoring of patients. The increase in the request for the procalcitonin test in a viral test is noteworthy (Table 3). In studies on COVID-19 and procalcitonin, elevated results were reported in patients with a severe form of the disease, and procalcitonin levels were normal in the mild forms of the disease without complications. Serial procalcitonin measurements are very valuable for showing bacterial superinfections or the complication of the COVID-19 course by accompanying disease in the patient and showing the transformation of COVID-19 into the severe form [5]. Although requests for blood gases were reduced almost in half compared to the previous year, the rate of requests per patient was calculated to increase two-fold compared with April 2019 in relation to the decrease in patient number (six tests/100 patients vs. 12 tests/100 patients). The reason for this is a severe respiratory failure caused by COVID-19 in some patients and the consequent need for frequent monitoring of blood gases. Compared with April of the previous year, only the number of tests per patient was seen to increase. This was because our hospital is a tertiary care hospital for the pandemic, it has a high number of intensive care beds and patients under critical conditions require close laboratory follow up.

Despite the interruption of international trade, the overall reduced test consumption prevented a stock problem. On the other hand, due to the decrease in test consumption, not using the tests on time may lead to a different stock problem-expiration. One way to reduce this problem is to continue testing without interruption.

Table 3: Tests with increased request in April 2020 compared with April 2019.

	April 2019	Number of tests per 1,000 patients	April 2020	Number of tests per 1,000 patients	Change in rates (%)
1 D-dimer	1,081	5.0	D-dimer 3,966	78.0	1,560.0
2 Procalcitonin	1,385	6.4	Procalcitonin 3,017	59.3	926.0
3 Fibrinogen	578	2.7	Fibrinogen 2,840	55.8	2,066.0

Table 4: Number of biochemical tests, number of patients cared and ratio of tests per patient in the first 4 months of 2020.

	January	February	March	April
Total test	715,604	654,194	479,039	238,595
Total patient	238,563	216,522	149,382	50,861
Test/patient ratio	3.00	3.02	3.21	4.69

However, healthcare institutions should be prepared for the increase in patients in the post-pandemic era. Delayed health care requirements will increase presentations to the hospitals acutely when the pandemic ends and the restrictions are lifted. Therefore, the statements of official authorities should be carefully followed and resources of both personnel and materials should be pre-planned for normal conditions.

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