Araştırma Makalesi
Research Article

The Impact of the COVID-19 Pandemic on the Practice of Pathology: Analysis of Specimen Volumes in the Only Pathology Laboratory in the City

COVID-19 PANDEMİSİNİN PATOLOJİ PRATİĞİ ÜZERİNE ETKİSİ: ŞEHRİN TEK PATOLOJİ LABORATUVARINDAKİ NUMUNE SAYILARININ ANALİZİ

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ABSTRACT

Objective: One of the measures taken against the COVID-19 pandemic has been the postponement of all non-emergency medical procedures and surgeries in pandemic hospitals. The aim of this study is to examine the effect of pandemic measures on the workload of a city's only pathology laboratory.

Materials and Methods: Data on monthly numbers of the histological, cytological samples, immunohistochemistry and histochemistry stainings belonging to the pathology department were obtained from the laboratory information management system. The monthly specimen volumes were compared with the same month of 2019.

Results: The total number of samples received in our laboratory in March, April and May 2020 decreased by 59.1%, 92.1% and 87.6%, respectively, compared to 2019. Overall specimen volume dropped rapidly in March 2020 and bottomed out in April at 7.8% of our volume in 2019. No lung biopsy was received in the first three months of the pandemic. The second and third sections with the highest decrease were cervical cytology and non-gynaecologic cytology samples (90.7%, 87.6% respectively).

Conclusions: It has been observed that the COVID-19 pandemic has had a major impact on the pathology laboratory. Postponement of the non-emergency surgeries, which is one of the first measures taken by hospitals in the face of changes in the number of COVID-19 cases, was reflected in daily pathology practice as a serious decrease in the number of samples. Future studies will show the changes in the diagnostic profile caused by the decrease in the number of elective procedures during the pandemic period.

Keywords: Pathology, cytology, COVID-19, SARS-CoV-2, specimen volumes, workload

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ÖZ

Amaç: COVID-19 pandemisine karşı alınan önlemlerden birisi de pandemi hastanelerindeki tüm acil olmayan medikal işlem ve ameliyatları durdurmak olmuştur. Bu çalışmanın amacı pandemi önlemlerinin bir şehrin tek patoloji laboratuvarının iş yüküne olan etkisini incelemektir.

Gereç ve Yöntem: Patoloji bölümüne ait Mart-Kasım 2020 arası aylık histolojik ve sitolojik numune sayıları, immünohistokimya ve histokimya boyamalarına ilişkin veriler laboratuvar bilgi yönetim sisteminden elde edildi. Aylık numune miktarı aynı ayın 2019 sayısal verileriyle kıyaslandı.

Bulgular: Mart, Nisan ve Mayıs 2020'de laboratuvarımıza kabul edilen toplam numune sayısı 2019 sayılarına göre sırasıyla %59,1, %92,1 ve %87,6 azaldı. Toplam numune hacmi Mart 2020'de hızla düştü ve Nisan ayında 2019 yılındaki numune hacminin %7,8'i ile dibe vurdu. Pandeminin ilk üç ayında laboratuvara akciğer biyopsisi gelmedi. En yüksek düşüşün olduğu ikinci ve üçüncü bölümler sırasıyla %90,7, %87,6 ile servikal sitoloji ve jinekolojik olmayan sitoloji örnekleriydi.

Sonuç: COVID-19 pandemisinin patoloji laboratuvarı üzerinde büyük bir etkisi olduğu görülmüştür. COVID-19 vaka sayısında görülen değişiklikler karşısında hastanelerin aldığı ilk önlemlerden biri olan acil olmayan ameliyatların durdurulması günlük patoloji pratiğine numune sayılarında ciddi azalma olarak yansımıştır. Pandemi dönemindeki elektif vaka sayısındaki azalmanın, tanı profilinde sebep olduğu değişiklikleri gelecekteki çalışmalar gösterecektir.

Anahtar kelimeler: Patoloji, sitoloji, COVID-19, SARS-CoV-2, numune hacmi, iş yükü

The starting of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), started in Wuhan, China, Hubei Province in December 2019 and rapidly spread over the world (1). The World Health Organization (WHO) declared that COVID-19 as a pandemic on 11 March 2020. The first COVID-19 case of Turkey was hospitalized on 9 March 2020 and the first death case related to COVID-19 occurred on 17 March 2020 (2). One of the measures taken against the pandemic is the postponement of non-emergency surgeries and non-emergency dentistry practices in order to prevent disease transmission and to keep health institutions at sufficient capacity. Despite the decrease in the number of non-emergency surgeries, our pathology laboratory continued to operate at full capacity. This study aimed to examine the effect of pandemic measures on the workload of an only pathology laboratory of the city for histopathology and cytopathology, therefore, to identify which sections were most severely affected by postponed care.

MATERIALS AND METHODS

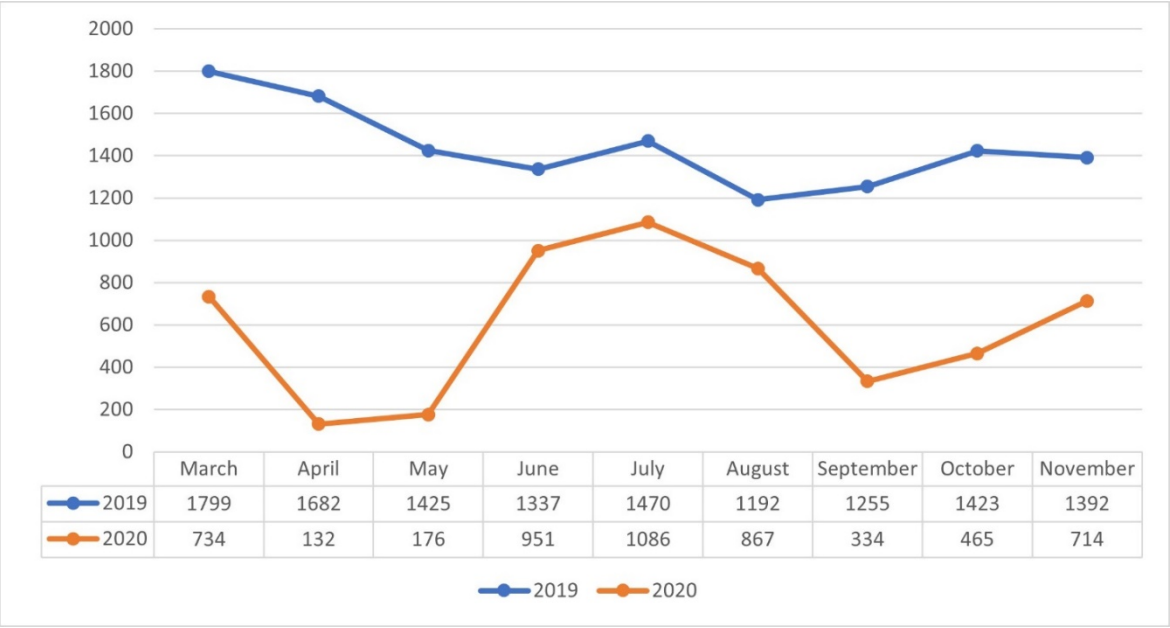
This study was planned in the only pathology laboratory in the city that belongs to the 500-bed capacity state hospital, which is one of the city's two public hospitals with a population of 300,000. After the ethical approval was obtained, the study was performed in the department of pathology. Data on monthly numbers of the histological, cytological samples, immunohistochemistry and histochemistry stainings between March-November 2020 and March-November 2019 were obtained from the laboratory information management system. The monthly sample amount of 2019 and 2020 years was compared with numerical data of the same month. The following samples were selected: colon biopsies, gastric biopsies, gynaecologic biopsy/curettage, breast biopsies, lung biopsies, skin punch biopsies, skin excisional biopsies, prostate and bladder biopsies, excision of soft tissue masses, appendectomy and cholecystectomy specimens, cervical cytology, and non-gynaecologic cytology. This selection was based on the

frequency with which samples were received in the laboratory. All immunohistochemical and histochemical stains were selected. All data were collected with Microsoft Excel (Redmond, WA, USA).

RESULTS

It was calculated that the total number of samples coming to our laboratory in March, April, and May 2020 decreased by 59.1%, 92.1%, and 87.6% compared to the same period in 2019, respectively. Overall specimen volume dropped rapidly in March 2020 and bottomed out in April at 7.8% of our volume in 2019 (Figure 1).

Figure 1. Comparison of the monthly total number of samples reaching the laboratory in the 9-month time period of 2019 and 2020 years.



	March	April	May	June	July	August	September	October	November
2019	1799	1682	1425	1337	1470	1192	1255	1423	1392
2020	734	132	176	951	1086	867	334	465	714

After the controlled social life process that started at the end of May, the decreases in June, July, and August 2020 were measured as 28.8%, 26.1%, and 27.2%. September, October, and November 2020 data showed that the decrease in the number of monthly samples were 73.3%, 67.3% and 48.7%, respectively.

No lung biopsy was received in the first three months of the pandemic. The second and third sections with the highest decrease were cervical cytology and non-gynaecologic cytology samples (90.7%, 87.6%, respectively). The total numbers of specimen volume per section in the 9-month time period of 2019 and 2020 years was given in Table 1.

Table 1. The total numbers of specimen volume per section in the 9-month time period of 2019 and 2020 years

		March	April	May	June	July	August	September	October	November
Colon biopsy	2019	49	19	48	25	31	34	39	15	18
	2020	14	1	3	15	18	17	7	5	22
Gastric biopsy	2019	159	150	168	103	131	108	126	134	145
	2020	81	3	15	96	71	69	19	39	70
Gynaecologic biopsy/curettage	2019	222	173	133	116	158	128	109	152	187
	2020	56	17	25	109	185	85	47	46	107
Breast biopsy	2019	6	2	4	4	4	4	4	8	1
	2020	11	2	1	7	4	2	1	1	3
Lung biopsy	2019	5	10	3	5	3	2	2	3	5
	2020	0	0	0	3	0	0	0	0	0
Skin punch biopsy	2019	15	9	12	14	14	13	9	16	13
	2020	6	3	0	9	12	10	6	9	13
Skin excisional biopsy	2019	73	67	63	57	108	81	45	66	71
	2020	30	0	4	37	72	42	14	32	30
Prostate and bladder biopsy	2019	19	30	14	17	12	11	15	10	18
	2020	15	3	2	15	17	9	5	2	3
Soft tissue mass excision	2019	87	114	70	78	92	40	59	70	88
	2020	46	2	0	49	45	42	10	11	28
Appendectomy	2019	24	22	27	28	17	21	33	26	15
	2020	21	21	17	18	24	12	17	20	25
Cholecystectomy	2019	50	42	39	29	50	27	48	47	55
	2020	54	1	7	46	50	28	9	21	34
Cervical cytology	2019	466	383	227	363	361	229	231	313	310

	2020	89	5	6	138	171	130	63	86	128
Non-gynaecologic cytology	2019	93	88	46	46	13	47	49	58	22
	2020	20	5	3	14	30	8	0	2	4
Immunohistochemistry	2019	63	121	117	112	83	64	90	97	54
	2020	53	9	23	110	98	109	39	40	48
Histochemistry	2019	258	237	248	168	161	168	181	203	181
	2020	109	8	25	138	146	160	31	75	111

For each section except breast biopsies, a decrease was noted in the first three months of the pandemic. The most decreases in the total number of samples were seen in colon biopsy, skin excisional biopsy, soft tissue excision, gynaecologic biopsy/curettage, and gastric biopsy. For breast biopsies, an increase of 16.6% and 8.3% were observed compared to the same period of 2019, in the first and second three months of the pandemic. And followed by a 61.5% decrease was noted in the third three months of the pandemic.

Considering the total 9-month numerical data between March and November 2020, the most decrease in the number of samples was again in lung biopsy, non-gynaecologic cytology and cervical cytology samples (92.1%, 81.3% and 71.6%, respectively). The least decrease in the total number of samples between March and November 2020 was seen in breast biopsy, appendectomy, and cholecystectomy specimens (13.5%,17.8% and 35.4%, respectively).

DISCUSSION

After the international spread of the COVID-19, Ministry of Health established a Scientific Board in Turkey and taken measures in the country simultaneously with the recommendations of WHO (2). One of these measures is to determine pandemic hospitals in each province. Possible and confirmed cases were isolated and treated at pandemic hospitals. Our hospital has been assessed as a pandemic hospital in the city. Many clinical services within the hospital have temporarily disappeared as patient rooms have been converted to COVID-19 patients' rooms. Because of this and the postponement of non-emergency surgeries, the number of surgeries performed has dropped significantly. The comparison between the 2020 and 2019 numbers of samples highlights the challenges faced during the COVID-19 pandemic. In this report, there was an absolute decrease in the number of samples coming to the pathology laboratory.

The workload reduction is most evident in April. Considering the dramatic decrease in the number of colon biopsy, cervical cytology, lung biopsy and prostate biopsies, it can be said that the cancer screening related samples were seriously affected by the measures taken. A similar reduction in cervical cytology and biopsy specimens was also observed in articles from Belgian and Italy (3–5). Another reason for the decrease in these numbers is thought to be people who were in isolation at home, either voluntary or mandatory. It is thought that the decrease in hospital admissions and the decrease in the number of the cancer screening related samples cause a delay in the diagnosis of possible malignancies. Therefore, it would not be wrong to predict that there will be a relative increase in the number of malignancy diagnoses in the post-pandemic period. There are articles discussing the changes that need to be made for the organization, safety, and patient management in interventional oncology (6, 7).

Conversely, a study from the USA reported that one of the services least affected by the pandemic was

tumour profiling services (8). The reason for this relative persistence has been explained as oncology was often looking for nonsurgical therapies to offer patients at a time when minimal surgeries were taking place, after the initial diagnosis and request for molecular testing.

Our pathology laboratory also saw a decline in histochemistry and immunohistochemistry. The decrease of the special stains was expected due to the decrease in the total number of cases. Immunohistochemistry has increased by 22.3% only in July.

The surgical operation least affected by the pandemic was appendectomy in our hospital. Considering that only emergency surgeries were performed, this result was not surprising. Lung biopsy was the most affected procedure by the pandemic. It was observed that lung biopsy was taken only in June during the 9-month period from March to November 2020. As pulmonologists were most concerned with COVID-19 patients during this period and the bronchoscopy procedure was highly contagious for COVID-19 infection, this data was not unexpected (9). When the controlled social life process started at the end of May 2020, the overall number of samples arriving in the pathology laboratory was started to increase, after the first three months of the pandemic.

It is anticipated that this data analysis will help predict future effects on specimen volume and workload. The analysis of a single-centre study should be interpreted with caution and incorporated into and compared to larger datasets. Future studies will be needed to determine the changes in the diagnostic profile caused by the reduction in the number of non-urgent cases during the pandemic period. And these analyses can help to make a preparedness plan to reduce the impact of such crises on pathology laboratories.

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Conflict of interests

None.

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