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Management of Emergency and Elective Oncological Surgeries at a Tertiary General Surgery Clinic in COVID-19 Pandemic

COVID-19 Pandemisinde 3. Basamak Genel Cerrahi Kliniğinde Acil ve Elektif Onkolojik Cerrahilerin Yönetimi

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Abstract

Objective: The Coronavirus disease-2019 (COVID-19) pandemic has made it difficult to manage both all healthcare systems and surgical clinics. General surgery clinics have been restructured. In this study, we present our results regarding the management of elective cancer surgery and emergency general surgery patients in the general surgery clinic in the early phase of the pandemic.

Methods: All patients (covid period) followed in our clinic between March 11, 2020 and June 1, 2020 were included in the study. Emergency cases and elective cancer cases were followed up in the same period last year (non-covid period) in the comparison group.

Results: A total of 173 patients were followed up in our pandemic and non-pandemic hospitals during the pandemic period. 44.5% were oncology, 55.5% were emergency cases. The average length of stay in the hospital was significantly shorter for all patients compared to last year. During the pandemic period, there was no significant difference in terms of complications and mortality development compared to the previous year. In the COVID-19 period, the most common reason for emergency operations was acute appendicitis cases, and the most common cause of oncological surgery was breast cancer. During the pandemic period, there was a significant decrease in the number of emergency trauma cases and oncological thyroid cancer surgeries.

Conclusion: During pandemic periods, "pandemic hospital" and "non-pandemic hospital" should be established and health personnel working order should be adjusted accordingly. At our institution, this structure was been created quickly and a successful organization has been established when the early results of the pandemic are examined.

Keywords: COVID-19, general surgery, emergency surgery, oncological surgery, pandemic

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19) pandemisi, hem tüm sağlık sistemlerinin hem de cerrahi kliniklerininin yönetimini zorlaştırmıştır. Genel cerrahi klinikleri yeniden yapılandırılmıştır. Bu çalışmada kurumumuzda, pandeminin erken döneminde genel cerrahi kliniğindeki elektif kanser cerrahisi ve acil genel cerrahi hastalarının yönetimiyle ilgili sonuçlarımızı sunmaktayız.

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Öz

Yöntem: Kliniğimizde 11 Mart 2020 ile 1 Haziran 2020 tarihleri arasında takip edilen tüm hastalar (covid dönemi) çalışmaya alındı. Karşılaştırma grubunda geçen yılın aynı döneminde (non-covid dönem) takip edilen acil olgular ve elektif kanser olguları yer aldı.

Bulgular: Pandemi döneminde pandemi ve non-pandemi hastanelerimizde toplam 173 hasta takip edildi. %44,5'si onkoloji, %55,5'i acil olgulardı. Geçen yıla göre tüm hastaların ortalama hastanede yatış süresi anlamlı olarak daha kısaydı. Pandemi döneminde, geçen yıla göre komplikasyon ve mortalite gelişimi açısından anlamlı bir fark yoktu. COVID-19 döneminde acil yapılan ameliyatların en sık nedeni akut apandisit olguları, onkolojik ameliyatların en sık nedeniyse meme kanseriydi. Pandemi döneminde özellikle acil travma vakalarının ve onkolojik tiroid kanseri ameliyatlarının sayısında önemli bir düşüş mevcuttu.

Sonuç: Pandemi dönemlerinde "pandemi hastanesi" ve "non-pandemi hastanesi" kurulmalı ve sağlık personeli çalışma düzeni buna göre ayarlanmalıdır. Kurumumuzda bu yapılanmaya hızlıca gidilmiş ve pandeminin erken dönem sonuçları incelendiğinde başarılı bir organizasyon kurulmuştur.

Anahtar Kelimeler: COVID-19, genel cerrahi, acil cerrahi, onkolojik cerrahi, pandemi

Introduction

On January 7, 2020, a new coronavirus was detected in the blood, urine and fecal samples of a patient in China and later, this virus was named as 2019-novel coronavirus by the World Health Organization (WHO). The WHO declared the 2019-20 coronavirus outbreak as a pandemic on March 11, 2020[1]. The first reported cases in Turkey were also confirmed on the date of March 11. Healthcare systems in many countries were caught unprepared for the Coronavirus disease-2019 (COVID-19) pandemic and national coordinated respond and rapid stringent precautions were developed by governments and health system administrators. Healthcare organizations have been insufficient to treat the patients as there is no known cure for the disease. Thus, the virus has rapidly spread among patients, healthcare professionals and healthcare workers globally. The reasons behind the inefficiency to deal with the outbreak can be listed as inadequate intensive care bed capacity, small number of intubation devices, lack of proper equipment in operating rooms, healthcare professionals with no experience in this pandemic condition, low number of hospital bed capacity, lack of healthcare workers, small numbers of protective equipment, socioeconomic and demographic factors.

Various institutional, national, and international algorithms and guidelines have been created by reviewing scientific research articles published with a limited number of patients with low accuracy rates. Almost all guidelines provide short-term measures and are only effective at that time. The current pandemic has forced governments to their limits. Many healthcare workers have been infected[2].

From the perspective of general surgery clinics, restructuring of the teams and minimizing the number of staff are important policies to reduce the number of teams providing trauma/emergency surgery services at the same time[3].

In this study, we presented our results regarding the management of elective cancer surgery and emergency general surgery patients in the general surgery clinic between March 11, 2020, when the situation was officially declared as pandemic, and June 1, 2020, starting date of "controlled normalization" in our country. Our successful general surgery organization, which we divide into "non-pandemic hospital" and "pandemic hospital" in the management of pandemic processes.

Materials and Methods

Patient Selection

Patients who were admitted and followed up in the general surgery clinic of our hospital between March 11, 2020, when the pandemic was declared, and June 1, 2020, when the controlled normalization process was initiated in our country were included. In the comparison group, there were emergency and elective cancer cases followed up by our clinic during the same period last year (non-covid period). Emergency surgery patients in a pandemic hospital and elective oncology patients in a non-pandemic hospital were included in the study. Elective cases in 2019 were excluded, as elective surgeries such as cholecystectomy, bariatric surgery, hernia, and hemorrhoidal disease were delayed at this early stage of the pandemic.

Patients' age, gender, reasons for surgery, procedures performed, average length of hospital stay, complications, mortality rates, whether COVID-19 symptom developed or not, the results of patients who underwent the COVID-19 diagnostic test and the presence of pneumonia were recorded. The study was approved by both the Ministry of Health and the Ethics Committee of our own hospital, and was conducted compliant with the Helsinki Declaration. An informed consent form was obtained from all patients.

Organization

During the COVID-19 pandemic, elective general surgical operations were canceled. General surgery services have been reconfigured to the services of all other branches to provide more space for critically-ill patients in anticipation of greater surges of COVID-19 cases. Beds of general surgery services were reserved for COVID-19 patients. Although there was a significant decrease in patients' admission to emergency services for reasons other than COVID-19, the need for emergency general surgery consultation continued. Certain services isolated from clinics where COVID-19-positive patients were hospitalized were divided into general surgery and other branches of emergency surgery. Since intensive care units (ICU) were insufficient in our hospital, the general surgery's ICU with seven beds was not transferred to the pandemic team and was managed by the general surgery team. COVID-positive patients were not admitted to this ICU. In this way, emergency surgery patients who needed intensive care were quickly operated. The main building where the patients hospitalized from the emergency department are followed up was named "pandemic hospital".

Apart from the management of the emergency general surgery unit, the most important issue was the patients who underwent elective cancer surgery. COVID-19 patients were not hospitalized in the additional service building, which is located within our hospital but located in a different district, which will only serve as an oncology hospital during the pandemic process. The emergency service here was closed. In this building, work schedules were arranged so that the service nurse, operating room nurse, technicians and other staff who will provide health services were worked only in this hospital. Since the equipment related to computerized tomography (CT), ultrasound (USG) and laboratory processes were included in the hospital before the pandemic, the organization was implemented quickly and this hospital was named "non-pandemic hospital". The non-pandemic hospital was divided into elective cancer surgery and patients who would receive oncology treatment. Preoperative and postoperative follow-up of all patients scheduled for elective cancer surgery was performed within the non-pandemic hospital. The multidisciplinary council was done online using digital technology. The decision-making process was accelerated as suggested in the guidelines by the surgeon responsible for the final decision[4].

Due to the presence of surgeons working in pandemic clinics, the development of COVID-19 positivity in surgeons, and the isolation of the teams in contact with these physicians, the current study program was dynamically planned and weekly programs were organized.

Considering that the pandemic will last longer than expected, the necessary organization was provided in our institution, unlike the guides that produce short-term solutions. After the diagnosis of oncology patients, their operations continued without delay. Because another important issue for patients is the impact of the COVID-19 pandemic, as well as the quality of life in the postponement period of cancer surgery. Studies have shown that the quality of life of these patients is also negatively affected[5].

Protective Measures

Routine chest CT scan was performed before all elective surgeries performed in the non-pandemic hospital. Oro-nasopharyngeal swabs were planned for patients with suspicious imaging. In the literature, it is recommended that patients who require urgent surgery should be considered suspected cases and need to be examined with abdominal and chest CT[6]. Routine chest CT was performed in patients who will undergo emergency surgery in the pandemic hospital. Oro-nasopharyngeal swabs were obtained from all patients with symptoms before or after surgery. No swabs were taken from patients who had no involvement in chest CT and no suspicious symptoms were found.

Enhanced Recovery After Surgery protocols, which accelerate hospital discharge and reduce contamination of body fluids, were applied diligently. The Turkish surgical association recommends waiting at least one to two hours between cases to decontaminate the operating room. They also recommend all staff to take a shower before continuing their duties.

Statistical Analysis

SPSS Statistics software, version 25.0, was used for data analysis. Continuous variables with a normal distribution are presented as mean and standard deviation. Non-normal variables are presented as median and interquartile range. Normally distributed and continuous variables were compared with the chi-square test. Non-normal distributed variables were compared with the Mann-Whitney U test. Probability value $p<0.05$ were considered statistically significant.

Results

A total of 173 patients were followed up in the pandemic and non-pandemic hospital. Seventy seven (44.5%) of these were oncology cases, 96 (55.5%) were emergency cases. In

the comparison group; in the same period of the previous year, 500 patients [307 (61.4%) emergency and 193 oncology (38.6%) patients] were detected (Table 1). The average hospital stay during the COVID period was 5.3 (±9.57) days for oncology patients and 6.6 (±11.23) days for emergency cases. When the length of hospitalization was compared with the non-covid period, there was no statistical difference between the subgroups. On the other hand, the total length of hospital stay of emergency and oncology patients was shortened during the COVID period, and the difference was significant (p=0.027) (Table 2). Complications for oncology patients were detected in 7 patients (9.1%) in the COVID period and 34 patients (17.6%) in the non-covid period. Complications for emergency patients were found in 18 (18.7%) patients during the covid period and 50 (16.3%) patients during the non-covid period. There were no significant differences in the complications between subgroups and total patients (Table 3). Pneumonia was seen in two patients (1.2%) in the COVID period and 19 patients (3.8%) in the non-covid period. There was no statistical difference in pneumonia development during (p=0.085). Mortality rates were found to increase slightly during the COVID period in both oncological and emergency cases, but this increase was not statistically significant (Table 3). Mortality was seen in patients who underwent total pancreatectomy due to pancreatic cancer and right hepatectomy for liver metastatic colon cancer in non-covid hospital. The cause of mortality in both patients was complications secondary to surgical procedures.

The most common diagnoses of the emergency cases during the Ovid period were 29 acute appendicitis (30.2%), 15 acute cholecystitis (15.6%), 8 ileus (8.3%), 7 incarcerated hernias (7.3%). The three most common causes were the same as those for the non-covid period (Table 4). The numerical difference in total emergency cases between COVID and non-covid periods is thought to be the curfew imposed during the pandemic period. Interventional radiology (IR) procedures can be applied safely by taking necessary protections[3]. Collaboration with the IR unit increased during the COVID period, and the rate of insertion of drainage catheters with USG in patients with high comorbidity increased. Catheters were performed in 3 (100%) of the 3 patients hospitalized during the COVID period due to liver abscess, and the patients were discharged without any problem. In 1 of 3 patients hospitalized due to an abdominal abscess, an USG-guided catheter was inserted instead of surgery because of

Table 1. General distribution of the patients

	Covid period (11.03.2020-01.06.2020)	**Non-covid period (11.03.2019-01.06.2020)**	**Covid/non-covid period rate of patients**
Oncology	77 patients (44.5%)	193 patients (38.6%)	77/193 (39.9%)
Emergency	96 patients (55.5%)	307 patients (61.4%)	96/307 (31.2%)
Total	173	500	

Table 2. Average length of hospital stay (and standard deviation). There is a significant decrease in the total length of stay

	Average length of hospital stay		
Covid period (11.03.2020-01.06.2020)	Oncology	Emergency	Total
	5.3 days (±9.57)	6.6 days (±11.23)	6.1 days (±10.52)
Non-covid period (11.03.2019-01.06.2020)	Oncology	Emergency	Total
	5.3 days (±6.29)	7.4 days (±10.08)	6.6 days (±8.86)
p value	p=0.076	p=0.167	p=0.027

Table 3. Complication development and mortality rates

	Complication development		**Mortality development**	
Covid period (11.03.2020-01.06.2020)	Oncology	Emergency	Oncology	Emergency
	7 patients (9.1%)	18 patients (18.7%)	2 patients (2.6%)	9 patients (9.4%)
Non-covid period (11.03.2019-01.06.2020)	Oncology	Emergency	Oncology	Emergency
	34 patients (17.6%)	50 patients (16.3%)	0 (%0)	19 patients (6.2%)
p value	p=0.078	p=0.574	p=0.081	p=0.284

its high comorbidity and the patient was discharged without any problem.

Cholecystostomy catheter was placed in 4 patients (26.6%) with high comorbidity among 15 patients followed up for acute cholecystitis and were discharged with oral antibiotherapy. Drainage local anesthesia was administered in the emergency department for perianal abscesses and outpatient follow-up with oral antibiotherapy was preferred. During this period, only 2 patients were hospitalized due to the recurrent drainage for perianal abscess. Ten of the emergency cases (10.4%) were operated laparoscopically.

The most common 4 cancers in elective oncology patients operating in a non-covid hospital were breast cancer (31 patients, 40.2%), colorectal cancer (11 patients, 14.2%), periampullary region tumor (8 patients, 10.3%), stomach cancer (4 patients, 5.2%). In the non-covid period, breast and colorectal cancers (CRC) were in the first two places, and unlike the COVID period, the third most common cancer was thyroid cancer (Table 5). Despite the decline in outpatient clinic patients, the decrease in the number of newly diagnosed patients and the interruption of routine screening programs; breast cancer was the most common cancer type that applied to outpatient clinics. The proportional increase was also statistically significant (p=0.032). The prevalence of neoadjuvant patients among breast cancers in the COVID period was 32.3%. Last year, this rate was only 15.4%. The patients whose neoadjuvant decision was taken before the pandemic and whose treatment was completed were treated without interruption in a non-covid hospital. During the pandemic period in the non-covid hospital, only 1 patient was excised for diagnostic purposes due to a mass with suspected malignancy in the breast. In the same period last year, 13 diagnostic operations were performed due to microcalcification or a high suspicious mass.

Only two patients (2.6%) were operated during the COVID period due to thyroid cancer. Last year, 21 patients (10.9%) underwent surgery for thyroid cancer. This decrease was statistically significant (p=0.028). The reasons for this decrease were the significant decrease in the number of applications to the outpatient clinic due to neck pain, the postponement of thyroid cancer surgery for a while in accordance with the guidelines, the decrease in the number of neck USGs and the decrease in the number of thyroid biopsies. During the COVID period, thyroid biopsies continued in the non-covid hospital. While diagnostic procedures for masses in the inguinal region, axilla or abdomen were performed in only one patient (1.2%) in the non-covid hospital during the pandemic period, 13 patients (6.7%) were excised from various parts of the body in the same period

Table 4. The five most common emergencies and trauma patients

The most common causes in etiology	Covid period	The most common causes in etiology	Non-covid period	p value
1. Acute appendicitis	29 patients (30.2%)	1. Acute appendicitis	89 patients (29%)	p=0.819
2. Acute cholecystitis	15 patients (15.6%)	2. Acute cholecystitis	32 patients (10.4%)	p=0.166
3. Ileus	8 patients (8.3%)	3. Ileus	31 patients (10.1%)	p=0.610
4. Incarcerated hernia*	7 patients (7.3%)	5.Incarcerated hernia	20 patients (6.5%)	p=0.790
5. Abdominal pain**	6 patients (6.2%)	4. Abdominal pain	21 patients (6.8%)	p=0.840
High energy trauma	3 patients (3.1%)	High energy trauma	17 patients (5.5%)	p=0.430

*Incarcerated hernias are the 5th most common case in the noncovid period.

**Abdominal pain is the 4th most common reason for hospitalization in the noncovid period.

Table 5. The most common 4 elective cancer cases

Covid period The most common causes in etiology		Non-covid period The most common causes in etiology		p value
1. Breast cancer	31 patients, 40.2%	1. Breast cancer	52 patients, 27%	p=0.032
2. Colorectal cancer	11 patients, 14.2%	2. Colorectal cancer	35 patients, 18.1%	p=0.448
3. Periampullary cancer	8 patients, 10.3%	3. Thyroid cancer	21 patients, 10.8%	
4. Gastric cancer	4 patients, 5.2%	4. Periampullary cancer	17 patients, 8.8%	

Although the total number of patients operated on for breast cancer decreased compared to last year, its ratio to the total number of patients increased during the pandemic period. The difference between the rates (40.2% and 27%) is statistically significant.

last year. Diagnostic excision during the pandemic period was applied to a female patient with suspected axillary lymph nodes upon consultation of the hematology unit and the patient was diagnosed with lymphoma.

Finally, during the pandemic period, one patient who was treated due to COVID pneumonia in the anesthesia ICU operated due to incarcerated umbilical hernia and the postoperative 30-day mortality was not seen in this patient.

Among 173 patients followed up during the COVID period, 23 patients were subjected to the real-time reverse transcription polymerase chain reaction (RT-PCR) test due to suspicious symptoms (the most common symptoms were fever and cough). One patient who was hospitalized in the emergency department due to abdominal pain of unknown origin was found COVID positive and transferred to the pandemic clinic for follow-up. The patient, who was followed up without surgery, was discharged upon regression of abdominal pain. No positivity was found among elective oncology cases operated in non-covid hospital. None of the 173 patients had suspicious chest CT scan findings in the preoperative period in terms of COVID-19.

Four (10.5%) of 38 surgeons working in our clinic developed positivity and 9 (23.6%) were quarantined. Thirty-six of them (94.7%) worked in various positions in pandemic clinics.

Discussion

The pandemic of COVID-19 was also affected the departments of surgery worldwide. Patriti et al.[7] reported 80% of general surgery clinics in Italy changed their practice and started working in other departments. COVID-19 positive patients were treated in 80.3% of the hospitals in this study. COVID-19 positivity developed in at least one surgeon in 28.2% of the hospitals in the study, and at least one team member was quarantined in 33.8% of the hospitals. While 73.9% of surgeons operated only emergency surgeries, 21.7% continued to perform a limited number of oncological elective surgeries. The number of emergency interventions significantly dropped significantly after the government put restrictions on mobility. In a case series of 138 patients treated in Wuhan hospital, 40 patients (29% of cases) were the hospital staff. Thirty-one (77.5%) of the affected staff were working in the general service, 7 (17.5%) in the emergency room, and 2 (5%) in the ICU[2]. The curfew and other prevention indicated in our country have also reduced the number of emergency admissions and emergency surgeries. Compared to the same period of the previous year, admissions to the general surgery clinic decreased by 68.8%. Positive cases occurring among team members of our clinic are common.

Evaluation of the hospital's resources before the surgery and directing patients to refer to a hospital without COVID-19 in the region if the resources are not insufficient is recommended by the Turkish Society of Colon and Rectal Diseases[8]. We could implement this algorithm at our own center. Therefore no patient who accepted the surgery were referred to another hospital. RT-PCR of viral nucleic acid is considered the standard reference test to confirm the diagnosis in the suspicion of COVID-19[9]. Gok et al.[3] suggested adding a chest CT scan to routine diagnostic tools to detect COVID-19 pneumonia even if the patient is asymptomatic. The exact results of the PCR test take up 4 to 120 h and this is not suitable for patients with acute abdomen. Recent studies have shown the importance of chest CT examination in COVID-19 patients with false negative PCR results and reported CT sensitivity as 98%[10]. However, it should be kept in mind that 56% of the patients had a normal chest CT scan in the early period of the disease[11]. Routine chest CT scans were performed on all elective and emergency patients at our hospital.

Delays in diagnosis and treatment increase complications in trauma patients[12]. There is no evidence to suggest that trauma patients are at higher risk than the general population, and therefore, asymptomatic patients should be screened according to institutional and national policy[13]. Although the rate and number of the trauma patients who followed up in our clinic was decreased; it was not statistically significant (Table 4). For treating acute appendicitis; non-surgical follow-up, intravenous antibiotherapy, and then transition to oral antibiotherapy are recommended for uncomplicated appropriate acute appendicitis[3]. Although this treatment is performed for selected patients, there are studies stating that non-surgical treatment is associated with frequent relapses[14]. Intravenous antibiotherapy requires hospitalization therefore it creates a risk for both filling the limited bed capacity and increasing the risk of transmission of the disease secondary to hospitalization. However, there is no consensus among surgeons on the best management approach for complicated acute appendicitis[15]. Surgical treatment is recommended for patients with complicated appendicitis or COVID-19-negative patients with uncomplicated appendicitis[3]. All acute appendicitis (complicated/uncomplicated) were operated with a rapid planning in our clinic due to elective oncology patients

were held in another building and the bed capacity was sufficient. Acute cholecystitis is the second most common cause of hospitalization in our emergency department admissions, and its treatment includes antimicrobial agents, percutaneous cholecystostomy (PC) and cholecystectomy options. If antibiotherapy fails, PC can be used as an alternative to cholecystectomy[16]. We preferred to treat grade-1 and grade-2 cases that were defined according to the Tokyo 2018 guidelines and applied to our outpatient clinics at the time of COVID-19 pandemic with oral antibiotherapy[17]. Emergency laparoscopic cholecystectomy was performed in 4 patients who did not respond to antibiotherapy with 2 American Society of Anesthesiologists (ASA) score according to the classification of the ASA among 5 patients with grade-2 cholecystitis. A PC catheter was inserted in another 1 patient with an ASA score of 3. PC catheter was performed on 3 patients with grade-3 cholecystitis that did not respond to antibiotherapy.

A area most frequently affected by the COVID-19 pandemic is elective cancer surgery applications. Many surgeries have been postponed or canceled. It is critical for governments to make plans to safely perform cancer surgeries. For this reason, it is recommended that time-critical elective operations such as cancer surgeries should be performed in designated units where COVID-19 patients are not treated[18]. From the first day of the pandemic, we quickly organized our supplementary service building and moved all elective cancer surgeries, oncology outpatient clinics and chemoradiotherapy centers, surgical and clinical oncology services here. COVID-19 positive patients were not followed up and treated in this hospital. All the staff of this hospital worked only within this hospital. This distinction between general surgeons could not be fully achieved due to positive cases and quarantine among surgeons, active emergency surgery services in the pandemic hospital, and physicians being assigned to pandemic units. Flexible working conditions were created by arranging working programs with isolation at home for 72 h after 24 h of work.

Breast cancer was found as the most frequently operated cancer as in the previous period. Almost all guidelines show that patients who have recently completed neoadjuvant chemotherapy should be given priority for surgical treatment. Also they recommend that breast cancer surgeries other than benign diseases, reconstruction procedures and excisional biopsies in masses such as Brady 3 should continue in hospitals where possible by ensuring patient safety[19]. The Royal College of Surgeons has published guidelines for the resumption of elective surgery and recommended performing surgical operations by taking necessary precautions in "green areas" where elective surgical patients can be managed[20]. In our clinic, 31 patients were operated for breast cancer in a non COVID-19 hospital in accordance with all these recommendations. Ten (32.2) of these patients received neoadjuvant therapy. Only one patient underwent excisional biopsy due to high suspicion of malignancy. In the same period of last year, 65 breast surgeries were performed, 52 (80%) for malignancy and 13 (20%) for excisional biopsy. The number of other diagnostic excisional biopsies also decreased significantly compared to the previous year.

The Surgical Oncology Association recommends the evaluation of neoadjuvant option in appropriate rectal cancer cases[21]. However, the patients receiving neoadjuvant treatment will need to visit hospital regularly, which will result in an increased risk of COVID-19 transmission and more frequent use of hospital resources. Therefore, the balance between surgical risk and neoadjuvant treatment processes that cause frequent hospital admissions in CRC should be carefully considered[8]. Although colonoscopy performed for screening was decreased colorectal carcinomas were still the most common surgeries among the cancer surgeries performed in our clinic during the COVID-19 pandemic period as before. 14.2% of all elective cancer operations were due to CRC. Due to the data covering the early period of the pandemic, our perforated and obstructed CRC cases were few in this period. Only one patient was operated urgently due to CRC causing obstruction in the pandemic hospital during this period.

Diagnostic examination of thyroid nodules, thyroid surgery for malignant thyroid nodules, and radioiodine therapy for differentiated thyroid cancers can be safely delayed during the COVID-19 pandemic, except in some selected cases[22]. In our clinic, thyroid cancer surgery was the proportionally and numerically most decreased surgery compared with the previous year and this difference was statistically significant. Guidelines are needed for the pancreatic cancer during the pandemic period due to having limited knowledge. Pancreatic cancer has high morbidity and significant mortality rates, and its treatment includes severe surgical procedures and chemotherapy periods with high side effects. In the COVID-19 period, some concerns are expressed in terms of resource consumption for a disease with such a poor prognosis[23]. However, surgical resection followed by adjuvant chemotherapy is the only way for long-term

survival in resectable pancreatic cancer[24]. This one chance is critical for patients. For this reason, 6 resectable pancreatic head and 1 distal pancreatic cancer were operated in our non-covid hospital. The most common complications in COVID-19-positive patients who were operated regardless of the type of surgery were pulmonary complications and unexpected fever[7]. The rate of pneumonia in our patients operated during the pandemic period was 1.2%. The PCR tests of these patients were negative and no appearance compatible with COVID-19 pneumonia was detected on chest CT. Our study includes the results of the early phase of the COVID-19 pandemic; therefore, it is possible that various changes may occur in some results as the pandemic period progresses.

Study Limitations

The limitations of our study include its retrospective design, limited number of patients, and being in a single center.

Conclusion

In the conclusion, the COVID-19 pandemic has deeply shaken health systems worldwide and caught many countries unprepared. Hundreds of articles and guidelines on this viral infection were published and vaccine studies and other protective measures were put at the top of the lists. Most of the beds in hospitals, financial resources and healthcare workforce were reserved for pandemic clinics. Although the number of patients who underwent emergency surgeries and took elective oncology treatments is decreasing, these patients should not be victimized. Order to achieve all these simultaneously, hospitals should reorganize themselves, provide good protective equipment to all staff and use their workforce effectively[3]. One of the most important reasons for the decrease in the number of emergency and oncological patients is that patients tend to prefer private hospitals that provide healthcare services in a relatively isolated manner, rather than tertiary public hospitals where intensive COVID-19 treatment is applied. There are many implications for the crisis desks in the public health organizations and health managers in hospitals that can be learned from this pandemic. We think that tertiary healthcare services that called "non-pandemic hospital" and have sufficient capacity in terms of operating room, service, ICU and own staff who are not working in pandemic clinics and should be determined for this and the next potential pandemics in city centers. It is critical for managing urgent and oncological surgery patients in pandemics by determining "non-pandemic" and "pandemic" hospitals in advance and informing the people living in that region on this issue. During the pandemic, maximum attention should be paid to treatment guidelines, and surgical habits and guidelines should be changed dynamically if necessary.

Ethics

Ethics Committee Approval: This study was compliant with the Declaration of Helsinki and approved by University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital (decision no: 2020/10-17, date: 12.08.2020).

Informed Consent: An informed consent form was obtained from all patients.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: A.D., K.T., G.K., S.D.A., B.E., H.E., İ.S., M.E., Concept: A.D., G.K., İ.S., Design: S.D.A., İ.S., Data Collection or Processing: A.D., B.E., Analysis or Interpretation: K.T., M.E., Literature Search: A.D., K.T., G.K., S.D.A., B.E., H.E., İ.S., M.E., Writing: A.D., G.K., H.E.

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