Organizacija rada u operacijskim dvoranama u COVID bolnici – KB Dubrava

Operating rooms management in Clinical Hospital Dubrava – COVID hospital

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Sažetak

Zbog specifične izgradnje bolnice i njezina smještaja, hrvatska je vlada odlučila da će Klinička bolnica Dubrava u potpunosti biti pretvorena u ustanovu za liječenje pacijenata oboljelih od bolesti COVID-19 za sjevernu Hrvatsku. U ožujku 2020. godine transformacija je započela stavljajući brojne izazove pred zaposlenike, posebno medicinske sestre. Transformacija je započela prilagodbom prostora i razvojem mnogih protokola, smjernica i radnih uputa vezanih za kretanje pacijenata i bolničkog osoblja unutar ustanove, pravilnu upotrebu osobne zaštitne opreme i rješavanje različitih situacija povezanih s COVID-19 bolesti. Operacijske medicinske sestre imale su velik doprinos u ovoj borbi radom u promijenjenim uvjetima, dislociranim operacijskim dvoranama, edukacijom medicinskog i nemedicinskog bolničkog osoblja o ispravnoj upotrebi osnovnih zaštitnih sredstava (OZS) te upravljanjem i raspolaganjem s OZS-om. Na valovima pandemije COVID-19 izazovno je brzo se prilagođavati učestalim promjenama u smjernicama i pratiti potrebe pacijenata te se istovremeno pripremati za mogući treći val pandemije i slične buduće scenarije.

Ključne riječi: pandemija, COVID-19, organizacija, operacijske medicinske sestre

Kratak naslov: Operacijska dvorana u COVID-19 uvjetima

Abstract

Due to the specific construction of the hospital and its location, the Croatian government decided that Clinical Hospital Dubrava will be fully converted into an institution for the treatment of COVID-19 positive patients for Northern Croatia. In March 2020 the transformation began bringing many challenges in front of employees, especially nurses. The transformation started with the conversion of space and the development of many protocols, guidelines, and work instructions related to the movement of patients and hospital staff within the institution, proper use of PPE, and dealing with various situations related to COVID-19. Operating nurses largely contributed to this fight by working in changed conditions, in dislocated operating rooms, by educating medical and non-medical hospital staff to correct use of PPE and management and disposition of PPE. In the time of the COVID-19 pandemic, it is challenging to adapt quickly to frequent changes in guidelines and monitor patient needs while preparing for a possible third pandemic wave and similar future scenarios.

Keywords: pandemic, COVID-19, organization, operating room nurses

Running head: Operating room in COVID-19 conditions

Received February 19th 2021; Accepted April 1th 2021;

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Uvod

Svjetska zdravstvena organizacija 11. ožujka 2020. godine COVID-19 proglasila je globalnom pandemijom. Suočavanje s pandemijom izazvanom bolesti COVID-19 uvelike je utjecalo je na živote i zdravlje milijuna ljudi diljem svijeta.

U ožujku 2020. godine zbog pandemije COVID-19 počinje brza transformacija Kliničke bolnice Dubrava (KB Dubrava) u Primarni respiracijski intenzivistički centar (PRIC) za sjevernu Hrvatsku zbog mogućeg naglog porasta broja zaraženih u državama u susjedstvu.

Transformacija KB-a Dubrava u COVID bolnicu

KB Dubrava građevinski je jedna od najmodernijih bolnica u Republici Hrvatskoj otvorena u proljeće 1988. godine. Bolnica ima površinu od 80 470 m2, heliodrom i dobro je prometno povezana.

Introduction

On the 11th March 2020, the World Health Organization declared COVID-19 as a global pandemic. Facing the pandemic caused by COVID-19 has greatly affected the lives and health of millions of people around the world.

The rapid transformation of the Clinical Hospital Dubrava (Dubrava Hospital) into the Primary Respiratory Intensive Care Center (PRIC) for Northern Croatia began because of a possible increase in the number of infected people in neighboring countries.

Transformation of Clinical Hospital Dubrava into a COVID Hospital

Clinical Hospital Dubrava is the most modern hospital in the Republic of Croatia which was opened in the spring of 1988. The hospital has an area of 80,470 m^2, a heliport, and is well connected.

Projektirana je i opremljena po uzoru na opće bolnice u SAD-u i drugim zapadnim zemljama, a sastoji se od 9 objekata međusobno povezanih dilatacijskim spojevima. Cijela bolnica potpuno je klimatizirana načinom 100% svježi zrak i 100% otpadni s rekuperacijom topline otpadnog zraka, a pojedini objekti imaju odvojeni klimatizacijski sustav (dva vanjska objekta spojena podrumskim hodnikom te prostor internog i kirurškog hitnog prijema u podrumu glavne zgrade). Bolnički odjeli organizirani su kao jedinice s 24 postelje, a svaka bolesnička soba ima maksimalno tri postelje i vlastiti sanitarni prostor, klimatizaciju i svu potrebnu infrastrukturu. Osim jedinica intenzivnog liječenja, postoje i tipizirane bolesničke jedinice te funkcionalna struktura prema pripadajućim djelatnostima.

Nakon razornog potresa koji je pogodio Zagreb u ožujku 2020. godine, bolnica nije pretrpjela veća oštećenja što je pomoglo u odluci da kasnije postane jedina bolnica u Republici Hrvatskoj isključivo za liječenje osoba oboljelih od bolesti COVID-19. S obzirom na specifičnost gradnje i klimatsko-ventilacijski sustav, pristupilo se reorganizaciji i restrukturiranju prostora. U kratkom vremenu osigurano je više od 500 bolesničkih postelja za pacijente oboljele od bolesti COVID-19. Zbog sustava potpune klimatizacije, prvo je planirano popunjavanje prostornih kapaciteta objekata s odvojenim klimatizacijskim sustavom. Taj je korak zahtijevao preseljenje potrebne aparature i bolesničkih postelja iz glavnog objekta KBD-a u objekte koji imaju odvojen klimatizacijski sustav te izgradnju tampon zona unutar glavnog objekta za odvajanje objekata gdje će biti smješteni pacijenti oboljeli od COVID-19 bolesti od takozvanih „čistih zona".

U svibnju 2020. godine KB Dubrava ponovo se reaktivira i do rujna 2020. radi za sve pacijente kada se zbog porasta broja osoba oboljelih od bolesti COVID-19 ponovo zatvara za uobičajeni rad i postaje bolnica samo za liječenje osoba oboljelih od bolesti COVID-19. Sve osobe oboljele od bolesti COVID-19 s područja 9 županija sjeverozapadne Hrvatske koje zahtijevaju bolničko liječenje od tada se primaju u KB Dubrava. Promjene u osnovi zbrinjavanja pacijenata s obzirom na epidemiološke i kliničke karakteristike COVID-19 bolesti, učinile su neizbježnom potrebu za izradom vlastitih protokola, postupnika i radnih uputa. Razvijene su prilagodbe u sestrinskom radu, organizirani su novi putevi kretanja i definirane su uobičajene rutine na novi način.

Organizacija rada Primarnog respiracijsko-intenzivističkog centra KB Dubrava

Primarni respiracijsko-intenzivistički centar (PRIC) svoj rad započinje 23. ožujka 2020. godine, dan nakon potresa. U danima prije prijema prvog pacijenta provedene su preinake prostora te nabava i doprema opreme potrebne za rad kako bi se osiguralo 300 bolesničkih postelja za osobe kojima je potrebna mehanička potpora disanju, te dodatnih 220 postelja za osobe koje imaju potrebu za liječenje kisikom. PRIC je smješten u objekte koji su imali odvojeni klimatizacijski sustav (dva vanjska objekta spojena s glavnom zgradom podrumskim hodnicima) te prostor internog i kirurškog hitnog prijema, a potpora tome bi-

The hospital is designed and equipped on the model of general hospitals in the USA and other Western countries. It consists of 9 interconnected buildings connected by expansion joints. The entire hospital is fully air-conditioned with 100% fresh air, and 100% waste air with waste air heat recovery and some buildings have separate air conditioning systems (two outdoor buildings connected by a basement hallway and internal and surgical emergency room in the basement of the main building). Hospital wards are organized as units with 24 beds, every room for patients has a maximum of three beds and its bathroom, air conditioning, and all necessary infrastructure. In addition to intensive care units, there are also typified patient units and a functional structure according to the associated activities.

After the devastating earthquake in March 2020, the hospital did not suffer any major damage. This later contributed to the decision of transforming it into the only hospital in the Republic of Croatia exclusively for the treatment of people that are infected with COVID-19. In a short time, more than 500 beds were provided for patients with COVID-19. Due to the full-air-conditioning system in the main hospital building, it was first planned to fill the spaces within the auxiliary buildings that have a separate air-conditioning system. This step required the relocation of all necessary equipment and beds from the main Hospital building to auxiliary buildings and the build-up of "buffer zones" within the main building to separate buildings where the COVID-19 patients will be situated from the so-called "clean zones".

In May 2020, Clinical Hospital Dubrava (CH Dubrava) was again reactivated and returned to work for all patients. In September 2020, there was an increase in the number of people infected with COVID-19, so the hospital closed for regular work and became a hospital only for the treatment of people suffering from COVID-19. Since then, all persons within the area of 9 counties in Northwestern Croatia infected with COVID-19 who require hospital treatment are admitted to the CH Dubrava. The changes in the basis of patient care regarding the epidemiological and clinical characteristics of COVID-19 have made it inevitable to develop our protocols, procedures, and work instructions. Adaptations have been developed in the nursing process carried out in the hospital, in the organization of new pathways, and in defining usual routines in a new way.

Work organization in the Primary Respiratory Intensity Center of the Clinical Hospital Dubrava

The Primary Respiratory Intensity Center (PRIC) started its work on March 23, 2020, one day after the devastating Zagreb earthquake. In the days before the first patient was admitted to the Hospital, the Hospital space was modified, and the needed equipment was procured and delivered to enable 300 patient beds for people who need mechanical breathing support and another 220 beds for people in need of oxygen treatment. The PRIC is situated in buildings that have a separate air-conditioning system and two outdoor buildings connected to the main building by basement corridors. Also, an internal and surgical emergency room, supported by 25 military tents fully equipped for operation with available oxygen connections. The PRIC consists of two basic units: the Intensive Care Center (IC) and the Res-

li su vojnički šatori (njih 25) potpuno opremljeni za rad i s dostupnim priključcima za kisik. PRIC se sastoji od dvije osnovne jedinice: intenzivističkog centra (IC) i respiracijskog centra (RC) s pripadajućim odjelima. Od tada do danas broj aktivnih odjela unutar centara i broj bolesničkih postelja ovisio je i prilagođavao se broju osoba oboljelih od COVID-19 bolesti i broju pacijenata primljenih u PRIC, a funkcioniranje Kliničke bolnice Dubrava odvijalo se prema propisanim Mjerama reaktivacije bolničkog sustava u sklopu izlazne strategije RH za COVID-19. Maksimalni kapacitet PRIC-a sastoji se od šest jedinica intenzivističkog centra, tri odjela kirurških djelatnosti respiracijskog centra, 14 odjela internističkih djelatnosti respiracijskog centra, odjela za dijalizu te objedinjenog hitnog bolničkog prijema.

Prateći situaciju u susjednim zemljama paralelno su uz transformaciju bolnice u PRIC nastajale i radne upute za postupanje s osobama pod sumnjom ili dokazanom infekcijom koronavirusom. Izrađeno je oko 85 radnih uputa koje definiraju puteve, postupke i principe rada za vrijeme pandemije. Velik izazov osoblju predstavljalo je korištenje osobne zaštitne opreme (OZS) pri radu s pacijentima pod sumnjom ili oboljelima od COVID-19 bolesti, stoga je jedna od prvih izrađenih radnih uputa bila upravo tog naziva. Radnu uputu prate i prilozi u obliku plakata u kojima je precizno objašnjen svaki korak odijevanja i svlačenja OZS-a. Svaki djelatnik ustanove prije ulaska na rad u zonu pacijenata pod sumnjom ili oboljelih od COVID-19 bolesti obavezno je morao prisustvovati tečaju odijevanja i svlačenja OZS-a što je bilo popraćeno odgovarajućom dokumentacijom predviđenom u Zakonu o zaštiti na radu [1].

Operacijske sestre preuzele su ulogu edukatora o korištenju OZS-a. Budući da je u ožujku 2020. godine bilo važno provesti edukaciju što više djelatnika, edukacija je bila organizirana u gustom rasporedu na način da je svaki edukator imao jednu grupu svaki puni sat koja je na više punktova demonstrirala odijevanje i svlačenje OZS-a. Educirano je više od tisuću djelatnika posebno za zaštitne ogrtače, a naknadno i za zaštitne kombinezone. U samim počecima operacijske sestre bile su podrška i „čuvari" osoblja na mjestima predviđenima za odijevanje i svlačenje OZS-a.

Mnoge studije istaknule su važnost odgovarajuće obuke za pravilnu upotrebu OZS-a, gdje se pokazalo da slaba usklađenost protokola ima značajnu povezanost s prijenosom koronavirusa [2].

Nabava odgovarajuće zaštitne opreme pokazala se globalnim problemom s promjenjivim i nepredvidivim lancima opskrbe i mrežama isporuke širom svijeta, ali unatoč tome, u Kliničkoj bolnici Dubrava količina zaštitne opreme bila je dostatna. U drugom valu pandemije porast zaraženih značio je veći broj pacijenata u KB-u Dubrava što je otvorilo potrebu za premještanjem osoblja unutar bolnice kako bi se pokrili nedostaci osoblja za rad u RC-u i IC-u. Budući da se kapacitet KB-a Dubrava popunjavao pacijentima, u pomoć su došle kolege iz drugih bolnica, a operacijske sestre dio su mjeseca radili u RC-u, a dio u operacijskim dvoranama. U KB-u Dubrava – COVID bolnici na vrhuncu epidemije bilo je hospitalizirano 500 bolesnika, a od rujna 2020. do sredine veljače 2021. godine napravljeno je više od 450 kirurških zahvata.

piratory Center (RC) with associated departments. From March 2020 until today, the number of active departments whitin the center and the number of available beds depended on the number of people infected with COVID-19. The number of patients received to the PRIC and the functioning of the Clinical Hospital Dubrava take place according to measures prescribed by the reactivation of the hospital system as a part of the Croatian exit strategy for COVID-19. The maximum capacity of the PRIC consists of 6 units of the Intensive Care Center, 3 departments of surgical activities, 14 departments of internal medicine activities, a dialysis department, and a unified emergency hospital admission.

Approximately 85 work instructions have been developed to define the ways, procedures, and principles of work during a pandemic and are specific for dealing with persons with suspected or proven coronavirus infection. These have been developed by monitoring the situation in neighboring countries and parallel with the transformation of the hospital into a PRIC.

A major challenge for staff was the use of Personal Protective Equipment (PPE) when working with suspected or infected COVID-19 patients. Consequently, one of the first work instructions developed was in response to this. The work instructions are also accompanied by attachments in the form of posters explaining every step of dressing and undressing while using PPE. Every employee in CH Dubrava is required to attend a course of dressing and undressing regarding the PPE before entering the zone of patients under suspicion or infected with COVID-19. The course was followed up by the appropriate documentation provided in the Occupational Safety and Health Act [1].

Operation nurses/technicians took on the role of educators on the use of PPE. Since March 2020, it was important to conduct training for as many Hospital employees as possible. The training was organized in a tight schedule, so each educator had one group for full hour and demonstrated dressing and undressing of PPE at several points. More than a thousand employees were trained especially for protective coats, and subsequently for protective overalls. In the beginning, operating nurses/ technicians were the support and "guardians" of staff in places for dressing and undressing of PPE. Many studies have highlighted the importance of appropriate training for the proper use of PPE and showed that poor protocol compliance has a significant association with transmission of coronavirus [2].

The procurement of appropriate protective equipment was shown as a global problem, with changing and unpredictable supply chains and supply networks being disrupted around the world. Despite these challenges, Clinical Hospital Dubrava keeps the amount of protective equipment under control. In the second wave of the epidemic, the increase of infected people meant a larger number of patients in the Clinical Hospital Dubrava. It created the need to relocate staff within the main hospital to cover staff shortages in the RC and IC. As CH Dubrava was filled with patients, colleagues from other hospitals and operating nurses/ technicians worked both in the RC and the operating rooms. At the peak of the epidemic, 500 patients were hospitalized at the Dubrava – COVID Hospital, and from September 2020 to mid-February 2021, over 450 surgical procedures were performed.

Organizacija rada u Središnjem operacijskom bloku u uvjetima COVID-19

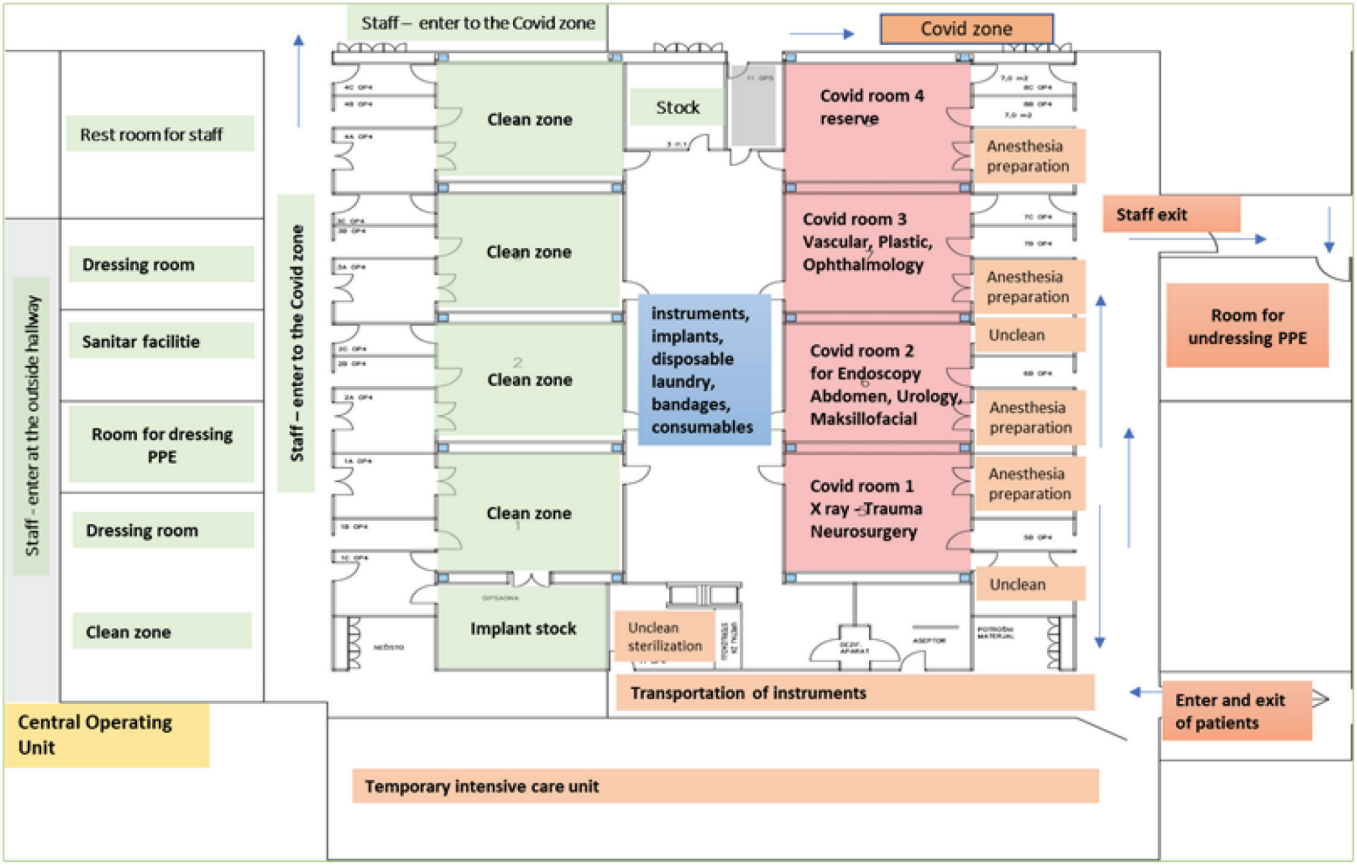
Operacijske dvorane KB-a Dubrava dobro su dizajnirane za rješavanje ove vrste rizičnih situacija, ali visok rizik od onečišćenja, ograničeni resursi i dodatno radno opterećenje osoblja pod pritiskom značajno su povećavali rizik od prijenosa bolesti i opterećenja svih kirurških timova. Zaštita osoblja bila je prioritet zbog velike mogućnosti da postanu glavni prenositelji bolesti, a u konačnici da ne dođe do kolapsa u zdravstvenom sustavu.

Provođenje mjera socijalnog distanciranja na radnom mjestu organizacijski je bilo vrlo izazovno, ali predstavljalo je nužan dio odgovora za usporavanje pandemije COVID-19. Stoga su u Operacijskom bloku jutarnji sastanci i primopredaje svedeni na minimalan broj djelatnika, a telefonska komunikacija postaje nova rutina. Kako bi svi djelatnici bili pravodobno informirani o svemu, napravljena je „radna whats app grupa" unutar Operacijskog bloka. Odmah u početku transformacije prepoznata je važnost pružanja specifičnih i pravovremenih informacija koje mogu spriječiti širenje pogrešnih informacija i olakšati promjene u ponašanju na razini operacijskog tima. Pokazalo se da razmjena informacija na taj način povećava kontrolu, poboljšava komunikaciju, daje osjećaj sigurnosti i potiče pozitivniji stav osoblja. Putevi kretanja osoblja u Operacijskom bloku označeni su natpisima i znakovima koji upućuju osoblje na ispravan put kretanja prema takozvanim čistim i nečistim zonama (Slika 1).

Organization of work in the Central Operating Unit in COVID-19 conditions

Although the operating rooms of Clinical Hospital Dubrava are well designed to deal with this type of risk situation, the high risk of contamination, limited resources, and the additional work for the staff under pressure significantly increased the risk of disease transmission. Staff protection was a top priority because it was important to prevent them from becoming the main carriers of the disease and to prevent a possible collapse in the health system.

Implementing social distancing measures in the workplace was very challenging organizationally, but it was a necessary part of the response to slowing down the COVID-19 pandemic. The morning meetings and handovers in the Operational unit were reduced to a minimum number of employees, and communication over the telephone became a new routine. For all employees to be well informed on time, a working group on WhatsApp was created within the Operating unit. Right at the beginning of the transformation, the importance of providing specific and timely information to prevent the occurrence of misinformation and facilitate any behavioral changes at the operational team level was recognized. It was shown that the exchange of information in this way increased control, improved communication, gave a sense of security and a more positive attitude of the staff. The routes of movement of staff in the Operating Unit are marked with inscriptions and signs that indicate personnel is on the correct route of movement to the so-called clean and unclean zones (Figure 1).



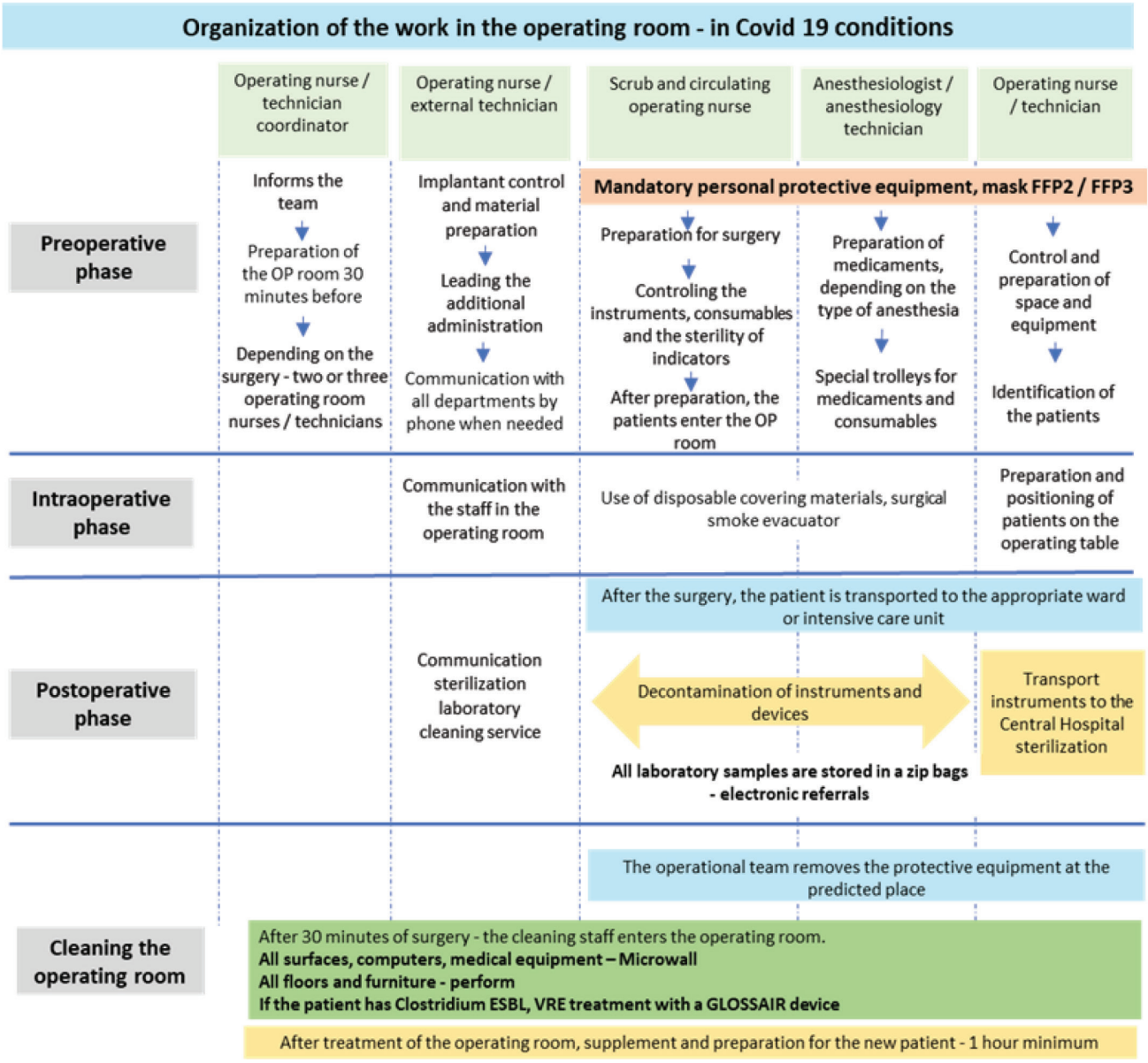
Slika / Figure [1] Tlocrt operacijskih dvorana – putevi kretanja / Floor plan of operating halls – routes of movement

Za kirurške zahvate određene su tehnički odgovarajuće operacijske dvorane na tri lokacije s obzirom na 6 dislociranih intenzivnih jedinica i 17 odjela. Put kretanja pacijenta prema operacijskoj dvorani uključivao je određene puteve, dizala i operacijsku dvoranu s ograničenim pristupom. Kirurški zahvati izvodili su se na lokaciji najbližoj pacijentu čime je sam transport pacijenta u operacijsku dvoranu bio kraći i lakši za osoblje i za pacijenta. Na prvoj lokaciji određene su 4 operacijske dvorane u kojima su pacijenti operirani, a podijeljene su prema kirurškim specijalnostima što je omogućilo da se potrebna posebna oprema ne seli iz čistih područja i obrnuto (Tablica 1):

- traumatologija i neurokirugija – specifičan operacijski stol i sala izolirana za rad u uvjetima korištenja RTG aparata;
- abdominalna, urologija, torakalna, maksilofacijalna;
- vaskularna, plastika, urologija, okulistika, ORL.

For surgical operations, there were determined technically appropriate operating rooms in 3 locations due to the 6 dislocated intensive units and 17 departments. The path of patient movement to the operating room included certain routes and used certain elevators to limit access to the operating room. Surgical operations were performed at the location closest to the patient, reducing the distance for the patient to travel and making transport easier for patients and staff. At the first location, 4 operating rooms were designated for the patients that were operated, and they were divided according to surgical specialties. That enabled the necessary specialist equipment to be in place, and there was no need to move from the clean areas and inversely (Table 1):

- Traumatology and neurosurgery; specific operating table and room isolated for work in conditions of using X-ray machines;
- Abdominal, urology, thoracic, maxillofacial;
- Vascular, plastic, urology, ophthalmology.



Tablica / Table [1] Organizacija rada u operacijskim dvoranama / Organization of work in operating rooms

Preoperacijska faza

Glavna sestra ili voditelj tima obavještava o operaciji osoblje koje ulazi u operacijsku dvoranu 30 minuta prije dolaska bolesnika. Ovisno o vrsti kirurškog zahvata ulaze dvije ili tri operacijske sestre, a jedna operacijska sestra u vanjskom je prostoru.

U operacijskim dvoranama oprema koja se ne upotrebljava uklonjena je iz prostora. Broj osoblja uključen u kirurški zahvat ograničen je, a kretanje osoblja u operacijskoj dvorani i izvan nje svedeno je na minimum i precizno određeno protokolom. Vrata operacijske dvorane moraju biti zatvorena tijekom cijelog trajanja zahvata. Operacijska dvorana s potrebnom opremom, instrumentarijem i jednokratnim potrošnim materijalima priprema se prije dolaska pacijenta.

Kako bi se minimizirao rizik od prenosivosti i unakrsne infekcije, CDC je preporučio mjere koje uključuju obveznu uporabu OZS-a koja uključuje kombinezone/ogrtače, rukavice, respirator-maske FFP3 ili FFP2 sa štitnikom za lice / zaštitne naočale [3].

Preoperative phase

The head nurse or team leader informs staff entering the operating room 30 minutes before the patient's arrival. Depending on the type of surgery, two or three operating nurses/technicians enter, and one operating nurse/technician remains outside the room.

Unused equipment in the operating rooms is removed from the space. The number of staff involved in the surgery is limited, and the movement of staff inside and outside the operating room is kept to a minimum, precisely determined by the protocol. The operating room door must be closed during the whole surgery. The operating room with the necessary equipment, instruments, and disposable consumables is prepared before the patient arrives (Figure 2 and Figure 3).

To minimize the risk of transmission and cross-infection the CDC has recommended measures for the mandatory use of PPE that includes overalls/coats, gloves, an FFP3 or FFP2 mask with face shield/goggles [3].

Slika / Figure [2] Priprema osoblja / Preparement of staff

Slika / Figure [3] Operacijska dvorana prije ulaska pacijenta / Operating rooms before the enter of patients

Intraoperacijska faza

Operacijska dvorana nakon ulaska pacijenta postaje nečista (COVID) zona. Računalo u operacijskoj dvorani upotrebljava se isključivo za pregled nalaza i snimki, a dodatno dokumentiranje odvija se na računalu izvan dvorane.

Izvan operacijske dvorane u čistom dijelu „vanjska" operacijska sestra u slučaju potrebe dodaje kroz prozor materijal potreban za vrijeme operacije. Sva vrata moraju biti zatvorena i komunicira se isključivo telefonom sa svim popratnim službama.

Bolesnik s kirurškom maskom dovozi se u operacijsku dvoranu te prebacuje na operacijski stol pokriven jednokratnim rubljem. Ovisno o vrsti zahvata, pristupa se anesteziji.

Preporuka je da instrumente za koagulaciju i rezanje tkiva koji se koriste visokofrekventnom strujom treba upotrebljavati na najnižoj razini energije kako bi se izbjegla nepotreb-

Intraoperative phase

The operating room becomes an unclean (COVID) zone after the patient enters. The computer in the operating room is used exclusively for reviewing findings, recordings, and additional documentation that takes place on the computer outside the room.

Outside the operating room, there is an "external" operating nurse (Figure 4) who can provide additional material during the operation through the window if necessary. All doors must be closed, and the communication is exclusively maintained by telephones with all departments.

The patient with a surgical mask is taken to the operating room and transferred to the operating table covered with disposable laundry (Figure 5). Depending on the type of surgery, they use the appropriate anesthesia.

Slika / Figure [4] "Vanjska" operacijska sestra / Operating nurse "external"

Slika / Figure [5] Operacijska dvorana u COVID-19 uvjetima / Operating room in COVID-19 conditions

na proizvodnja dima i aerosola. Mnoge studije pokazale su da se virusni i bakterijski aerosoli mogu otkriti i u laparoskopskim te otvorenim kirurškim operacijama, stoga je sastavni dio opreme i evakuator dima [4]. Bolesnika se pokriva isključivo sterilnim jednokratnim rubljem.

Postoperacijska faza

Nakon operativnog zahvata, slijedi transport pacijenta na odgovarajući odjel ili jedinicu intenzivnog liječenja. Korištene instrumente i pribor namijenjen za jednokratnu uporabu odbacuje se u zarazni otpad na mjestu nastajanja (operacijska dvorana), a višekratni instrumenti šalju se u Centralnu bolničku sterilizaciju gdje se reprocesiraju odmah nakon završetka zahvata (strojno se peru, dezinficiraju i suše te steriliziraju). Nakon standardnih postupaka u Centralnoj bolničkoj sterilizaciji, instrumenti i setovi dostavljaju se u Središnji operacijski blok.

Zarazni otpad nastao u operacijskoj dvorani mora biti pravilno složen i upakiran u ambalažu tako da se zaštite pacijenti, osoblje i javnost od potencijalnog izlaganja infektivnim agensima. Otpad se pakira u dvije vreće odgovarajuće boje ili u čvrste spremnike koji se potom označavaju nazivom ustrojstvene jedinice u kojoj je nastao, a vreća ili spremnik se dezinficiraju te transportiraju na mjesto privremenog skladištenja otpada (bolnički deponij) [5, 6].

Ako je u operacijskoj dvorani korišteno pamučno rublje, ono se nakon korištenja odlagalo u namjenske polutopive vreće koje su se dostavljale u bolničku praonicu rublja gdje su se obrađivale pranjem i dezinfekcijom na bazi klora [6].

Čišćenje prostora operacijske dvorane provodi se odmah nakon operacijskog zahvata. Nakon otklanjanja ukupnog otpada i grube nečistoće, sve površine operacijske dvorane čiste se pomoću kombinacije sredstva za čišćenje i dezinficijensa. Djelatnici zaduženi za čišćenje operacijske dvorane upotrebljavaju propisani OZS te pribor za čišćenje koji odlažu na propisani način [7].

Po završetku operativnog zahvata, cijeli operacijski tim svlači OZS na predviđenom mjestu slijedeći preporuke te

It is recommended for tissue coagulation and cutting instruments that have high-frequency power to use the lowest energy level to avoid unnecessary smoke and aerosol production. Many studies have shown that viral and bacterial aerosols can be detected in both laparoscopic and in open surgical operations and, therefore, a smoke evacuator is an integral part of the equipment [4]. The patient is covered exclusively with sterile disposable laundry.

Postoperative phase

After the surgery, the patient is transported to the appropriate ward or intensive care unit. The used instruments and accessories intended for single-use are disposed of to the infectious waste at the place of origin (operating room), and the reusable instruments are sent to the Central Hospital Sterilization where they are reprocessed immediately after the surgery (machine washed, disinfected, dried and sterilized). After following standard procedures in the Central Hospital Sterilization, reusable instruments and kits are sent back to the Central Operating Unit.

The infectious waste generated in the operating room must be properly stacked, and packaged in such a way as to protect patients, staff and other people from potential exposure to infectious agents. The waste is packed in two bags of appropriate color or in solid containers marked with the name of the organizational unit in which it was generated. The bag or container is disinfected and transported to the temporary storage of waste (hospital landfill) [5, 6].

If the cotton laundry is used in the operating room, it is stored in the same special semi-soluble bags after use and delivered to the hospital laundry. There it is treated with chlorine-based washing and disinfection [5].

Cleaning of the operating room is performed immediately after the surgery. After removing all of the waste and coarse impurities, all surfaces of the operating room are cleaned using a combination of cleanser and disinfectant. Employees cleaning the operating room use the prescribed PPE and dispose of the equipment for cleaning in the prescribed way [6].

opremu odlaže u spremnike za zarazni otpad. OZS mora se uklanjati polako u ispravnom slijedu kako bi se smanjila mogućnost kontaminacije ili druge izloženosti virusu.

Svi postupci kod pacijenta oboljelog od COVID-19 bolesti kojemu je potreban operativni zahvat odvijali su se na uobičajen način i uz postupke za najbolji ishod za pacijenta. Pandemija koronavirusa nije utjecala na pacijenta i tijek operativnog zahvata koji se na njemu izvodio, ali uvelike je utjecala na radno opterećenje operacijskih sestara / tehničara i postavila dodatne zahtjeve vezane za proces rada u operacijskom bloku.

Zaključak

Odgovor na pandemiju COVID-19 zahtijeva novu organizaciju rada te njezinu primjenu i održavanje. Važno je imati odgovarajuću osobnu zaštitnu opremu i odgovarajuće protokole primjenjive u praksi u svrhu zadovoljstva osoblja te zadovoljstva i sigurnosti pacijenata.

Slika / Figure [6] Prostorija za odlaganje OZS-a / Room for the remove of PPE

At the end of the surgery, the complete operational team takes off the PPE at the intended place following recommendations, and dispose of equipment into containers for infectious waste. PPE must be removed slowly in the correct order to reduce the possibility of contamination or other exposure to the virus.

All procedures in patients with COVID-19 disease that require surgery are performed in the usual way and with procedures for the best outcome for the patient. The coronavirus pandemic does not affect the patient and the flow of the surgery performed, but it greatly affects the pressure experienced by operating room nurses/technicians and brings additional requirements to the work process in the Operating unit.

Conclusion

The response to the COVID-19 pandemic requires a new organization of work in the way it is implemented and maintained. It is important to have appropriate personal protective equipment and appropriate protocols applicable in practice for staff satisfaction and the satisfaction and safety of the patients.

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