

Emergency Surgery in a “No-Covid-19 Spoke Center” during the pandemic.

One year of experience and a new organizational model



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Emergency Surgery in a “No-Covid-19 Spoke Center” during the pandemic. One year of experience and a new organizational model

AIM: We analysed our one-year surgical activity in a spoke ‘COVID-19 free’ centre during the pandemic in South Italy. **MATERIAL OF STUDY:** From Feb 2020 to Feb 2021 we performed 800 operations (40% in emergency and 60% of major surgery). We applied restrictive measures for the access of patients in our department from 15/2/2020 after several cases of unclear fever. Visitors were not allowed to stay in the ward.

RESULTS: In the first period of lockdown, from March to June 2020, in our Region, biomolecular test was indicated only for symptomatic people. We organized the hospitalization with a sealed compartment system (that we defined “boing system”) in which the patient stationed in an ‘isolation room’ for at least 48 hours upon the entry. From July 2020 molecular test were made to all patients before hospitalization. The boing system remains for emergency recovery.

DISCUSSION: In the first phase of pandemia we chose to subject patients to serological examination based on the IgM assay to consider them negative. We organized the hospitalization with a sealed compartment system (that we defined “boing system”).

CONCLUSION: In the first phase of the pandemic the serological examination has shown high specificity in identifying positive patients for COVID 19. In that period we supposed that patients with negative serology could be considered non-contagious. Neither patients or staff has been resulted positive to SarS CoV2 test.

KEY WORDS: Covid 19, Emergency Surgery, Spoke Center, Pandemia, Serological Tests

Introduction

The new coronavirus SarS-CoV2 was initially identified in China in December 2019 ¹.

On January the 31st 2020 WHO qualified COVID-19 outbreak as public health emergency of international concern.

The day after the Italian Government declared public health emergency ².

We described the surgical activity of our department of Surgery in PO D. Camberlingo Hospital in Francavilla Fontana-Italy, a No Covid spoke center during one year of Covid pandemic period.

Closure to visitors was performed from February the 15th when a no well defined number of fever appeared in our department. We adopted a model of organization inspired to Singapore’s Hospital at the start of pandemia ³.

From Feb 2020 to Feb 2021, 1300 patients were admitted in our ward, and 800 underwent to surgery.

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The model created allowed us to avoid SarS CoV 2 infections among patients and staff.

Materials and Methods

The “D.Camberlingo” Hospital in Francavilla Fontana (Brindisi - Italy) is a spoke centre located half between of two big provinces and is equidistant from the two Hub centres of SS Annunziata Hospital in Taranto and Perrino Hospital in Brindisi (ASL refence Hub). The hospital has a first level DEA without ICU and is included as a Rural Center of Trauma (First Aid Trauma) in the regional trauma service.

The UOC of General Surgery deals with elective and emergency surgery with 800 operations from February 2020 to February 2021, 40% in emergency and 60% of mayor surgery.

After the diffusion of the pandemic in Asia in the early days of 2020 our attention for patients with hyperpyrexia and respiratory symptoms has increased enough to take some amendments on our organization ².

From the 15/02/2020 in our ward we adopted some containment measures for the visitor access after the appearance of some fever not associated to the clinical situation or surgical symptoms of patients hospitalized in that period. In the first period, only one relative for every patient was admitted for a short time (10 min), with a personal numbered pass assigned.

The entry rules for visitors were modified and was allowed access to the ward for a single relative, for a short time, accompanied by a nurse who ensured that their hands were adequately washed and that disposable gowns and surgical masks were worn. At the admission desk was given a paper with all the explanation about the reasons for this organization containing the behavioural rules for patients and visitors.

In addition, measures of isolation of febrile cases were introduced to prevent the possible transmission of COVID infection, so they were isolated from other patients.

Daily briefings between the UOC Departments and the Management of the Hospital (Medical Direction) began on 5/3/2020, to adopt containment measures in a shared manner as indicated by regional and ministerial directives. From 7/3/2020, in agreement with all the departments of the PO, all elective activities were suspended. In Italy, the lockdown was declared from Prime Minister, with the DPCM published on 9/3/2020, and at March 28, 2020 90,000 affected, symptomatic cases were described ⁴.

Pending the arrival of regional IPD (individual protection disposable), each member of the staff was equipped with an FFP2 mask, disposable and TFT gown, footwear and protective visor. The Management distributed tutorials on how to use PPE.

All members of staff were invited to observe rest peri-

ods and other contractual instruments provided by the Prime Minister's Decree to stay at home in order to activate the turnover in case of contagion of the staff on duty.

On the first day of lockdown, all patients presented in hospital in good condition were discharged, even without having finished their course of treatment, according to multiple patients access and mass casualty protocols, in agreement with the general practitioners, after an informative interview with family members.

Once the ward was cleared, only the non-dischargeable and surgically complex cases remained. The logistics were modified to allow the creation of an isolation filter and hospitalization due to the intensity of care.

The entry and exit paths to and from the ward were described by changing the destination of the medical records archive in the pre-triage room, where OSS and Nurses made a triage by a questionnaire containing an ingress score (attached).

All patients, visitors and staff were submitted to temperature check with a thermo scanner and access was not allowed to those who had a body temperature higher than 37.5 °C.

All staff, patients and visitors were required to wear a surgical mask.

Each hospital room was designed to accommodate a supernumerary bed.



Fig. 1

The first room near the entrance to the ward was used as a consulting room and patient acceptance, with the entry and exit routes from the ward highlighted and separated. From the emergency room each patient had to be escorted prior notice, and suspected cases had to be evaluated exclusively at the DEA ward.

The second and third rooms starting from the entrance door, were used as isolation rooms, using the visitor bathroom in the corridor as a dressing room for staff. Febrile patients, newly hospitalized patients and in any case all those waiting for a swab were observed in this way. Two rooms adjacent to the medical room were equipped with multiparameter monitors and a non-invasive ventilator for the management of the most critical cases. A temporary surgical sub-intensive therapy was set up, pending an intensive therapy not yet opened, in order to avoid transferring patients in other hospitals.

The other 4 rooms have been equipped with a fourth bed with oxygen in case of sudden access of non-surgical patients with need for non-invasive respiratory support. The hospitalization modality was centripetal, i.e. the patients were hospitalized from the further room to the one closest to the door, in order to free the rooms in rotation and to sanitize them at least two times a day. In the first phase, the execution of nasopharyngeal swabs in our hospital required authorization from infectious disease consultants and the Medical Management, and the reporting time for urgent swabs was obtained within 48-72 hours.

In agreement with Department of Clinical Pathology and the Medical Management of our hospital, all patients admitted to our UOC were subjected to a quantitative serological examination, considering the negative serology as negative for COVID 19 and the positives as suspected, were submitted to nasopharyngeal swab.

For the serological tests used for the determination of IgG and IgM anti SarS CoV antibodies we used the iFlash1800 instrument from march 2020, a multiparameter chemiluminescence analyzer (Shenzhen YHLO Biotech®, China). The SarS CoV2 IgG and IgM kits, performed for this instrumental platform, were produced by the company Shenzhen YHLO Biotech® (China). The determination, defined by the producers of a qualitative type, given the absence of international standards, could be considered semi-quantitative thanks to the algorithm of the instrumental software. The test, lasting 30 minutes, involved the use of magnetic microparticles which adsorbed with two antigens of the Coronavirus Covid-19, the viral nucleocapsid protein (N protein) and the S glycoprotein, which is part of the "viral spicules". The microparticles were incubated with the serum for 15 minutes; after suitable washing, an anti-human IgG or IgM antibody conjugated with acridinium was added to the reaction cuvettes. After further washing, the addition of Pre-Trigger and Trigger allows to measure the possible immune complex present in the cuvettes as RLUs. The system automatically calculates the analytical con-

centration of the sample, attributing a result in Arbitrary Units per mL (AU/mL).

The cut-off value is established at 10 AU/mL for both the IgG and IgM assays.

For the molecular tests on nasopharyngeal swabs, performed in other laboratories, the following instruments were used: CFX96 Touch™ system (Bio-Rad, Hercules, California, USA); LightCycler 480 Real-Time PCR System (Roche Diagnostics, Mannheim, Germany) ⁵.

With the reopening of services and the changes of regional provisions, all hospitalized patients were subjected to nasopharyngeal swab for SarSCoV2 before being admitted to the hospital rooms, with the resumption of serological tests as needed.

Results

From February 2020 to March 2021, 1300 patients were treated at our UOC, 800 of them underwent surgery. This type of organization (with admissions following a sealed compartment filter, the use of PPE, the continuous transmission of information flows, and the periodic use of quantitative serological tests also to the staff) allowed our department not to have any patients positive to CoViD 19 (both hospitalized without surgery and submitted to surgery).

We have adopted early the measures of restriction and control in the access of patients on the basis of the organizational paths described in the hospital center in Singapore ³.

Furthermore, we immediately prepared the ward in advance, preparing it to accommodate an additional third of patients, where the situation had foreseen it.

The hospitalization and management system for patients has been called the "boing system" inspired to the name of an old summer game.

All patients with negative serology, subsequently checked with nasopharyngeal swab, remained negative and it was possible to intercept positive patients either in the emergency room than in the pretriage phase, however there no positive patients among the patients.

In April 2020, our department was the only surgical ward of the Brindisi province and all the emergency and oncological operation of the ASL were guaranteed at our UOC.

Non-covid patients were managed on site, while a team was assigned for covid patients to go directly to HUB for emergency management.

From December 2020 our surgery was the only no covid surgery between Taranto and Brindisi town.

In one year of experience none among staff and patients was found positive to covid-19.

In four cases we found a positive case in pre-hospitalized patients and in one case a patient in our ward resulted positive after the hyperbaric treatment in another hospital. He was isolated and then transferred. All

other patients and staff resulted negative to two swabs executed at 48 hrs one to other.

Discussion

Elective surgery in lockdown was reduced and acute care surgeons, although not directly involved in treating COVID 19 + patients, have often modified their daily activity.

From the beginning we believed in the importance and the main role of no covid centers to manage surgical patients better, because of a high number of no covid patients needing surgery.

During pandemic period, people avoided access to our emergency department, because they were afraid to be infected by SARS-COV2. So a great number of patients arrived in operatory theatre with advanced abdominal disease in severe conditions.

We treated a high number of severe peritonitis with sepsis and near all patients were submitted to mayor surgery, in emergency.

We performed a great number of mininvasive and laparoscopic operation even in emergency and preferred laparoscopic approach to reduce the area of exposure for the risk of contagious in a period in which abdominal diffusion of virus was unclear (in the first phase of pandemic the presence of SARS-COV2) in peritoneal fluid and literature was discordant for a non respiratory virus transmission^{2, 6-10}.

To prevent the eventual risk of oro-fecal and/or blood transmission we employed CO2 insufflator and smoke aspiration system to filter micro particles (<0.01micron – Airseal® system), combined with use of balloon fixed trocars for laparoscopy to avoid gas contamination in operatory room,^{10, 11}

To minimize infection spread, all suspected Covid-19 patients requiring surgery, were treated as positive case sure that a good organization and a preventive approach are mandatory in the phase of mass casualty incident^{2, 12-16}.

In literature were published several experiences of covid centers but no protocol, no guideline about no covid center were reported.

From March to June 2020, in our hospital, no molecular test was available in emergency, so we considered symptoms like fever, cough and dyspnea as suspect of covid positivity. All patients with abdominal pain were submitted to a CT scan of abdomen extended to chest to exclude pneumonia.

We chose serology after a multidisciplinary evaluation. Indeed, several studies have demonstrated that serological testing for the presence of antibodies (IgM or IgG) against SARS-CoV-2 has good clinical specificity and high detection sensitivity and can be used as a necessary supplement for the screening and diagnosis of COVID-19⁷. Compared with SARS-CoV-2 molecular detection,

the detection of serological antibodies may be more accurate when used to estimate the true SARS-CoV-2 infection rate in the population and can be used to detect past asymptomatic infections, since 4 antibodies against SARS-CoV-2, especially IgG, are likely to persist for a long time after the viral infection is cleared^{2, 17-18}.

Conclusions

In the first phase of the pandemic the serological examination has shown high specificity in identifying positive patients for COVID 19. In that period we supposed that patients with negative serology could be considered non-contagious. Neither patients or staff has been resulted positive to SarS CoV2 test.

We have shown that a good organization in this pandemic year avoided positive covid cases in patients and staff of a rural no-covid surgery center. We believe that the use of laparoscopy and adequate smoke evacuation systems represented an important solution in the prevention of covid transmission. Our study underlines the importance to make surgery in no covid centers to avoid delays in the treatment of oncological patients and those with time dependent diseases.

Institution had to provide to organize a pandemic network in which a no covid structure should be performed normal activity.

Riassunto

Abbiamo analizzato la nostra attività chirurgica nell'arco dell'anno pandemico dal Febbraio 2020 al Febbraio 2021.

In questo lasso di tempo il nostro Presidio Ospedaliero, il 'D Camberlingo' di Francavilla Fontana – ASL Brindisi, era stato designato, ed è tuttora, centro 'Covid-19 free'. Nonostante le restrizioni alla nostra attività elettiva abbiamo eseguito 800 interventi, il 40% dei quali in regime d'urgenza con un 60 % di interventi di chirurgia maggiore. Dal 15/2/2020 dopo aver notato diversi casi di febbre poco chiara abbiamo applicato misure più restrittive per l'accesso dei pazienti nel nostro reparto di degenza. Ai visitatori non è stato più permesso di rimanere nel reparto. Nel primo periodo di lockdown, da marzo a giugno 2020, nella nostra Regione, il test biomolecolare è stato suggerito solo per le persone sintomatiche. In questa fase della pandemia abbiamo scelto di sottoporre i pazienti ad esame sierologico basato sul dosaggio delle IgM. L'assenza di tali anticorpi ci permetteva di considerarli negativi. Abbiamo organizzato il ricovero con un sistema a compartimenti stagni, definito "sistema boing", in cui il paziente stazionava in una "stanza di isolamento" per almeno 48 ore dal momento dell'ingresso. Da luglio 2020 sono stati effettuati test molecolari a tutti i pazienti prima del ricove-

ro. Il 'sistema boing' è rimasto tuttora per i pazienti ricoverati in regime d'urgenza. Questi ultimi infatti restano in stanza di isolamento in attesa dell'esito del tampone molecolare a cui vengono sottoposti.

Nella prima fase della pandemia l'esame sierologico ha mostrato un'elevata specificità nell'individuare pazienti positivi al Sars-CoV2. Grazie a questo sistema di compartimenti stagni, al tempestivo ricorso al test sierologico e/o molecolare in caso di sintomi sospetti e all'utilizzo della laparoscopia con trocar con sistemi di aspirazione incorporata non abbiamo registrato positività al nuovo coronavirus né tra il personale né tra i ricoverati.

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