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Redeployment of specialist surgeons in the COVID-19 pandemic in a general hospital: critical issues and suggestions

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Abstract. *Background and aim:* to gain experience and highlight any margins for improvement, we outlined the role played by specialist surgeons (with particular reference to orthopedic surgeons), redeployed in treating COVID-19 patients in the Emergency Department of a general hospital, with severe overcrowding due to the massive and continuous arrival of patients. *Methods:* "on the field" experience of the Authors is reported, followed by a narrative review of the literature, mainly on the topic of health-personnel redeployment during an emergency. *Results:* a brief chronological discussion of the progressive reorganization of the hospital, in relation to the progress of the epidemic in the area, is reported, with specific reference to the experience of orthopedic and other branches specialist surgeons, that was characterized by a high degree of uncertainty about what to do, worsened by organizational difficulties due to the incessant arrival of patients and subsequent overcrowding. Observations relating to the critical aspects that have emerged and the various solutions proposed or implemented, if they have been identified, as well as the problems still open, are then made and compared to current literature. *Conclusions*: the most significant aspect that we have tried to outline is the organizational difficulty, due to the rapid and unpredictable change in the situation: greater efficiency and flexibility, seen as the ability to overcome bureaucratic, logistical, regulatory or budgetary obstacles that prevent the rapid changes made necessary by the epidemic, could perhaps help to face better any subsequent pandemic wave, like the fierce one ongoing at the present moment (www.actabiomedica.it)

Keywords: COVID-19, public-health, Emergency room, management, critical issues, pandemic, redeployment

Introduction

Italy was the first Western country to be hit hard by the new Coronavirus pandemic. After the identification of patient 1 in Codogno and the subsequent creation of the "red zone", our country, and in particular our region, Lombardy, were overwhelmed by a real tsunami: in a few weeks, due to the very high number of people who simultaneously presented severe or very serious forms of COVID-19, there was a radical and unexpected disruption of everyday working life. The same seems to happen in the days of the final revision of this work, which takes place in the midst of the so-called "second wave".

Undeniably, reading some of the articles published during or immediately after the "first wave", a certain tendency towards self-celebration, certainly due to the magnitude of the challenge to which the Authors have been subjected, can be appreciated, which however leads to underestimate or omit to report the negative or critical aspects experienced during the emergency. On the other hand, it seems useful to highlight these

latter elements as well, to gain experience and highlight any margins for improvement, so as not to be caught unprepared if a catastrophic scenario similar to the one already occurred should reappear, as it seems to be happening at the moment.

The purpose of this report is to outline the role played by specialist surgeons (urologist, vascular surgeons, neurosurgeons, orthopedic surgeons, otolaryngologists, plastic surgeons, ophthalmologists), with particular reference to orthopedic surgeons, of a hospital in the center of Milan, a city that was strongly affected by the epidemic wave of March-April 2020 and happen to be one of the epicenters of the current one. A common experience of surgeons of specialized branches, in the hardest hit areas, both in Italy and abroad, was that of being redeployed in internal medicine roles due to the massive arrival of patients suffering from pneumonia, associated with the simultaneous reduction of normal surgical activity (1–5).

The Covid-19 pandemic in Italy: impact on the health system

Below is a brief chronological discussion of the progressive reorganization of our institution in relation to the progress of the epidemic in the area, with specific reference to the activity of orthopedic surgeons.

- On 31/01/2020, following the World Health Organization (WHO) declaration of health emergency, a state of emergency is established in Italy. On 21/02/2020 the patient 1 of Codogno (Lombardy) is identified. The following day, "red zones" are established in the areas affected by the outbreaks: checkpoints are created, and a quarantine of the inhabitants is imposed.
- From the hospital point of view, on February the 23rd any planned admission activities are suspended, even in our institution, except those that cannot be postponed. On February the 24th any non-deferrable outpatient activity is suspended as well.
- In the first days of March the infections exceed 1000 cases, the Government launches further restrictive measures that culminate in the closure of schools throughout the country (04/03/2020). On March the 8th the entire Lombardy (10 million inhabitants) is made "red zone", resulting in panic and fleeing of people to their hometowns in other regions.
- From the hospital point of view, the Emergency Department (DEU) is reorganized: from March the 1st, the Pediatric area is moved to another location and exits the main building of the DEU. The conversion of the hospital begins with the creation of an area dedicated to the stay of patients awaiting the outcome of their nasopharyngeal swab: patients previously hospitalized there are transferred to other departments, including ours, which faces an initial reduction in available beds. On March the 7th, also the orthopedic trauma area is moved out of the main building of the DEU, which is completely reorganized: in the rooms formerly used for fractures and dislocations reductions, the evaluation area for patients with respiratory symptoms is set up (and it is still there at the time of submission of this article); separate paths are created for patients suspected of COVID-19. Positive patients who need hospitalization are still transferred to other facilities. With a resolution of the regional government (date 08/03/2020), "hub" hospitals are identified for the treatment of pathologies not related to the epidemic, whose treatments cannot be postponed, for the other institutions (including ours) the progressive, almost exclusive conversion to COVID-19 treatment is expected.
- On March the 3rd a "lockdown" is instituted throughout the country (60 million inhabitants): cases have now exceeded 10,000 units; the press proclaims the "collapse" of the Lombard health system (6).
- From the hospital point of view, the care burden linked to the epidemic increases progressively, from the second week of March some internal medicine services are left vacant, due to the reassignment of medical staff to COVID-19 patients: the need to redeploy medical staff from the surgical department begins to turn up, given the simultaneous reduction of related activity. The orthopedics ward is definitively reallocated

and subsequently closed, the patients have now been almost all discharged. This relocation of resources takes place in a similar way also in other Lombardy hospitals (7).

- Finally, in the second half of March, COVID-only wards are set up at our facility too. Having not yet been officially redeployed, the medical staff of orthopedics and other specialist branches communicate their voluntary willingness to take care of COVID-19 patients, given the seriousness of the public health emergency. The Emergency Department is again completely reorganized, surgeons are then assigned to the care of patients suffering from respiratory disease without the need for ventilation ("Green Codes").
- In the following days, the epidemic wave continues to grow, on March the 18th the picture of a long queue of military vehicles used to transport the bodies of the city of Bergamo, which later became a symbol of the emergency, is published in the newspapers. The lockdown is eased for the first time only six weeks later, on May the 4th, with the beginning of the so-called "phase 2".
- From April the 24th positive patients finally start to be transferred to another facility, the progressive return of the hospital to the treatment of other diseases is planned. The surgeons' internal medicine activity in the Emergency Department will cease at the end of April.

Critical issues and solutions

As mentioned, our experience as surgeons during the COVID-19 emergency was characterized, as it was natural, by various critical issues, affecting both the normal activity, which was progressively suspended, and that performed in the care of patients with respiratory illnesses: these critical aspects had both a technical and a purely organizational nature. In order to deal with them, various solutions with varying degrees of effectiveness have been proposed and possibly implemented, both by the management and by the staff in service: finally, some problems remain open and deserving of further discussion or study.

The first real impact with the pandemic for specialized surgery teams was the gradual reduction of normal activity, which soon came to a complete stop. This interruption involved at first elective surgery, together with the deferrable outpatient activity, and then included all the services usually provided, including urgent admissions, which almost disappeared with the establishment of regional hubs (see above). The published works deal with the issue, however the most critical aspects are not always shown clearly (7,8). At least in our hospital, but probably it was likewise also elsewhere, the transition was not always easy: especially in the first days, there were great difficulties in informing patients, who in more than half of the cases were treated despite the blockage, as it was not possible to warn them of the suspension. Moreover, reduction of activity was largely still operational at the time of the sudden appearance of the "second wave" (late October, 2020), due to the need for a demanding pre-screening work for each patient, with slowing of admission procedures and inevitable reduction of the number of services that can be performed, witch consequent important implications from the social welfare point of view. Data have already been published that show the extent of the reduction in performance, which reached, as regards Orthopedics, 75% for outpatient activity and 50% for trauma surgery: this is an important aspect because it is also partly the result of the narrowing of surgical indications, a tangible sign of the overall decline in the healthcare offer available to citizens (8). On May the 4th, the Italian National Institute of Statistics (ISTAT) released, for the first time since the outbreak of the epidemic, the data on excess mortality of 6866 municipalities (87%): the increase in total mortality in 2020 compared to the average same period of the years 2015-2019 was 49.4%; notably, only 54% of these excess deaths occurred in positive patients (9). Ultimately, the problem of reduced activity had not yet been resolved and was one of the daily challenges for the health system and especially for the surgical departments. Unfortunately, the same situation reappeared again lately, in an almost identical way, with a dramatic and sudden return to the "starting point", due to the new block of services set up in the new "red zones" (but not only in those) just established in Italy (05/11/2020).

The stop of the activity was followed by a period, albeit short, of total uncertainty: we surgeons soon found ourselves with a clear reduction in the daily work to be done; moreover, the Government suspended, from March the 2nd, holidays or leave for all health personnel, without distinction of role or discipline. Furthermore, we were more and more aware, being informed by colleagues, institutions, and press, of the progressive saturation of the emergency and internal medicine departments of the region, which were gradually transitioning to treat almost exclusively patients with COVID-19. However, in our hospital, the involvement of surgeons in treating COVID-19 patients was not immediate: participation in the emergency was voluntary, when it was clear that the care burden for colleagues was then unsustainable, against an extreme downsizing of our daily activity. This was also a critical aspect. In fact, articles have been published that show a greater medico-legal and insurance exposure of doctors who carry out activities not relevant to the specialization achieved (10): performing it voluntarily could have represented a further exposure, given the implicit assertion of being qualified for the task, potentially presumed by the fact that we volunteered to do it.

The legal aspect, while significant, is associated with a material one, relating to the actual ability of operators usually dedicated to other tasks to assist patients with respiratory diseases, even severe or very serious (11). Some, in particular, have argued that this activity was possible thanks to the normal knowledge acquired in achieving the medical degree; however, this assumption clashed with reality both on a formal level, given the legal requirement of specialization to carry out hospital activities, and on a substantial one, given the fact that this wealth of knowledge has turned out to be very often insufficient, due to the normal evolution of medical knowledge, and for the fact that many skills are the result of activities carried out in the field and not of mere mnemonic study on books. On the other hand, from a certain moment onwards, the extent of the emergency was such, in many areas of Italy as well as abroad, that the redeployment of staff was essentially unavoidable (1, 2, 12).

A partial solution came from the insurance companies, which have often issued reassurances to their customers that they would be covered for claims related to the health emergency, since it was a catastrophic and exceptional event. However, the problem is still largely unresolved: from the legal point of view, immediately after the end of the acute phase of the emergency, the first collective lawsuits emerged from the relatives of the deceased patients, the outcome of which is still all to see.

As mentioned, despite the medical degree, many of us specialist surgeons have had a difficult impact with the need to address a disease very different from the ones we were used to treat. The activity was carried out at the Emergency Department, in the treatment of patients with symptoms suspicious of COVID-19, but still with stable vital parameters and therefore with a "Green Code". The first shifts were characterized by the complete absence of practical instructions on the work to be done: it was very different, as already widely said, from the usual one, even in emergency room shifts. The few indications came from fellow emergency doctors working in other rooms of the department, albeit very busy, and they were often not very organic and fragmented: at the beginning we were forced to limit ourselves to monitoring vital parameters, which is also important, as it is not uncommon for COVID-19 patients to worsen suddenly and need to be moved to higher intensity care. These difficulties were progressively aggravated by the massive arrival of patients, which was not followed by a regular outflow due to the saturation of the beds in the hospital wards: therefore, tighter monitoring and timely therapy prescription (from oxygen supplementation, to non-invasive ventilation, to the administration of drug therapy) became critical. However, everything was characterized by important difficulties, to the point that even monitoring alone became increasingly demanding: moreover, having to carry out other activities (both medical and bureaucratic ones: see the following paragraph), in the phases of greater commitment it was almost impossible to monitor each patient, so that the less severe were visited even only once a day, despite the risk of aggravation. Beyond the mere monitoring, another highly critical aspect was the therapeutic management of cases; as widely discussed, the treatment of patients with potentially critical respiratory symptoms is not in the classic cultural background of a surgeon (4),

which is why our role should have been only supportive: the reality was different because, especially in the most critical phases, the workload was such that our colleagues (emergency doctors) did not have time and resources to visit, even for a brief exchange, the "green code" patients assigned to us. Therefore, we often had to treat them alone, despite little or no knowledge on the current therapeutic addresses of respiratory infections, in the context of a disease for which the treatment algorithms were not yet consolidated (as they still are). We omit from the discussion the considerations on the difficult, at times impossible, correct isolation of COVID-19 positive patients in the emergency room, as well as the topic of the saturation of intensive and subintensive care units, as they are beyond the scope of this article.

The difficulty was aggravated by the significant bureaucratization of the procedures related to the management of COVID-19 positive patients: the rules of conduct provided, reasonably, required the execution of a pre-screening questionnaire of all suspected cases, a timely notification of the cases to various institutions, with different forms to be filled in, and the need to forward part of them digitally, the formal obligation to contact the on-call infectious disease specialist for the correct management of each case; some of these steps had to be completed within the first 30 minutes of accepting the case and the task was almost exclusively a responsibility of the doctor who was managing the patient: not infrequently, the physician had to decide whether to give priority to a clinical gesture or a bureaucratic one and, according to many colleagues, in some shifts almost all the activity carried out was of this type. Another critical issue was the unavoidable need to inform relatives of the clinical conditions of their loved ones: this activity, very important yet not purely medical, was unfortunately added to those that subtracted time and resources from proper patient care.

The practical management of such a flow of patients was probably the most difficult aspect of the whole emergency phase, at least as far as the surgical teams were concerned, as they are even less used to following a patient population of this type than their colleagues emergency doctors, who every year are instead dealing with seasonal flu peaks: it is difficult to say whether the enormous effort undertaken, by all staff and management, have been effective, it is probably a response that will come only with the analytical study of the enormous amount of epidemiological data acquired.

The solutions adopted have been undertaken by various entities. The management had the merit of effectively and in a short time converting the hospital to the almost exclusive treatment of COVID-19 positive patients. The training courses on dressing procedures and on the use of non-invasive ventilation devices were also exhaustive and timely, even if, unfortunately, not sufficient to train the staff on the real situation which later occurred, as told, in an unpredictable and sudden way. Precisely for this reason, in a short time, given the complete absence of notions on "what to do" we had, the emergency doctors team drafted a short protocol on the imaging and blood tests to be requested and how to interpret them, as well as on the first treatments to be administered to positive patients: the same protocol provided for a moment of exchange between us and internal medicine colleagues, which unfortunately, given the seriousness of the situation and the massive arrival of patients, was often, if not always, impossible; this has led to a difficult management of discharges and therefore represents an important point to take into consideration, especially at a time like the present one, in which a similar scenario is reoccurring. We surgeons also made a small contribution to solve the situation, by creating charts for internal use, to facilitate the handover and allow effective monitoring of the many patients present in the emergency room. The administrative problems were instead partially solved with the establishment of a dedicated telephone number that relatives could contact for news, and with the automation and computerization of some procedures (e.g. request for exams): however, much of the bureaucratic burden remained and is still in charge of the medical doctor, with obvious consequences should a massive flow of patients recur again, as it seems to be happening just in these days.

Unfortunately, during the present "second wave" a few of the issues described so far have happened again, mostly unchanged: we experienced DEU overcrowding, as well as the need of redeploy some of the surgical personnel, with consequent struggles in the treatment of patients. Furthermore, much less doctors decide to

volunteer. However, thanks to the experience acquired, problems were transient and could be addressed in a couple of weeks, and doctors of other specialties had to provide mainly a supporting role: nonetheless, a sort of general unpreparedness could be felt.

Thus, our suggestion for the present second wave and for any subsequent one is to prioritize any reform addressed to improve efficiency, such as a cut of the bureaucratic burden on doctors, extensive training of all medical personnel on COVID-19 management, development and broadcasting of clear protocols of hospital rearrangement in cases of COVID-19 peaks, creation of adequate spaces and facilities allowing fast upscaling and relocation of resources as well as acceptable patient distancing. Most of these changes, especially those related to personnel recruiting and training, as well as building or renovation of hospital facilities, should be implemented during periods of lesser hospital load (i.e., between peaks), in order to avoid any uncertainty during the "hot phases".

Conclusion

Even just describing, after a few months, the rapid and confusing succession of events of the "first wave" of the epidemic in Lombardy is difficult: in a short article like the present perhaps impossible. The human impact has been deliberately omitted from discussion as well. These issues have already been widely discussed in other articles and were outside the main objective of this one: to highlight the most critical aspects experienced by a certain category, in order to highlight a further feature of the extraordinary event that is happening, and to implement the overall knowledge of the phenomenon.

The most significant aspect that we have tried to outline is the organizational difficulty, due to the rapid and unpredictable change in the situation, the flow of patients that soon became massive, the lack of adequate spaces and procedures, which made it necessary to resort to atypical solutions, as was the redeployment of specialist surgeons in the COVID-19 emergency department: however this happened without the appropriate coordination and without adequate support in terms of resources, due to the aforementioned unpredictability and sudden onset of the pandemic. As is well known, the price paid in terms of mortality and morbidity was very high in Lombardy: it is not excluded, but epidemiological elaborations on the subject are expected, that greater efficiency and flexibility, seen as the ability to overcome bureaucratic, logistical, regulatory or budgetary obstacles that prevent the rapid changes made necessary by the epidemic, could have helped to limit it.

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