



Article Type: Short Communication

Received: 25/11/2021

Published: 08/12/2021

DOI: 10.46718/JBGSR.2021.10.000245

Management of Hospital Overcrowding during the Second Wave of COVID-19 Pandemic in Pisa (Italy) before Vaccination Campaign: from Medical Stays to Low and Intermediate Cares

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ABSTRACT

Background: After the summer season, in Italy, a second wave of COVID-19 pandemic involved all the Italian Regions. From September to December 2020, in Tuscany Region COVID-19 cases increased from 15.000 to 110.000.

Methods: This occurrence led to a sharp raise of hospitalized patients, in the Azienda Ospedaliero-Universitaria Pisana (AOUP) (Pisa, Tuscany), a highly specialized teaching, with 1082-bed hospital. In this perspective we describe the application of a structural plan in AOUP for the management of hospital overcrowding during the second wave of COVID-19 pandemic.

Results: From November 16th, AOUP COVID hospital has been organized in different areas: Intensive Care Units intended for critical patients; Medical Stays intended for medium critical patients; a Low care structure intended for low critical patients needing continuous cares; an Intermediate care structure intended for patients needing nursing cares; and a COVID hotel intended for still positive patients in discharge.

Conclusion: This strategy may improve the COVID patients flow during the epidemic, allowing a quickly beds release and a continuous patient path from one level of care to another.

Keywords: COVID-19, low cares, intermediate cares, second wave.

Introduction

In Italy COVID-19 emergency evolved in a first wave in the period between February and May 2020 with over 200.000 cases [1]. Italian hospitals managed the increase of hospitalizations in terms of COVID and not COVID areas. In North West Tuscany, the Azienda Ospedaliero-Universitaria Pisana (AOUP), began their preparedness. The AOUP is a highly specialized, tertiary, 1082-bed hospital. COVID clinical wards were divided into infectious disease and pulmonology units. Further clinical wards and operating rooms were repurposed to realize 160 additional beds in COVID medical stays and 83 COVID beds in Intensive Care

Units (ICUs) [2,3]. This response induced the stop of the scheduled surgical activities, which were partly resumed from June 2020.

After the summer season, a second wave of COVID-19 emergency involved in Italy. From September 01st to November 24th, in Tuscany Region COVID-19 cases increased from 14.827 to 96.990 [4]. This occurrence led to a sharp raise of hospitalized patients, which increased in AOUP from 11 to 214, in almost 50 days. During the first wave the peak of hospitalized COVID patients was achieved in March 30th, with 187 patients.

Methods and Results

Considering this epidemiological trend, from October 15th the regional task force was set up in order to coordinate a new preparedness plan of the AOUP health services, providing a new procedure for hospital reorganization.

In a first moment, we dedicated 23 beds of infectious disease unit; 19 beds in pulmonary ward and 20 beds in a new COVID-19 pavilion [5].

In this second wave, a critical point consisted in the difficulty in converting of operating rooms and its ICUs in COVID areas, as performed in March 2020. This limit is due to the slowdowns in surgical activities, which were caused by the first wave. AOUP is a high specialized hospital, where surgical activities cover almost 65% of all healthcare services. In this plan, the AOUP may guarantee all the high specialized surgeries (transplants, oncologic and cardiac surgeries). Emergency interventions and 80% of all further surgeries were maintained. From October 15th, new clinical wards (endocrinology, geriatric, urology, internal medicine) were gradually converted in COVID area, with a total of 217 beds (132 beds in medical stays; 43 beds in sub-ICUs and 42

beds in ICUs).

This new reorganization resulted not-sufficient and a rapid beds exhaustion was obtained in few days. Considering the choice of not further reducing surgeries and clinic wards and considering the fast hospitalizations in COVID medical stays, on November 16th the task force teams implemented a plan to integrate the intermediate and low cares in AOUP. COVID-19 hospital emergency needs an “intermediate structure” suitable for patients in discharge from medical stays, needing a protected environment having medical devices and a continuous nursing surveillance [6].

The importance of these cares during COVID-19 pandemic, described by Regional Decree (7) may be useful for:

- A. avoiding the inappropriate hospitalization;
- B. ensuring the continuous cares;
- C. promoting the patients discharge and the homecare.

From November 16th, in AOUP, COVID hospital has been organized in different areas (Figure 1), including:

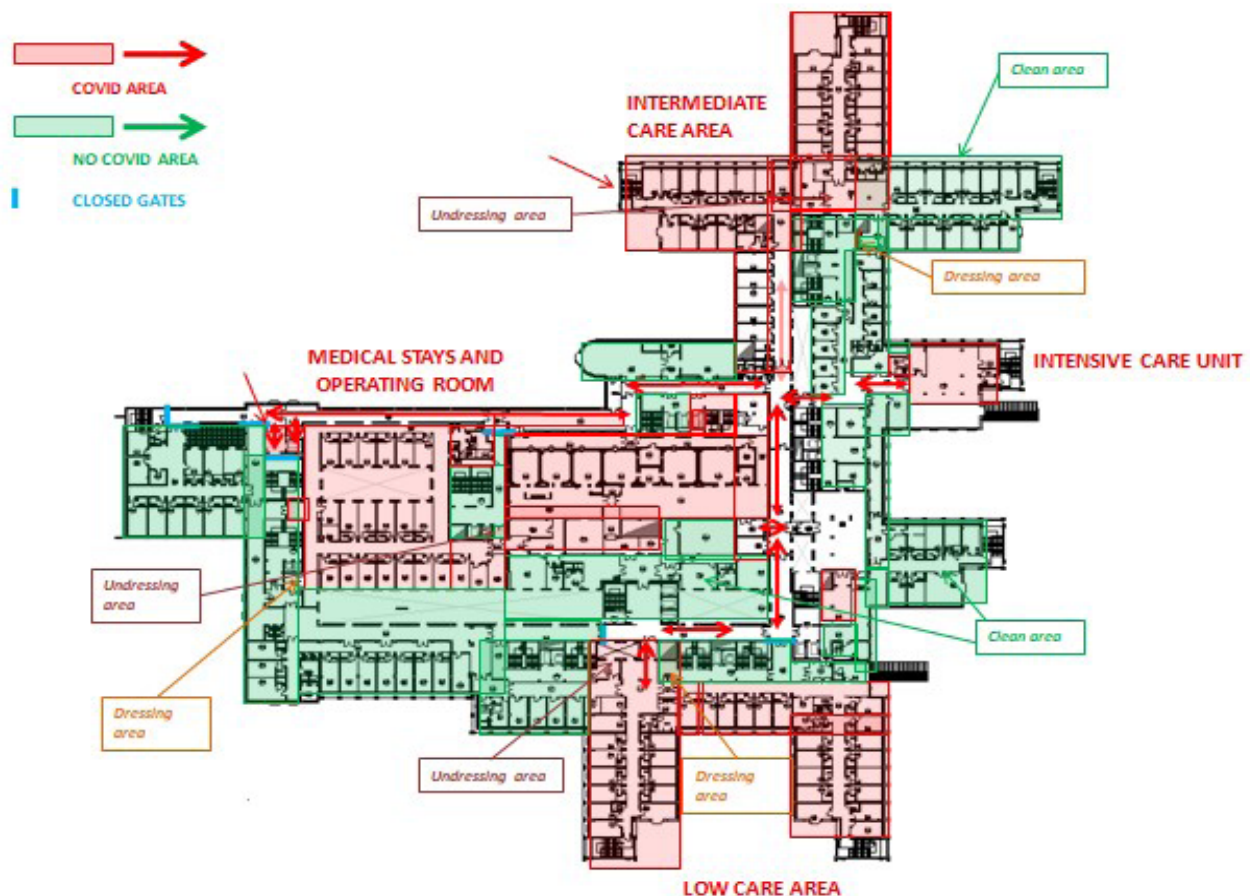


Figure 1: Planimetry of different healthcare levels reorganized in Azienda Ospedaliero Universitaria Pisana (AOUP) during the second wave of COVID-19 pandemic.

A. 42 beds in ICUs and 43 beds in sub-ICUs, intended for critical patients (including which needing C-PAP therapy);

B. 132 beds in Medical Stays intended for medium critical patients (including which needing C-PAP therapy) and Operating room unit;

C. 16 beds in “Low care structure” intended for low critical patients needing continuous cares (from November 16th).

D. 32 beds in “Intermediate care structure” intended for patients needing nursing cares (from November 16th);

E. 90 beds in “COVID hotel” intended for still positive patients in discharge.

F. Intermediate and low care structures were implemented after the evaluation of structural requirements (number of beds, ambulatories); organizational requirements (continuous nursing cares); technological requirements (equipments, medical devices).

G. Organizational model provides a “Low Care Team” composed by:

H. Medical staff (internist, geriatrician and anesthetist) with a 24/7 service;

I. Nursing staff (nurse and a social health operator) with a 24/7 service;

J. Rehabilitation staff (physiotherapist).

With a daily basis, medical and nursing staff check COVID Medical Stays in order to detect the patients which may be transferred in low care area. These evaluations are applied following the requirements defined by the Regional Decree (8) (blood oxygen saturation >94% in 48h; slow relaxed diaphragmatic breathing <22 breath per minute; absence of dyspnea; absence of non-invasive ventilation in 78h; hemodynamic stability).

The same evaluation is performed in low care structure,

in order to identify patients needing the only continuous nursing assistance in intermediate care structure.

Conclusion

These implementations improve the COVID patients flow during the epidemic, allowing a quickly beds release and a continuous patient path from one level of care to another. Patient discharge may be enhanced throughout the addition of different healthcare levels, from the high to the low care units, present in AOUP. In this way the most surgical activities are guaranteed and the risk of COVID hospital overcrowding may be reduced.

Acknowledgments

The authors acknowledge the efforts of healthcare workers and essential workers during the COVID-19 pandemic.

Conflict of Interest

All authors report no conflicts of interest relevant to this article.

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