

# Advances in Radiation Oncology

## Southern Italy: How the supply of radiation therapy, patient outcomes, and risk to health care providers have changed during the COVID-19 Pandemic

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<b>Corresponding Author:</b>	Maurizio Portaluri, M.D. Hospital A. Perrino Brindisi, ITALY
<b>First Author:</b>	Maurizio Portaluri, M.D.
<b>Order of Authors:</b>	Maurizio Portaluri, M.D. Francesco Tramacere, MD Tommaso Portaluri, MSc Emilio A.L. Gianicolo, PhD
<b>Abstract:</b>	

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Maurizio Portaluri, MD, Francesco Tramacere, MD, Tommaso Portaluri, MSc (1,2), Emilio A.L. Gianicolo, PhD (3,4)

Dept Radiation Oncology "A.Perrino Hospital", Brindisi (Italy)

1. IN Srl, Udine (Italy)
2. Centro per l'Eccellenza e gli Studi Transdisciplinari (CEST), Turin, (Italy)
3. Italian National Research Council, Institute of Clinical Physiology, Lecce, Italy
4. University of Mainz, Institute of medical Biostatistics, Epidemiology and Informatics, Mainz, Germany

## **Southern Italy: How the supply of radiation therapy, patient outcomes, and risk to health care providers have changed during the COVID-19 Pandemic**

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On March 11th, 2020, after the global spread of the COVID-19 epidemic, the World Health Organization (WHO) declared a spreading pandemic (1). As of 31<sup>st</sup> of March 2020, 809,608 people globally are registered as confirmed cases and 39,033 died. Italy has been particularly affected, becoming the second most-hit country after US per confirmed cases and the most hit per total deaths (2). In these days health capacity to assure equal assistance is scarce (3). Some radiation oncologists of the North of Italy described their experience in an area with a high incidence of the viral disease (4, 5).

The first COVID-19 patient in Apulia Region (Italy), one of the largest region of the South, was diagnosed on February 24<sup>th</sup>, 2020 while the first Italian patient in a hospital ward in Italy was diagnosed in Codogno on the 20<sup>th</sup> of February, a town in the South of Lombardy, the first Italian region for population and gross internal product per capita. The first case diagnosed in Apulia had been some days before in Codogno.

Since many people who live or work in Lombardy are originally from the South, their visit to parents and relatives represented one of the major way the infection spread from affected areas in the North to the South of Italy. Another way of infectious spread could have been by the transfer of patients, mostly cancer patients, who despite living in the South of Italy are treated in health institutions in Lombardy: this phenomenon is called “health migration” and depends on shortage of health care facilities in the South for causes beyond the scope of this letter. According to the Italian Ministry of Health, almost 40,000 hospital admissions per year take place out of the Apulia Region and more than 10,000 take place in Lombardy (6).

On March 28<sup>th</sup>, 2020, total diagnosed cases in Lombardy amounted to 39,415 and to 1,458 in Apulia. It should be noted that in the night of March 8<sup>th</sup> 2020, after miscommunications which followed first government restrictions to mobility from Lombardy and some other northern areas, about 25 thousands of students and workers came back to the South. A regional act prescribed them to communicate their arrival to regional authorities and to self-quarantine: in Apulia region about 2000 did so.

This letter describes how COVID-19 pandemic changed the supply of radiation therapy, patient outcomes, and risk to health care providers.

### **FIRST COVID-19 PATIENTS IN RADIATION ONCOLOGY DEPARTMENT**

On March 2<sup>nd</sup> 2020 in our radiation oncology department (ROd), a male patient with mediastinal syndrome was referred from the Medical Oncology department. He underwent CT simulation and started the treatment of five daily fractions. On March 5<sup>th</sup> 2020 a woman with brain metastasis

underwent CT simulation for whole brain and another patient with bone metastasis started treatment. During the second session of radiotherapy the patient with brain metastases had vomiting in the treatment room and treatment was stopped. Three technologists and one physician did not use personal protective equipment (PPE) at that time when they went into contact with her. On March 13<sup>th</sup> 2020 the head of ROD was informed that the aforementioned patients resulted COVID-19 positive. Two of them died some days after. The four professionals were put in quarantine and COVID-19 test was required. On March 16<sup>th</sup>, 2020, PPE were provided and constituted by surgical mask, FFP2 (Filtering Face Piece) mask to be used during contact with patients, disposable gowns and gloves. FFP1 masks filter nontoxic powder with an admitted leakage of 15%, FFP2 ones filter powder fumes and aerosols damaging the human health with maximum leakage of 11%, and FFP3 as the FFP2 but they also filter viruses and bacteria with a maximum leakage of 5%.

On March 19<sup>th</sup>, 2020, the Health Direction of the Hospital decided to do COVID-19 tests to all personnel: 1 out of 27 resulted positive. Note that these results were communicated one week after the tests were performed. None of the professionals got ill during this period.

After initial, inhomogeneous reactions across different regions, the testing for all the healthcare workers (HCW) was strongly required by the professional organizations. Following these protests, quarantine was reserved only to HCW coming into a “strict contact” (less than 1 meter) with COVID-19 positive patients without PPE (at least surgical mask) and tests were performed at the 7<sup>th</sup> day following the contact. In case of other type of contacts with positive patients, the HCW is required to keep working and to self-monitor her health status (temperature monitoring). It is likely that this policy was determined by regional shortage of tests and personnel. In this department the positive nurse was put in quarantine and the remaining HWC were treated as cases with non-strict contact because of the use of surgical masks.

## THE SEQUENCE OF LEGISLATIVE PROVISIONS AND THE NEW INTERNAL PROCEDURES

On March 8<sup>th</sup>, 2020, the Prime Minister (7) decreed a lockdown of the areas where the epidemic originated and of those in which spread faster; in the following days, other decrees extended the lockdown to the entire nation (8, 9). In this latter decree, it was disposed health professionals to adopt all the measures for an effective prevention of the diffusion of the respiratory infection, provided by World Health Organization (10). On March 9<sup>th</sup>, 2020, a new Decree-Law was published by the National Government for the empowerment of Health Service disposing health professionals to start, differently from general population, quarantine only at the onset of symptoms or after a positive test (11). These provisions obviously applied to the entire personnel of this department, also in the week following the COVID-19 tests, while waiting for the results which found one person positive. As a consequence, the tests are being performed again.

Because health service depends on regional governments, Apulia Government published a general act on 8<sup>th</sup> march, 2020, obliging people coming from the regions of onset of the epidemic to declare their name and address. Furthermore, an administrative act declared medical activities should still be performed, including radiation oncology (12).

On March 13<sup>th</sup>, 2020, another administrative act defined a procedure in case of contact between a health professional and COVID-19-positive patients (13). In case of contact without PPE with confirmed COVID-19 patient, the professional must be put in quarantine and tested after 7 days from the contact.

On March 16<sup>th</sup>, 2020, the local authority mandated the use of FFP2 mask in front of suspected cases and FFP3 in case of confirmed COVID-19 in aerosol generating procedures. Since then radiotherapy personnel in this hospital have used surgical masks and FFP2 in case of suspected cases. The local authority mandated also to perform a daily triage of radiotherapy patients: those

with cough or fever are thus to be excluded from the radiotherapy treatment and sent to a medical practitioner to start the diagnostic procedures for COVID-19

On March 17<sup>th</sup>, 2020, a hospital directive required physicians to “evaluate, for each patient, the opportunity to perform or delay” radiotherapy, to impose that patients enter individually into the ROd in order to avoid simultaneous waiting of too many patients and to give each of them a protective mask. In particular, treatment of breast and prostate postoperative patients and intact prostate cancers in hormone-deprivation patients was postponed. The scheduled delay was of two weeks.

Conversely, the Italian Health Ministry had published a note on March 10<sup>th</sup>, 2020, stating that the delivery of radiotherapy treatment in COVID-19 patients should be assured (14). This document declared also that the completion of oncologic treatment to patients who had contacts with COVID-19 infected persons should be assured. In our opinion, since the oncologic treatment could worsen immunosuppression and foster virus infection, this measure could lead to additional problems to patients and medical personnel.

On March 19<sup>th</sup>, 2020, the Italian Association of Radiation Oncology (AIRO) sent to its associates some guidelines coherent with the procedure provided by the regional and local health authorities in Apulia (15).

## ACTIONS

In this department, control visits were delayed unless patients, after telephone call, declared active oncologic problems or persistent acute side effects; for a first consultation the patients were offered the possibility to send the documentation by email and to do a video consultation by means a dedicated internet link not requiring any app installation (16). Up to now, we have treated three patients from the hospital wards who were subsequently diagnosed as COVID-19 positive and, in two cases, the start of outpatient radiotherapy treatment was interrupted as they informed they were under testing following contact with infected relatives.

In order to avoid having different patients at the same time in the waiting room we have distributed them in three sessions per hour and asked accompanying persons not to enter with the patient in the department. This decision has reduced the number of treatments per day. The total number of daily treated patients was reduced from 65 to 45 (two LINACs); as mentioned, one nurse resulted positive to COVID-19 test. According to the above-mentioned rules, there is no forecast of new tests in HCWs without symptoms. Consequently, in our scheduling, postoperative treatments – mostly favorable postoperative breast cancers, prostate cancer under hormone deprivation or with postoperative indication – have been postponed by two weeks. We will keep monitoring the impact of COVID-19 on our service supply.(Fig 1)

We have registered a good compliance with the new rules. Some elderly patients have asked to delay the treatment, most likely because mortality for COVID-19 in Italy is higher for people aged 80 and above. We have observed difficulties for many patients to complete tumor staging on an outpatient basis because of the restriction of ordinary health procedures. At this time, many wards are being closed and changed into COVID-19 wards so many surgical operations were delayed despite the law requiring that they take place.

## CONCLUSIVE REMARKS

Although radiotherapy is an activity formally guaranteed by authorities during the pandemic, it is likely that many patients will suffer a real shortage of access to diagnostic and therapeutic procedures, interrupting and postponing their treatment. We expect poorer outcomes for these patients in the near future. We also observed that a delay in providing PPE for medical personnel reduced the available staff, further affecting the treatment schedules.

In the controversial debate on whether people are dying *with* COVID-19 or *due to* COVID-19, there is probably a forgotten category: patients *without* COVID-19 who will still die *due to* COVID-19 and, specifically, for the shortage of resources or delays in treatments it is causing.

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Figure 1. Flow-chart of clinical events and actions (Rod = Radiation Oncology Department; HCW = Health Care Worker)

