



Surgical treatment of lung cancer during the coronavirus disease 2019 (COVID-19) pandemic: lessons learned

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Since 2019 the coronavirus disease (COVID) pandemic has had a huge impact on health-care systems worldwide, with most of the resources redirected to the treatment of the millions of patients infected by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) virus. Besides causing over six million of deaths mainly due to respiratory complications, the coronavirus disease 2019 (COVID-19) pandemic has also had relevant consequences in the treatment of neoplastic diseases, particularly of lung tumors (1). Especially in the first phases of the emergency hospital resources dedicated to the treatment of lung cancer were significantly reduced and reallocated to the treatment of COVID-19. Moreover, patients with lung cancer have a higher risk of severe pulmonary complications and mortality due to COVID-19 in comparison to the general population (2). A detrimental effect on the diagnosis of early-stage tumors and therefore on long-term survival may have also been caused by the suspension of screening programs and by a delayed referral of patients to general practitioners and hospitals due to the fear of being exposed to SARS-CoV-2 (3).

However, after the first months of the pandemic the health-care systems were gradually reorganized to provide adequate treatment to patients with COVID-19 while maintaining sufficient levels of care for other diseases as lung cancer. The health-care protocols were adapted in the different phases of the pandemic as the knowledge about the new viral infection grew, following the success of a worldwide vaccination campaign and the development of

new antiviral treatments that reduced the clinical impact of SARS-CoV-2 (4).

The strategies included strict patient and personnel screening and isolation protocols. Symptom screening, polymerase chain reaction test and computed tomography scan of the chest before surgery became standard procedures to allow surgical treatment of lung cancer to be maintained during the pandemic, taking into account the increased risk of respiratory complications and mortality in patients that developed COVID-19 after surgery. In fact, an important issue to limit perioperative morbidity concerns the ideal timing of the surgical treatment in patients with previous COVID-19, since mortality and morbidity were significantly increased in patients operated within 6 weeks of the diagnosis of a SARS-CoV-2 infection (5). In some regions patients with lung cancer were also referred to dedicated smaller ‘COVID-free’ hospitals, reserving major hospitals to the treatment of COVID-19 patients (6).

International societies have proposed guidelines to re-organize treatment according to the priority of the neoplastic disease and the availability of clinical resources. The American College of Surgeons (ACS) guidelines prioritized surgical treatment in three triage levels according to the number of COVID-19 patients and available hospital resources. In a first phase with few COVID-19 patients and adequate hospital resources the treatment of ‘ground glass’ lesions, slow-growing tumors and solid nodules <2 cm was deferred, since survival in these cases was not expected

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to be compromised if surgery was not performed within three months. In a second phase, with a high number of COVID-19 cases and limited hospital resources, elective procedures had to be delayed or referred to hospitals with preserved facilities. In a third phase in which almost all resources were dedicated to the treatment of COVID-19 patients, only emergent treatment for complicated cases was advised (7). The European Society for Medical Oncology (ESMO) also developed guidelines according to clinical and histological characteristics of the tumor and the type of treatment required, with priority criteria given to patients with more advanced stages and less differentiated tumors (8).

Despite the efforts made to optimize resources the pandemic had a significant impact on surgical treatment of lung cancer, especially in the first phases of the emergency. According to a survey of the Spanish Society of Thoracic Surgery a reduction by 95.7% of surgical procedures was observed (9). These data were confirmed by a survey of the European Society of Thoracic Surgeons (ESTS), that showed a delay of surgical procedures in 89% of the centers. This was in part due to the commitment of thoracic surgeons to the treatment of COVID-19 patients, reported in 63% of the centers (10).

Conversely, other reports showed that thanks to a reorganization of healthcare resources and application of specific protocols to protect patients and personnel against the SARS-CoV-2 infection, adequate volumes of surgical procedures could be maintained with limited morbidity. In particular, the data of the London Thoracic Collaborative Group showed that elective thoracic surgery procedures could be continued during the peak of the pandemic provided that strict screening and isolation protocols were maintained. The type of surgical approach was not modified, and in particular robotic-assisted thoracic surgery (RATS) and video-assisted thoracoscopic surgery (VATS) procedures continued to be carried out with favourable results (11). These data were confirmed by another Spanish study, in which the use of specific preoperative protocols including symptom screening, polymerase chain reaction test and computed tomography scan performed within 48 hours before the operation allowed to continue performing thoracic surgical procedures with limited perioperative morbidity (12).

In a more recent study Dolan *et al.* assessed the results of surgical treatment of lung cancer in a high-volume United States hospital and observed that despite a reduction of the number of operated patients during the peak of the COVID-19 pandemics, pathological tumor stage and waiting time before surgery were not significantly different

in comparison with the period before the COVID-19 outbreak. Two extremely important issues in this study concern the fact that no difference in the perioperative complication rate between the two periods of time was observed, and that no patient was tested positive for COVID-19 during the hospital stay and early period after discharge. The adopted protocol included preoperative COVID-19 testing, symptom screening and dedicated ward and intensive care unit beds. Triage case selection was accomplished by a local multidisciplinary team according to a priority score defined according to clinical variables. However, despite these favourable results, the study was not focused on patients that may have delayed referral or that may have undergone alternative treatments, and therefore the long-term repercussions of COVID-19 on long-term survival of patients with lung cancer are still to be unveiled (13).

In fact, according to a UK national population-based modelling study an increase in the mortality due to lung cancer between 4.8% and 5.3% is to be expected at 5 years following the COVID-19 pandemic (14). Moreover, a factor that has not been evaluated in depth concerns the long-term impact of the respiratory and cardiovascular sequelae of the SARS-CoV-2 infection and, on the other hand, a potentially favourable effect of occasional diagnosis of thoracic tumors in patients submitted to CT scan during COVID-19. Another point that may have negatively influenced the long-term results of surgical treatment of lung cancer concerns the suspension of the multidisciplinary team approach and a suboptimal preoperative staging that occurred in most of the centers during the pandemic. In fact, due to limited hospital resources multidisciplinary discussions were reduced despite the use of remote meetings, and according to the data of the ESTS survey they were maintained in only 66% of the centers (10). Moreover, the possibility to perform an adequate preoperative assessment, in particular endoscopic mediastinal staging, may have been hindered by the pandemic. In fact, according to a statement of the American Association for Bronchology and Interventional Pulmonology (AABIP), bronchoscopy had to be reserved to life-saving procedures due to the risk of personnel contamination (15).

In conclusion, an optimal reallocation of health-care resources allowed to maintain adequate surgical treatment of lung cancer during the pandemic with limited morbidity. International guidelines are essential to face a possible recrudescence of the pandemic or to cope with other global health emergencies in the future. However, the long-term impact of the pandemic on the treatment of lung cancer is to be unveiled only in the next few years.

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References

- Berzenji L, Vercauteren L, Yogeswaran SK, et al. Safety and Feasibility of Lung Cancer Surgery under the COVID-19 Circumstance. *Cancers (Basel)* 2022;14:1334.
- Passaro A, Bestvina C, Velez Velez M, et al. Severity of COVID-19 in patients with lung cancer: evidence and challenges. *J Immunother Cancer* 2021;9:e002266.
- Mazzone PJ, Gould MK, Arenberg DA, et al. Management of Lung Nodules and Lung Cancer Screening During the COVID-19 Pandemic: CHEST Expert Panel Report. *Chest* 2020;158:406-15.
- Fernandes Q, Inchakalody VP, Merhi M, et al. Emerging COVID-19 variants and their impact on SARS-CoV-2 diagnosis, therapeutics and vaccines. *Ann Med* 2022;54:524-40.
- COVIDSurg Collaborative; GlobalSurg Collaborative. Timing of surgery following SARS-CoV-2 infection: an international prospective cohort study. *Anaesthesia* 2021;76:748-58.
- Ciriaco P, Carretta A, Bandiera A, et al. Perspective: Did Covid-19 Change Non-small Cell Lung Cancer Surgery Approach? *Front Surg* 2021;8:662592.
- American College of Surgeons. COVID-19 Guidelines for triage of thoracic patients 2021. Available online: <https://www.facs.org/covid-19/clinical-guidance/elective-case/thoracic-cancer>
- Passaro A, Addeo A, Von Garnier C, et al. ESMO Management and treatment adapted recommendations in the COVID-19 era: Lung cancer. *ESMO Open* 2020;5:e000820.
- Martínez-Hernández NJ, Caballero Silva U, Cabañero Sánchez A, et al. Effect of COVID-19 on Thoracic Oncology Surgery in Spain: A Spanish Thoracic Surgery Society (SECT) Survey. *Cancers (Basel)* 2021;13:2897.
- Depypere LP, Daddi N, Gooseman MR, et al. The impact of coronavirus disease 2019 on the practice of thoracic oncology surgery: a survey of members of the European Society of Thoracic Surgeons (ESTS). *Eur J Cardiothorac Surg* 2020;58:752-62.
- Fraser S, Baranowski R, Patrini D, et al. Maintaining safe lung cancer surgery during the COVID-19 pandemic in a global city. *EClinicalMedicine* 2021;39:101085.
- Salmerón Jiménez M, Hermoso Alarza F, Martínez Serna I, et al. Clinical features and outcomes of thoracic surgery patients during the COVID-19 pandemic. *Eur J Cardiothorac Surg* 2020;58:738-44.
- Dolan DP, Lee DN, Polhemus E, et al. Report on lung cancer surgery during COVID-19 pandemic at a high volume US institution. *J Thorac Dis* 2022;14:2874-9.
- Maringe C, Spicer J, Morris M, et al. The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study. *Lancet Oncol* 2020;21:1023-34.
- Wahidi MM, Lamb C, Murgu S, et al. American Association for Bronchology and Interventional Pulmonology (AABIP) Statement on the Use of Bronchoscopy and Respiratory Specimen Collection in Patients With Suspected or Confirmed COVID-19 Infection. *J Bronchology Interv Pulmonol* 2020;27:e52-4.

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