COVID-19



As the COVID-19 pandemic unfolds, imaging is playing an increasingly vital role in determining therapeutic options, patient care management and new research directions. We are learning that patients with novel COVID-19 infection have a variety of clinical presentations and outcomes. They may be asymptomatic with a positive test for infection, or exhibiting only mild cold like symptoms. Recent clinical experience has shown that chest imaging in infected patients may show specific lung findings that can be used to triage patients for isolation and predict for severe infection sequelae. To date, most experience has been with chest CT and radiographic exams. Use of imaging for COVID-19 infected patients is proving to be valuable for patient triage, risk assessment for poor outcome, particularly in at risk populations, and follow-up. Beyond the respiratory system, advanced imaging is being used to track renal, hepatic, cardiac and neurological sequelae of COVID-19. There is a growing corpus of digital pathology images as well, drawn from both biopsy and post mortem samples. Whole body MR or CT virtual autopsies are being performed in some institutions.

Early research from China and Europe has clearly demonstrated the efficacy of quantitative image analysis including machine learning based radiomic analyses, for example, to distinguish between viral pneumonia and COVID-19 ARDS. As of July 7, 2020, the NLM LitCovid literature hub lists over 1400 publications analyzing CT image data from COVID-19 patients based predominantly on local data sets. These preliminary findings require large, multi-national open access data for validation.

The NIH has launched the National COVID Cohort Collaborative (N3C) program to gather and analyze COVID-19 related clinical data, currently not including imaging. Because there is an urgent public health need to have COVID-19 image data for all disease stages freely available for caregivers and the research community immediately, the NCI Cancer Imaging Program (CIP) is utilizing its Cancer Imaging Archive (TCIA) as a resource for making image sets public since it is uniquely ready to carry out a short term effort COVID-19 patient images for immediate reference by the community.

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COVID-19 Datasets on TCIA

1. Chest Imaging with Clinical and Genomic Correlates Representing a Rural COVID-19 Positive Population (COVID-19-AR)
2. CT Images in COVID-19
3. Medical Imaging Data Resource Center (MIDRC) - RSNA International COVID-19 Open Radiology Database (RICORD) Release 1a - Chest CT Covid+ (MIDRC-RICORD-1A)
4. Medical Imaging Data Resource Center (MIDRC) - RSNA International COVID-19 Open Radiology Database (RICORD) Release 1b - Chest CT Covid- (MIDRC-RICORD-1B)
5. Medical Imaging Data Resource Center (MIDRC) - RSNA International COVID-19 Open Radiology Database (RICORD) Release 1c - Chest x-ray Covid+ (MIDRC-RICORD-1C)
6. Stony Brook University COVID-19 Positive Cases (COVID-19-NY-SBU)

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Additional resources

- ACR guidance: https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Recommendations-for-Chest-Radiography-and-CT-for-Suspected-COVID19-Infection
- RSNA data collection: https://sites.google.com/rsna.org/rsna-ricord-resources/home?authuser=1
- NLM LitCovid Literature hub: https://www.ncbi.nlm.nih.gov/research/coronavirus/
- National COVID Cohort Collaborative (N3C): https://ncats.nih.gov/n3c

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