

Pre-operative CT Chest as a screening tool for COVID-19: An appraisal of current evidence

Editor

The safety of patients and health care professionals stipulates screening and early diagnosis of COVID-19 infection in patients undergoing surgery or other in-hospital procedures. Real-time reverse transcriptase-polymerase chain reaction (RT-PCR) of nasopharyngeal swab has been the gold standard test and has been used universally or selectively as a preoperative screening tool. However, results may not be readily available and have high turn-around time. This, in addition to encouraging results from early studies using Chest CT for identifying the typical pulmonary lesions related to the COVID-19 infection, prompted clinicians to recommend it as a screening tool¹. The standardized COronavirus disease 2019 (COVID-19) Reporting And Data System (CO-RADS) performs well in assessing pulmonary involvement of COVID-19 in an unenhanced chest CT¹. Its high sensitivity induced clinicians to consider it as a primary tool for current COVID-19 detection in epidemic areas.

However, more rigorous scrutiny of evidence recently by systemic reviews questioned the sensitivity and use of chest CT as a screening tool for COVID-19 patients². This prompted us to appraise the current evidence on this crucial issue in a preoperative setting. We included studies published between 1st February 2020 and 31st July 2020 with more than 5 cases reporting the use of preoperative CT in a surgical setting (emergency or elective). Recommendations, guidelines, commentaries, reviews, viewpoints, opinions, and non-peer-reviewed material were excluded. QUADAS-2 (Q – Quality, A – Assessment of, D – Diagnostic, A – Accuracy, S – Studies) as an evidence-based tool was used for the quality appraisal of retrieved publications.

Overall, six studies (total 2434 patients undergoing CTs) were found on preoperative use of chest CT scans in routine and emergency settings, CT was found positive in 10-80% (range 4-81-16-8), and RT-PCR in 1-88% (range 0-8-81). Important observations included unnecessary delays in elective surgery due to false-positive CT findings which were not confirmed on RT-PCR and the

fact that there was no change in the management in an emergency setting. Five out of six studies concluded that preoperative screening by CT chest is not justified in low prevalence populations (Table 1)³⁻⁸. Quality assessment of diagnostic accuracy by QUADAS-2 assessment revealed that most of the studies had a high risk of bias, however, all rated low for concerns about applicability domains.

As this pandemic continues to rage; our knowledge, attitudes, and practices toward COVID-19 continue to evolve. These recent findings have put a question mark on the use of Pre-operative CT Chest as a screening tool for COVID-19; moreover, its positive predictive value further decreases with disease prevalence^{5,6,8}. Other concerns include radiation hazards to patients, additional pressure on imaging departments, delay in emergency surgical management, increased cost of treatment, risk of transmission while visiting the radiology department, the safety of radiology personnel, need for decontamination of radiology equipment, and therefore, unavailability of CT room for a period after the imaging of a COVID-19 positive patient. This change in the philosophy of its down-

Table 1 Summary of findings in studies using preoperative CT Chest screening in a surgical setting

Author	Month of Publication	No of patients undergoing Chest CT	Positive on CT	Positive on RT-PCR	Remarks
Callaway <i>et al</i> ³	June	677	90(13.49%)	13/643(2.02%)	Sensitivity- 68.4%, Specificity- 88%, Disease prevalence- 2.95% Difficult to justify this additional examination.
Chetan <i>et al</i> ⁴	June	439	32(7.28%)	7(1.59%)	Altered surgical management in 7% of the elective surgical cohort, but not in the acute abdominal emergency cohort requiring surgery.
Hernigou <i>et al</i> ⁵	July	298	16(5.36%)	20/227(8.81%)	Chest CT scan is no longer useful outside the pandemic period Most accurate diagnostic test for COVID-19 pneumonia in patients who needed surgery in emergency Useful in patients who had a previous symptomatic infection with recovery and may have pulmonary sequelae
Huybens <i>et al</i> ⁶	July	374	18(4.81%)	3(0.80%)	CT chest has no added value in a low prevalence population.
Ikehara <i>et al</i> ⁷	July	21	2(9.52%)	0	54% of asymptomatic patients have Pneumonic changes on CT, chest CT screening before procedural endoscopy may contribute to identify COVID-19 patients.
Shah <i>et al</i> ⁸	July	625	105(16.8%)	1(0.16%)	Chest CT scanning did not provide valuable information in detecting asymptomatic cases of COVID-19 in low prevalence populations.

grading as a screening tool, is reflected in newer revised recommendations that exclude CT chest as an essential part of preoperative work-up^{9,10}. The CT chest remains relevant as a preoperative screening tool in the emergency settings where the result of RT-PCR may not be readily available but has questionable value in an asymptomatic patient belonging to the low-prevalence area. However, in the elective settings, where results of RT-PCR are available, CT continues to play a role of an imaging tool for symptomatic COVID-19 patients who are at a higher risk of complication after surgery or the COVID-19 recovered patients with a pulmonary sequel.

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