



Advice on appropriate use of CT throughout the COVID-19 pandemic – 9 April 2020

Key messages:

- The safety of surgical teams is paramount.
- Compared to the UK, USA and some European centres, Australia and New Zealand currently have less community transmission, better access to PPE and better access to PCR testing. Guidelines from these international centres may therefore be inappropriate in the Australian and New Zealand context.
- CT chest has a radiation exposure risk.
- CT chest has poor sensitivity for Covid-19 in asymptomatic patients or those early in the disease and should have no bearing on determining appropriate infection precautions.
- Surgical patients under investigation for Covid-19 (based on history or clinical presentations or findings) should be managed as such with droplet +/- aerosol precautions irrespective of CXR or CT findings.
- Routine CT chest of surgical patients who do not meet the criteria for coronavirus PCR testing is not currently justified in the Australian and New Zealand context.

The Royal Australian and New Zealand College of Radiologists (RANZCR) recognises the need for our surgical colleagues to have the utmost protection against the risk of becoming infected during the course of their daily work and strongly supports policies, procedures and PPE that facilitate this.

However, RANZCR strongly advises against conducting routine chest CT scans for all individuals undergoing emergency surgery in Australia and New Zealand. RANZCR believes the misuse of chest CT and misapplication of results in this situation bring unnecessary and clinically important risks to the surgical team and the patient, given the current status of the COVID-19 pandemic in Australia and New Zealand.

RANZCR is aware that the routine utilisation of chest CT has been advocated for patients proceeding to urgent surgery in statements recently released by some surgical Colleges. This includes the four Surgical Colleges in the United Kingdom and subsequently the Royal Australasian College of Surgeons (RACS). The relevant statements are included at appendix A. Furthermore, RANZCR recognises that, in the case of emergency surgical conditions, it is likely to be unfeasible for a patient who is under investigation for COVID-19 to have the results of PCR testing in a timeframe that allows precautions to be removed prior to surgery. "Under investigation" is defined **either** as:

- a. A patient who has had a clinical risk assessment and nasopharyngeal swab due to meeting certain clinical and epidemiological criteria for being tested using RT – PCR,
OR
- b. Having been identified, based on this risk assessment, as requiring a swab.

In emergency procedures, the patient and their immediate environment (including staff, operating theatres and imaging equipment) should be treated as if the patient were COVID-19 positive on RT - PCR until proven otherwise. PPE appropriate for droplet and/or aerosol precautions should be used and the equipment and rooms cleaned according to local protocols. Currently in Australia and New Zealand, there is no evidence that PPE is in such short supply that emergency surgical teams do not have adequate access to appropriate equipment when a patient is under investigation for COVID-19.

In emergency surgical procedures, a chest CT has no bearing on the infection control precautions that are put in place. A chest CT may be very useful if the patient has suspicion of chest pathology e.g. metastatic disease or pulmonary embolism. However, chest CT performed for no reason other than to screen the patient for possible COVID-19 does not change the need to protect equipment and staff from possible infection until COVID-19 precautions can be removed through a combination of negative swab(s) and clinical risk reassessment.

Findings in Chest CT are normal in 20% of patients who are hospitalised with COVID-19 (Ai et al, Radiology, 2020¹), and in 50% of those who are asymptomatic but swab positive (Inui et al, Radiology, 2020²). Thus, the absence of lung parenchymal changes on CT should not lead to removal of COVID-19 precautions when a patient is *clinically assessed* to be at sufficient risk as to be under investigation for COVID-19.

The recommendations of the international Royal Surgical Colleges may be a pragmatic response in an environment of PPE shortage, substantially higher and more rapidly growing rates of community transmission (and thus possible asymptomatic carriage), as well as much lower rates of PCR testing than exist in Australia. The situation in Australia is not the same as overseas.

It is the view of RANZCR that the routine exposure to chest CT of all individuals who do not meet current clinical and epidemiological criteria for COVID-19 PCR, but who are having emergency abdominal surgery, cannot be clinically justified in Australia or New Zealand. This position is based on current sufficient access to PPE and PCR testing in both countries, demonstrated low rates of community transmission derived from high quality [national data collection](#), diminishing numbers of new cases of COVID-19 despite testing criteria that have continued to be liberalised, and likely low rates of asymptomatic carriage based on >98% PCR test negativity and more than 310,000 tests having been performed in Australia. This contrasts sharply with the recent situations in China, the United Kingdom, and Italy which gave rise to utilisation of CT as a screening test in an environment of high pre-test probability, even in asymptomatic people, and the need to ration PPE.

Appropriate use criteria and the principle of clinical justification prior to exposure of a patient to ionising radiation are as important now as they ever have been. In particular, the population exposures that may ensue from widespread use of chest CT, especially in young adults, with no medical indication, are of significant concern.

The unintended adverse consequences of utilising chest CT as a routine to screen for COVID-19 in all patients who are having abdominal CT when they do not have sufficient clinical or epidemiological risk factors to justify COVID-19 PCR include the following:

1. **Lack of scientific evidence at present about the specificity of so called “COVID-19 typical” lung findings.**
This means that in a patient with no clinical/epidemiological reason for suspecting COVID-19, ascribing changes to COVID-19 could trigger PCR testing, relegate the patient to a COVID-19 hospital or COVID-19 ward, when there are no longer private isolation rooms, while they await their PCR result and clinical review. This exposure to the risk of COVID-19 will occur during their post-surgical convalescence due to incorrect diagnosis of COVID-19 lung disease on CT, when they have something else entirely such as influenza, adenovirus, other community-acquired lung infection, or drug reaction - related lung disease. In Australia and New Zealand at present, these other infections continue to be much more common causes of community-acquired lower respiratory infection when the patient has no clinical or epidemiological risk of COVID-19. This will be increasingly true with the onset of the influenza season.
2. **Radiation exposure from the initial chest CT and follow up examinations for incidental findings increasing the theoretical risk of carcinogenesis** to radiosensitive organs that are essentially unexposed during routine abdominal CT including breast, thyroid, lung and bone marrow of the spine and ribs.
3. **Identification of incidental lung nodules and other unexpected chest/lower neck findings that will trigger recommendations for follow up imaging.**
4. **Lack of current evidence in Australia and New Zealand that high rates of community transmission exist and, by association, a lack of evidence that asymptomatic, infected patients would be frequently or even occasionally detected on screening CT.** The likelihood of current low rates of community transmission is supported by very high rates of PCR testing by international standards and low rates (1 – 1.8%) of test positivity in symptomatic individuals despite increasingly liberal testing criteria.

Appendix A

Royal Australasian College of Surgeons (RACS)

- COVID-19 precautions in the operating theatre:
 1. The following patients are regarded as high risk for COVID-19
 - a. Positive test for COVID-19
 - b. Close contact with a confirmed case of COVID-19
 - c. International travel within the last 14 days
 - d. Any of the following symptoms:
 - i. Sore throat
 - ii. Cough
 - iii. Shortness of breath
 - iv. Fever > 38C
 2. At least 15% of patients are asymptomatic
 3. **Identify high risk COVID-19 patients pre-operatively. All should have a Chest X-ray (or better, CT Chest whenever any other CT is required, particularly CT Abdomen- include chest on requisition).**

The four Royal Surgical Colleges and the Association of Surgeons of Great Britain and Ireland in a [statement](#) issued 6 April 2020 that included the following advice which they stated also had the support of the Royal College of Radiologists (RCR).

Acute patients are our priority. COVID-19 should be sought in any patient referred acutely or needing emergency surgery: history, COVID-19 testing, and CXR can assist. Any patient undergoing an abdominal CT scan for acute pain as an emergency presentation should have a CT chest at the same time, unless CT chest previously performed within 24 hours. Current tests for COVID-19, including CXR and chest CT, may be false negative.

References

1. Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, Tao Q, Sun Z, Xia L. Correlation of Chest CT and RT-PCR Testing in Coronavirus Disease 2019 (COVID-19) in China: A Report of 1014 Cases. Radiology 2020).
2. Inui S, Fujikawa A, Jitsu M, Kunishima N, Watanabe S, Suzuki Y, Umeda S, Uwabe Y. Chest CT Findings in Cases from the Cruise Ship "Diamond Princess" with Coronavirus Disease 2019 (COVID-19). Radiology: Cardiothoracic Imaging 2020).

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