

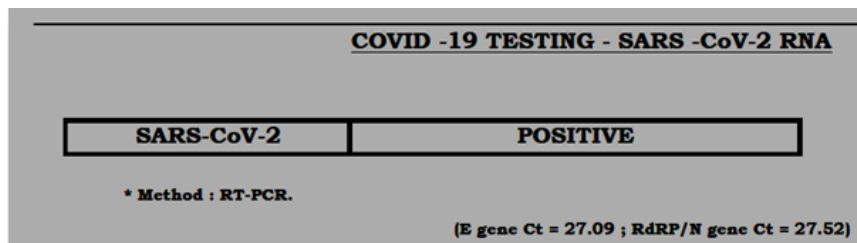
Essential Update

CT Value in the RT-PCR Report : What does it mean?

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The Covid-19 pandemic has revolutionized the field of medicine over the last one year. It was just one year ago, on 31st December, 2019 that the first case of novel coronavirus was reported from Wuhan, China. Now, after one year, this new virus has left a trail of death and mayhem in all the continents. One of the significant paradigm shifts in this pandemic has been the widespread use of molecular genetic tests. In the previous epidemics like scrub typhus, dengue or malaria, the diagnosis was mainly done by antigen or antibody tests. But Covid-19 is the first pandemic (besides the small outbreak of swine flu in 2009) where the main diagnostic modality is a genetic test. For internists, this is a new domain and they have to get used to the technical terms. One such frequently used term: **CT** is described here.

Let us look at a Covid-19 test report of a recent patient:



Right below the RT-PCR positive report, the Ct value is written for two different genes. The full form of this is **Cycle Threshold**. In RT-PCR, the clinical material is subjected to repeated cycles of DNA amplification to reach a threshold of detection. Ct is the number of cycles required for the fluorescent signal to reach this threshold. Thus, if the nuclear material in the sample is high, it will get amplified easily with less number of cycles, that is, the Ct value will be low. So, lower the Ct value, more the amount of DNA/RNA in the clinical

sample; in other words, more the viral load.

Usually, the instruments used for clinical purpose perform around 40 replication cycles per sample. If nothing is detected by 40 cycles, the sample may be considered to be negative for clinical purpose.

The two genes mentioned here are **E**: envelope protein and **RdRP**: RNA-dependent RNA polymerase. If only one gene target is used for PCR detection, the test will be faster. But accuracy will be less. Most Indian laboratories are using two gene targets (as shown in this report).

What is the Ct value for considering high viral load? This cut-off is still debatable and different authors have mentioned different cut-offs from 25 to 29. When do you consider a test to be negative? This is again debatable. While some authors define a threshold of 35, others consider higher values to determine negativity.

The Ct value may vary with the kit used, the method of sample collection and the temperature at which the sample is transported. Thus, at present, there is no clinical significance of this number. Low values can identify high viral load, **BUT IT DOES NOT CORRELATE WITH PROGNOSIS, CHANCE OF PROGRESSION OR INFECTIVITY** of that person. Clinicians should not give undue importance to this number. Patients should be treated mainly based on clinical judgement.

REFERENCES

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