extraction and d) retro-transcription of viral RNA e) Amplification.

RESULTS AND DISCUSSION

Serological test

For detecting specific viruses, a variety of serological tests have been used, including Neutralisation tests,

- Immuno Fluorescent Assays (IFAs),
- Enzyme-Linked Immunosorbent Assays (ELISA),
- Immuno Chromatographic Tests (ICT).

Molecular testing is comparatively arduous than serological tests as serological test detects antibodies like IgA IgG and IgM antibodies from materials like blood and saliva by using assays like ELISA. Their diagnostic value for early infections must be restricted during symptoms onset, during this time, virus shedding appears to be at its peak, and the danger of transmission appears to be at its highest. For consistent antibody response many days and at times weeks are required. If results come out to be negative it doesn't rule out COVID-19 infection, especially in those who have recently been exposed to the virus as it could be false negative. Antibody cross-reactivity with non-SARS-CoV-2 coronavirus proteins is also a concern, as positive results could be the consequence of previous or current infection with other human coronaviruses (Figures 7 and 8) [11].

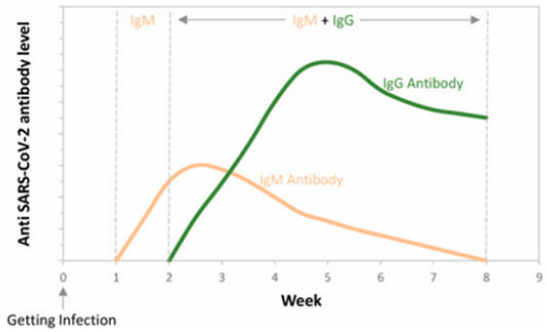

Figure 7: At different weeks following infection: initially there is no antibody formation. Then there is formation of IgM antibody and further IgG antibody formation occurs producing an immune response for longer time period.

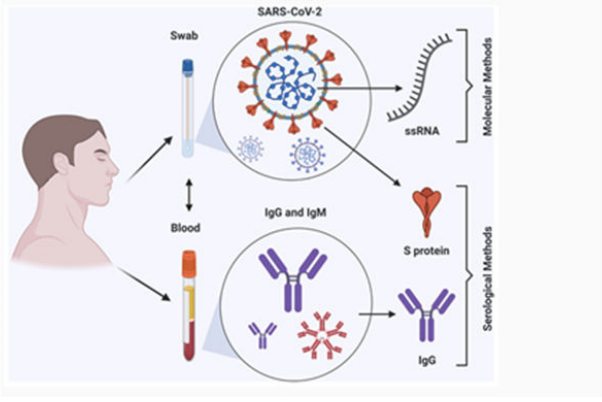

Figure 8: Summary: COVID-19 detection methods.

Enzyme-linked immunosorbent assay

Enzyme Immunoassay is different type of serological test (EIA). In clinics and research laboratories, ELISA is for identifying and quantification of molecules which are soluble like proteins and antibodies. ELISA consists of direct test and indirect test both. Antigen is coated on inside surface of 96 well or 384 wells of polystyrene in indirect ELISA as it are more sensitive than direct ELISA. Wells are pre-filled with patient plasma which is diluted and it may consist of IgG/IgM antibody of SARS-CoV-2, after that plate is incubated and antibodies combine with antigens on surface for an hour. After washing the plate to remove unspecific contacts, a conjugated antibody that is antibody antigen complex with a recognised enzyme such as Horseradish Peroxidase (HRP) or Alkaline Phosphatase (AP) is added to make complexes. Then complexes are detected and estimated or quantification is done by introducing a substrate (for example: 3,3′,5,5′-tetramethylbenzidine) to the reaction. Results are shown as colour change in reaction. There is a plate reader for detecting and measuring colour. When compared to rRT-PCR, ELISA is quick (2-5 hours) and cheap. On day 0 of COVID-19 infection, ELISA results for patients were 49% (IgG) and 80% percent (IgM), and on day five, they were 80 percent (IgG) and 99 percent (IgM) (Figure 9 and Table 1).

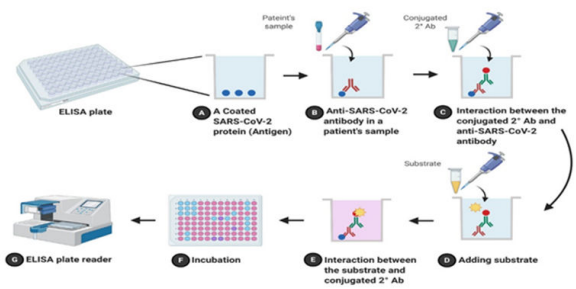

Figure 9: Indirect ELISA flowchart diagram; a) Coated COVID antigen in well; b) Antibody in patients' sample; c) Interaction between antigen and antibody; d) Addition of substrate e) Interaction of substrate and conjugated secondary antibody; f) Incubation; g) Reading of result on ELISA plate reader.

Table 1: Properties of NiTi and stainless steel rotary files.

	Molecular methods			Serological methods	
Technique based	**rRT-PCR**	**Isothermal amplification**	**CRISPR-Cas-12**	**LFA**	**ELISA**
Sample	RNA	RNA	RNA	Ag or Ab	Ag or Ab
Accuracy	High	High/Moderate	High	Low	Moderate
Time"	Hours	Minutes	Minutes	Minutes	Hours
Professional skills need	Yes	Yes	YES/No	No	Yes
POCT	No	Yes/No	Yes/No	Yes	No
Availability	Limited	Limited	Limited	Available	Available
Cost	Very high	High	Average	Low	Average
High throughput	Yes	No	No	No	Yes

Method: we have gathered knowledge from PubMed and google scholars using main term like diagnosis of COVID-19 considering both molecular and serological basis of virus detection. After gathering data from many articles this summary report is created. The global threat posed by the COVID-19 pandemic is serious issue. With a mild clinical manifestations and asymptomatic carriers, it's noticeable that controlling covid-19 requires an early and correct diagnosis. Rt-PCR is a critical component of SARS-CoV-2 laboratory diagnosis; however, it has significant drawbacks. A combine approach of Guiding patient management and infection control, combining laboratory tools (rt-PCR, serology and radiographic characteristics and clinical features) is required [12,13]. The present methods can be utilised quickly and mainly quantitatively in the event of a COVID-19 revival, allowing for the rapid detection of additional infected persons, isolation, and confinement measures. Further test optimization and clinical and epidemiological validation, as well as official FDA clearance, are still required [14,15]. Few of the related key studies were reviewed [16-21].

CONCLUSION

The diagnostic value of a test is not solely determined by the technique of collecting the material, the quality of the sample, or the equipment used, as it is with any other infectious disease. From the moment a sample is obtained, as well as a suitable technique (storage and handling) before to analysis, are equally important pre-analytical concerns. Author contribution: All authors made best contribution for the assessment and evaluation, concept, data acquisition and analysis and interpretation of the data.

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