A QUESTION ANSWER SESSON ON DIAGNOSTIC TESTS OF COVID AND ALSO ON POST VACCINATION TESTING.

The majority of tests for Covid-19 can be divided into

- **Polymerase chain reaction (PCR) and**
- **Serologic tests.**

Both of these tests use different kinds of samples to search for different hallmarks of the SARS-CoV-2 virus – and neither of them are exactly perfect.

"At the moment the majority of the current Covid-19 tests that all the reports are coming from are using PCR," says University of Sussex senior lecturer in microbiology Dr Edward Wright.

"They detect the genetic information of the virus, the RNA. That's only possible if the virus is there and someone is actively infected."

It is to be understood that PCR tests are used to directly detect the presence of an antigen, rather than the presence of the body's immune response, or antibodies.

By detecting viral RNA, which will be present in the body before antibodies form or symptoms of the disease are present, the tests can tell whether or not someone has the virus very early on.

Advantages of PCR

PCR gives us a good indication of who is infected.

They can be isolated and get in contact with people they've been in touch with so they can be quarantined too, just in case.

This is important as doctors who are operating patients are sur that the patient is a Covid.

By scaling PCR testing to screen vast swathes of nasopharyngeal swab samples from within a population, public health officials can get a clearer picture of the spread of a disease like Covid-19 within a population. PROBLEM IS ITS TIME CONUMING and especially now in Indian scenario, will take further time as lacs of reports are pending.

Warwick Medical School honorary clinical lecturer Dr James Gill said: "During the course of the outbreak, the PCR testing has been refined from the initial testing procedures and with the addition of greater automation to reduce errors. **As such, we now have 80-85% specificity – i.e. the chance the test is detecting the virus.**

What is serologic testing?

Wright says: "**An antibody test tells us what proportion of the population has been infected**.

It won't tell you who is infected, because the antibodies are generated after a week or two, after which time the virus should have been cleared from the system. But it tells you who's been infected and who should be immune to the virus."

This point is important for surgeons, as during OT the surgeon can't be sure if the patient is then in active Covid.

It's not yet clear how long any immunity period after a Covid-19 infection will turn out to be. Historical studies have indicated that people who survived the 2003 – 2003 sudden acute respiratory syndrome (SARS) outbreaks had antibodies in their blood for years after recovery.

Both SARS and Covid-19 are caused by coronaviruses, but it's too early to say if Covid-19 will generate a similar immune response. Reports also indicate that some people have been infected with the virus twice over, meaning these particular patients didn't develop any immunity at all.

All that said, if public health officials can get a handle on what proportion of the population are theoretically immune to the virus, the information could help lift the social distancing restrictions on movement.

"If there's a high enough level of people in the population who have immunity, they will then stop this virus from circulating within the population, which is known as herd immunity," says Wright. **"If someone is infected, as long as the people around them have immunity the virus won't be able to spread."**

Unlike PCR tests, which commonly use swabs to detect Covid-19, blood samples are usually used for antibody tests. This is because there will be a very small amount of the coronavirus circulating in the blood compared to the respiratory tract, but a significant and measurable antibody presence.

How about a lateral flow assay?

Canadian firm Sona Nanotech has been attempting to push a completely different kind of rapid screening test for Covid-19 to market. It's a quick-response lateral flow assay, and the firm says it expects its test to produce results in five to 15 minutes, and be administrable by untrained individuals. Lateral flow assays have a wide array of applications and can test a variety of samples like urine, blood, saliva, sweat, serum, and other fluids.

All lateral flow tests are designed to identify the presence of a specific biological marker. Sona owns a proprietary gold nanorod technology which can be used in numerous lateral flow applications. In lateral flow tests, particles like Sona's nanorods are used to bind to biological materials and carry them along a test strip, producing a positive or negative result.

This isn't a PCR test which requires a swab, a wait and specialist analysis to yield a result. Many antibody tests rely on lateral flow, but it isn't one of those either, as Sona's test will directly detect the Covid-19 virus.

The ease-of-use of Sona's technology should make it suitable for in-home testing and monitoring, to help identify if patients need treatment in a clinical facility. It should also be able to verify if people are ready for release from quarantine and to screen individuals prior to entering closed public venues like aeroplanes.

Rapid in-clinic antigen testing

Bosch has also taken an innovative approach to Covid-19, developing a point of care swab test designed to produce results in **less than two and a half hours**.

Running on Bosch's pre-existing Vivalytic analysis device, the company says the test is one of the world's first fully automated molecular diagnostic tests that can be used directly by all medical institutions.

Vivalytic consists of an analyser device and matching test cartridges. There are biological components in each of the cartridges that are used to prove whether a sample contains SARS-CoV-2 or nine other respiratory viruses. This eliminates the need for further tests if a patient doesn't have Covid-19, but is presenting with one of the nine other infections.

The will be made available in Germany in April, with other European markets to follow.

A Bosch spokesperson says: “The Covid-19 quick test from Bosch is one of the world’s first fully automated molecular diagnostic tests that is able to determine an infection with SARS-CoV-2 and nine other respiratory viruses within 2.5 hours. It is therefore an antigen test.”

SUMMARY

In an urgent situation, a surgeon can get a rough idea whether the patient has been infected in past, and by certain tests like Gene-expert or Rapid antigen can have a rough idea whether the patient on table is Covid.

However, if the surgeon wants to be sure, and can wait (elective surgery) then still the gold standard is PCR.

POST VACCINATION TESTING

Preventive testing and diagnosis remain to be the keys to fighting the COVID pandemic. Antibody tests, which act as a derivative of infection-driven immunity are currently on the rise right now, especially amongst those who have been vaccinated against novel coronavirus to check whether or not they have gained the benefits of vaccination.

In some places, people belonging to higher-risk categories, such as elderlies, who are prone to frail immunity are also being advised to get it done to check if the vaccine is working well on them or not.

When do you have sufficient immunity after getting vaccinated?

Most vaccines we have right now work as two-dose regimes (barring the single-dose Johnson and Johnson jab). Both the doses are subjected to be given a while apart so that a person scores maximum immunity.

While both the doses help drive up immunity-granting antibodies (and therefore generate immune reactions or side effects), a person will only be considered fully vaccinated or fully immunized 14 days after receiving the second vaccine dose. A rise in antibodies before that would be considered partial immunity.

What happens if you do not have enough antibodies then?

- As per international standards**, an antibody count between 10-1000 IU is deemed protective.** Experts say that vaccine driven immunity could scale upwards of 300 when a person is inoculated. *However, simply going by the numbers may not be ideal.*
- For example, there can be people who may be well-protected but have certain complications that do not help them mount necessary antibodies.
- It could also happen with the ones who may have battled an infection.
- Lower production of antibodies, though rare is also sometimes attributed to genetic and chromosomal mismatch. However, it does not mean the vaccine may not be working for you. Similar is the case with the ones who do have a higher antibody count.

Should that mean you get the test?

On paper, antibody tests sound like a good idea to measure immune response in respect of vaccination.

But it's not absolutely necessary to get one done. Unless you are specifically advised, getting antibody tests pre/post vaccination may not be actually needed.

However, even if you do get one, it's important to know that the results may not be entirely foolproof.

Some experts worry that the antibody tests available to the public right now may not be able to specifically map out the vaccine-generated antibodies.

How long does COVID-19 vaccine immunity last?

- With the rollout of the vaccines in and around the world, people have developed a sense of hope and optimism. Millions have already got themselves vaccinated and others are queuing up for the same.
- However, questions about the vaccine's efficacy and the duration of immunity it provides still remains to be answered.
- People are curious to know as to how long the immunity from the COVID-19 vaccination lasts?
- Still under research.

Does COVID-19 vaccine provide immunity against the virus?

- COVID-19 vaccines help our bodies develop immunity against SARs-COV-2 infection.

- It revs up the body's immune response against deadly pathogens and develops antibodies that provide lasting immunity for the future.
- However, since the novel coronavirus is a new type of virus and COVID vaccines have just been developed, there's no solid evidence that could determine how well a person is protected after the vaccination or the duration of immunity it provides.

For your satisfaction, as an eg

A new report by the Centres for Disease Control and Prevention (CDC) looked into the data of 4,000 vaccinated healthcare professionals and frontline workers.

The study found that the messenger RNA (mRNA) vaccines developed by Pfizer-BioNTech and Moderna were effective in 80 percent of cases after the first dose and 90 percent after the second dose.

Additionally, they discovered that the vaccines reduce the risk of COVID-19 transmission by vaccinated individuals to others.

How effective are COVID vaccines against the new variants?

- The study, conducted by the National Institute of Allergy and Infectious Diseases (NIAI), found that the COVID vaccines can protect against the new COVID variants.
- The research, led by NIAID staff scientist Andrew Redd, evaluated and analysed the white blood cell samples of 30 people infected by the SARs-COV-2 virus and recovered from it prior to the emergence of the variants in different parts of the world.

- It was found that the T-cells remained active against the virus and its responses remained largely intact and could recognize virtually all mutations in the variants studied, as per the experts.

That said, the NIAID press release stated, **"While larger studies are needed, the researchers note that their findings suggest that the T cell response in convalescent individuals, and most likely in vaccines, are largely not affected by the mutations found in these three variants, and should offer protection against emerging variants."**

Should you continue wearing masks?

- At the current stage, we cannot wholly depend on the COVID vaccines for immunity. It is important that we continue wearing well-fitted masks and practice social distancing.
- Following all public health measures is crucial to contain the virus and protect ourselves and loved ones from the same.

Can you get a positive Covid test after vaccine?

The coronavirus vaccine cannot cause a COVID nasal swab to become positive.

If you test positive for COVID-19 even after being vaccinated, you should treat that positive test as an actual COVID infection.

What about missing 2nd dose?

It’s extremely important not to miss your second dose appointment, unless it’s a true emergency or you’ve been quarantined. If you must miss it, start working to reschedule that second dose immediately.

The CDC guidance states that once fully vaccinated, we are able to meet with a single unvaccinated household, unmasked and indoors.

What are the chances of getting Covid-19 after vaccine?

It showed that there were nine cases of COVID-19 at least seven days after the second dose among 19,965 vaccine recipients and 169 among 20,172 placebo recipients.

“**Bottom line is that it is rare to get the disease after vaccination but not impossible,”** (Professor Tambyah)

What is the difference between people who have asymptomatic or pre-symptomatic COVID-19?

Both terms refer to people who do not have symptoms.

- The difference is that ‘asymptomatic’ refers to people who are infected but never develop any symptoms,
- While ‘pre-symptomatic’ refers to infected people who have not yet developed symptoms but go on to develop symptoms later.

(Again for your eyes only)

Is Favilavir (Favipiravir) after Remdesvir –a new step ahead, showing sensitivity for COVID-19 treatments?

As per the Government of India's technical committee, there is no concrete evidence to suggest the efficacy of antiviral drugs such as Remedesivir or Favipinavir in the management of COVID-19. In countries that are using these two drugs for the management of their COVID-19 subjects, there is no reduction in mortality nor a reduction in hospitalization time.

Do you need vaccine if you had Covid?

If you've had COVID-19, you'll still need the vaccine for full protection from the virus.

Do side effects of Covid vaccine mean it's working?

Common and mild or moderate side effects are a good thing: they show us that the vaccine is working.

Experiencing no side effects doesn't mean the vaccine is ineffective. It means everybody responds differently.

When do vaccine side effects kick in?

When exactly symptoms set in following your dose will vary from person to person, but Adams generalizes that you can expect your side effects to hit *within 24 hours of your dose, and not to stretch 7 days post your vaccination.*

What if you get Covid between shots?

If you catch COVID-19 between your two doses, you should self-isolate for at least 10 days just as you would if you had it without any vaccine shots. "You're OK to get your second dose, but you want to make sure that you're not contagious to the people that are vaccinating you,".

What are the common side effects of the AstraZeneca Covid-19 vaccine? –(We all took it)

People who have received COVID-19 vaccines should be aware of the common side effects, which include *fever, sore muscles, tiredness and headache.* Rarely coagulation (clotting) disorders have been reported after Covisheild, (AstraZeneca) However, in my own experience of over 1000 neuro covid patients, still as of now I have seen cases of post vaccination Cranial neuropathy (involvement of all 12 cranial nerves of which the commonest were 3^{rd},4^{th},6^{th},7^{th} &8^{th} nerves -under publication - review has accepted the article which increases my no to 8 published articles on Neuro-covid, Post vaccination Covid and post vaccination complications.)

These usually start within 24 hours of vaccination and last for 1-2 days. These side effects are expected and are not of concern unless severe or persistent

FINALLY THEREFORE

SHOULD YOU GO FOR ANTIBODY TEST?

It might be tempting to undergo an antibody test days after getting a Covid-19 vaccine. But it is not a necessity. Experts say antibody production after a vaccine shot varies from person to person depending on a number of biological factors.

- Some people may have an immediate response while others may show a delayed response to a vaccine shot.
- No antibody test is foolproof, experts also say.
- What is certain is that for most people getting a vaccine, their immune system is in a state of readiness to meet the challenge of a pathogen attack.

- The ultimate level of response may still vary.

Still, vaccines provide the best protection that is currently available against Covid-19.

Vaccination may not prevent SARS-CoV-2 infection or its transmissibility from one person to another. But vaccines are preventing, as per trial records, the severity of Covid-19 illness.

NB: So, should you go for antibody test?

Well, that is essentially your own call.