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# An Approach to Evaluate a New Rapid Method for Detecting Antigen of SARS-CoV2 from Blood Samples

Utpal Kumar Chattopadhyay<sup>1</sup>, Sayan Bhattacharyya<sup>2</sup>, Atul Raj<sup>3</sup>, Amit Banik<sup>4</sup>,  
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## Abstract

The current pandemic caused by COVID-19 is raging across the world now. The causative agent is SARS-CoV2. Till now more than 5 lakh deaths have been reported in India, alone because of this pandemic. The diagnosis of COVID-19 rests upon detecting the pathogen or its antigen in nasopharyngeal swabs by PCR and rapid diagnosis by various lateral flow techniques of rapid ICT tests. So far ICT tests from blood samples have not been tried. We are here to present our research to find out the evaluation of ICT tests from blood samples.

**Keywords:** COVID; Research; ICT.

## Introduction

COVID 19 pandemic is in its third wave in India and other countries due to the parent strain and its numerous mutants, variants, and recombinations.<sup>1</sup> Diagnosis of COVID-19 is carried out by Real-time PCR or rapid diagnostic kits from the nasopharyngeal swab, or by other nucleic acid amplification techniques like CBNAAT.<sup>2</sup> However, till now no effort has been made to detect viral antigens using existing rapid test kits and lysis buffer provided, from plasma samples.

This should be important because COVID-19 due to parent wild strain of virus or latter mutants is associated with some degree of viremia where the SARS-CoV2 virus is seen in blood. This viremia can also be associated significantly with severity of disease.<sup>3</sup> Viral particles are found in plasma also

and are seen more in ICU admitted patients than non-ICU patients.<sup>3</sup>

## Materials and Methods

We tested 194 plasma samples in EDTA vials, collected in November 2021 from a blood donation camp in Diamond Harbour, near Kolkata. Two ml of the leftover samples after blood donation were put in EDTA vial and were brought to Department and kept at 4°C till use. A Rapid diagnostic kit for COVID-19 were purchased (Confirm It, Alpine diagnostics) and kept at 4°C. Sixty (60) µl of whole plasma was mixed with 80 µl lysis buffer provided in the kit. The mixture in the aliquot bottles was stirred briefly for 2 minutes and then 3 drops were poured in the well of the kit. Then, the results were read after 15 minutes. After 20 minutes the card kits

were discarded if found negative or positive.

## Results

All samples showed the Control Band but in 2 test samples faint band was detected. Thus, out of 194 tests in 2 samples where test bands were found. Thus all samples were negative except 2 samples.

## Discussion

Viremia, cellular oxidation and immune dysfunction are the 3 key elements linked with disease severity in COVID-19.<sup>4</sup> Hence this test can be an alternative for screening for COVID-19, in blood samples only. As far as we know, such studies have not been carried out yet. Thus donors can be safely screened from blood samples only, using ICT test.

## Conclusion

Blood sample can be safely used as an alternative to nasopharyngeal swab for diagnosis of COVID-19 if the present new test using plasma is established.

This is a pilot study using a new method where few plasma samples were tested from volunteers who can be tested from different areas of the state to find out the sensitivity and specificity of this new method if clear cut band from the samples are seen. If this method is successful, the cost of the test will be very low and the test can be performed anywhere, at least as a suitable screening test from humans having suspected COVID signs/symptoms.

In order to establish this method, larger samples from different group of people and of different category of people with known status of covid-19 should be considered. The sample size will be provided for Statistics Department of the Institute. Blood collected from the donors are tested for the presence of different blood-borne diseases and if significant result is obtained by this new technique, then a policy decision for considering this test be included for donated blood which may prevent COVID-19 to the recipient of blood.

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# Leukemia and its Conventional Treatment: A Preliminary Review

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## Abstract

Leukemias are a group of life threatening malignant disorders of the blood and bone marrow. In the adolescent and young adult (AYA) population, the acute leukemias are most prevalent, with chronic myeloid leukemia being infrequently seen. Factors associated with more aggressive disease biology tend to increase in frequency with increasing age, whilst tolerability of treatment strategies decreases. There are also challenges regarding the effective delivery of therapy specific to the AYA group, consequences on the unique psychosocial needs of this age group, including compliance. This chapter reviews the current status of epidemiology, pathophysiology, treatment strategies and outcomes of AYA leukemia, with a focus on acute lymphoblastic leukemia and acute myeloid leukemia.

**Keyword:** Leukemia; Pathophysiology; Lymphoblastic; White blood cells.

## Introduction

Leukemia is a term for cancers of the blood cells. Leukemia starts in blood forming tissues such as the bone marrow. Your bone marrow makes the cells which will develop into white blood cells, red blood cells, and platelets. Each type of cell has a different job: White blood cells help your body fight infection. Red blood cells deliver oxygen from your lungs to your tissues and organs. Platelets help form clots to stop bleeding.

When you have leukemia, your bone marrow makes large numbers of abnormal cells. This problem most often happens with white blood cells. These abnormal cells build up in your bone marrow and blood. They crowd out the healthy blood cells and make it hard for your cells and blood to do their work.

## Classification of Leukemia

There are different types of leukemia. Which type of leukemia you have depends on the type of blood cell that becomes cancer and whether it grows quickly or slowly.

### *The type of blood cell could be:*

- Lymphocytes, a type of white blood cell
- Myeloid cells, immature cells that become white blood cells, red blood cells, or platelets

### *The different types can grow quickly or slowly:*

- Acute leukemia is fast growing. It usually gets worse quickly if it's not treated.
- Chronic leukemia is slow growing. It usually gets worse over a longer period of time.

### *The main types of leukemia are:*

- Acute lymphocytic leukemia (ALL), which is the most common type of cancer in children. It can also affect adults.
- Acute myeloid leukemia (AML), which is more common in older adults but can also affect children.
- Chronic lymphocytic leukemia (CLL), which is one of the most common types of leukemia in adults. It often occurs during or after middle age.
- Chronic myeloid leukemia (CML), which usually occurs in adults during or after middle age.

Leukemia happens when there are changes in the genetic material (DNA) in bone marrow cells. The cause of these genetic changes is unknown.

### *Risk Factors*

The specific types, there are different factors which can raise your risk of getting that type. Overall, your risk of leukemia goes up as you age. It is most common over age 60.

### *Clinical manifestations*

Some of the symptoms of leukemia may include:

- Feeling tired
- Fever or night sweats
- Easy bruising or bleeding
- Weight loss or loss of appetite
- Petechiae, which are tiny red dots under the skin. They are caused by bleeding.
- Other leukemia symptoms can be different from type to type. Chronic leukemia may not cause symptoms at first.

### *Diagnosis*

Your health care provider may use many tools to diagnose leukemia: Your health care provider may use many tools to diagnose leukemia.

- A physical exam
- A medical history
- Blood tests, such as a complete blood count (CBC)
- Bone marrow tests
- There are two main types - bone marrow aspiration and bone marrow biopsy
- Both tests involve removing a sample of bone marrow and bone. The samples are sent to a lab for testing.

- Genetic tests to look for gene and chromosome changes once the provider makes a diagnosis, there may be additional tests to see whether the cancer has spread. These include imaging tests and a lumbar puncture, which is a procedure to collect and test cerebrospinal fluid (CSF).

### *Treatment*

The treatments for leukemia depend on which type you have, how severe the leukemia is, your age, your overall health, and other factors. Some possible treatments might include:

### *Chemotherapy*

Chemotherapy is the use of drugs to destroy cancer cells, usually by keeping the cancer cells from growing, dividing, and making more cells. It may be given before surgery to shrink a large tumor, make surgery easier, and/or reduce the risk of recurrence, called neoadjuvant chemotherapy. It may also be given after surgery to reduce the risk of recurrence, called adjuvant chemotherapy.

A chemotherapy regimen, or schedule, usually consists of a combination of drugs given in a specific number of cycles over a set period of time. Chemotherapy may be given on many different schedules depending on what worked best in clinical trials for that specific type of regimen. It may be given once a week, once every 2 weeks, once every 3 weeks, or even once every 4 weeks. There are many types of chemotherapy used to treat breast cancer. Common drugs include:

- Docetaxel (Taxotere)
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- Doxorubicin (available as a generic drug)
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- Cyclophosphamide (available as a generic drug)
- Eribulin (Halaven)
- Fluorouracil (5-FU)
- Gemcitabine (Gemzar)
- Ixabepilone (Ixempra)
- Methotrexate (Rheumatrex, Trexall)
- Protein-bound paclitaxel (Abraxane)
- Vinorelbine (Navelbine)



### ***Radiation Therapy***

Radiation therapy is the use of high-energy x-rays or other particles to destroy cancer cells. A doctor who specializes in giving radiation therapy to treat cancer is called a radiation oncologist. There are several different types of radiation therapy:

**External-beam radiation therapy.** This is the most common type of radiation treatment and is given from a machine outside the body. This includes whole breast radiation therapy and partial breast radiation therapy, as well as accelerated breast radiation therapy, which can be several days instead of several weeks.

**Intra-operative radiation therapy.** This is when radiation treatment is given using a probe in the operating room. **Brachytherapy.** This type of radiation therapy is given by placing radioactive sources into the tumor.

Although the research results are encouraging, intra-operative radiation therapy and brachytherapy are not widely used. Where available, they may be options for a patient with a small tumor that has not spread to the lymph nodes. A radiation therapy regimen, or schedule, usually consists of a specific number of treatments given over a set period of time, such as 5 days a week for 3 to 6 weeks. Radiation therapy often helps lower the risk of recurrence in the breast. In fact, with modern surgery and radiation therapy, recurrence rates in the breast are now less than 5% in the 10 years after treatment or 6% to 7% at 20 years. Survival is the same with lumpectomy or mastectomy.

If there is cancer in the lymph nodes under the arm, radiation therapy may also be given to the same side of the neck or underarm near the breast or chest wall.

*Radiation therapy may be given after or before surgery:* Adjuvant radiation therapy is given after surgery. Most commonly, it is given after a lumpectomy, and sometimes, chemotherapy. Patients who have a mastectomy may or may not need radiation therapy, depending on the features of the tumor. Radiation therapy may be recommended after

mastectomy if a patient has a larger tumor, cancer in the lymph nodes, cancer cells outside of the capsule of the lymph node, or cancer that has grown into the skin or chest wall, as well as for other reasons.

Neoadjuvant radiation therapy is radiation therapy given before surgery to shrink a large tumor, which makes it easier to remove. This approach is uncommon and is usually only considered when a tumor cannot be removed with surgery.

### ***Chemotherapy With Stem Cell Transplant***

Stem cells are cells with the potential to develop into many different types of cells in the body. They serve as a repair system for the body. There are two main types of stem cells: embryonic stem cells and adult stem cells.

Stem cells are different from other cells in the body in three ways:

They can divide and renew themselves over a long time.

They are unspecialized, so they cannot do specific functions in the body.

They have the potential to become specialized cells, such as muscle cells, blood cells, and brain cells.

Doctors and scientists are excited about stem cells because they could help in many different areas of health and medical research. Studying stem cells may help explain how serious conditions such as birth defects and cancer come about. Stem cells may one day be used to make cells and tissues for therapy of many diseases. Examples include Parkinson's disease, Alzheimer's disease, spinal cord injury, heart disease, diabetes, and arthritis.

Targeted therapy, which uses drugs or other substances that attack specific cancer cells with less harm to normal cells.

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## A Case of Undifferentiated Connective Tissue Disorder

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Netai Pramanik<sup>6</sup>

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### Abstract

Undifferentiated connective tissue diseases (UCTDs) are less common entities characterised by signs and symptoms suggestive of a systemic autoimmune disease, which do not fulfil the diagnostic criteria for a defined connective tissue disease. It is difficult to determine the prevalence of UCTD, but 10% to 20% of referrals to tertiary care clinics may be for this diagnosis. We are reporting a case without any internal organ involvement.

**Key words:** Connective tissue-related, undifferentiated disease, no systemic organ involvement.

### Introduction

The term undifferentiated connective tissue disease (UCTD) is characterized by features suggestive of CTD which do not meet the classification criteria of the American College of Rheumatology for a specific single disease, such as systemic lupus erythematosus, systemic sclerosis, polymyositis/dermatomyositis, and Sjögren's syndrome.<sup>1</sup> UCTD can evolve in these patients over time. Kinder et al.<sup>2</sup>, had suggested prespecified criteria for diagnosis of UCTD, which are at least one of the following symptoms: Raynaud's phenomenon, arthralgias/multiple joint swelling, photosensitivity, unintentional weight loss, morning stiffness, dry mouth or dry eyes (sicca features), dysphagia, recurrent unexplained fever, gastroesophageal reflux, skin changes (rash), oral ulceration, nonandrogenic alopecia, and proximal

muscle weakness; and at least one of the following indicators of systemic inflammation in the absence of infection: antinuclear antigen, rheumatoid factor, anti-SCL 70 antibody, anti-SS-A or SS-B antibody, anti-Jo-1 antibody, sedimentation rate (>2 times normal), C-reactive protein. This patient should be diagnosed and treated early to prevent their disease progression.

### Case Report

A 22 years married female presented to us maculo-papular rash over cheek, upper limbs and upper trunk for 13 months. The rashes were non-itchy, no changes on sun exposure without any scar formation. There was associated multiple joint pain of hand and foot for one year. There was no significant morning stiffness. There was no history of fever, oral ulcer, joint swelling,

raynaud's phenomenon or pregnancy loss. On examination she had mild pallor, there was butterfly shaped malar rash and maculo-papular rash over both upper limb and upper trunk. There was mild tenderness in hand and foot joints and both elbow joints. But there was no other joint tenderness, swelling or any deformity. Other system examinations were all normal. Her routine blood examination showed hemoglobin 10.8 mg/dl with normocytic normochromic anemia and ESR is 30. All blood biochemistry and CRP are normal. Her routine urine examination did not show any proteinuria. Her blood for ANA profile showed highly positive ANA with positive U1RNP and Anti Sm. Rheumatoid factor and anti-CCP antibody were normal. Serum C3, C4 normal, direct coombs test was normal. Her HRCT thorax was also normal. After a multidisciplinary discussion (dermatologist and rheumatologist) a final diagnosis of UCTD was made.

## Discussion

Different Rheumatologic studies have estimated that up to 25% of patients with features of a systemic autoimmune disease do not fulfill ACR classification criteria for CTD (14–18). These patients are considered to have diffuse or undifferentiated CTD (UCTD). The majority of such cases (65–94%) after years of follow-up do not develop into a “differentiated” CTD (e.g., rheumatoid arthritis, systemic lupus erythematosus, systemic sclerosis, mixed CTD).<sup>3</sup> Consequently, it has been proposed that UCTD represents a distinct clinical entity with the following criteria: signs and symptoms suggestive of a CTD, positive serologic results, and disease duration of at least 1 year.<sup>3</sup>

These conditions may be difficult to distinguish from early phases of defined diseases such as systemic lupus erythematosus, systemic sclerosis and others. The natural history of these rare entities is variable: a high percentage of patients with UCTD maintain an undifferentiated clinical course and do not evolve to a distinct CTD, whereas some patients can evolve over time.<sup>1</sup> Laboratory test screening is essential to identify markers that may suggest a systemic, autoimmune disease, or specific organ involvement. In fact, about 90% of the patients with UCTD show positive ANA.<sup>4,5</sup>

The onset of UCTD is similar to most CTDs, peaking in the middle years of life. There are no specific signs or symptoms of UCTDs because these entities present manifestations common to other CTDs. Major organ involvement is unusual and the lung has been reported as a late complication, often

determining a worse outcome.<sup>6</sup>

We have described a case of a patient with UCTD whose first clinical manifestation was skin rashes. UCTD should be considered when a young female presented with prolong skin rash which may not associated with other clinical features of connective tissue diseases.

## Legends of Figures



Fig 1: Butterfly lesions over face



Fig 2: Maculo-papular rash on upper limb

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