Exploring the Effects of COVID-19 on Type 1 Diabetes: A Case Study

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Abstract- **The objective of this study is to establish a connection between COVID-19 and Type 1 Diabetes by conducting a comprehensive case study on a patient who, subsequent to contracting the COVID-19 virus, developed Latent Autoimmune Diabetes in Adults (LADA). An interview was carried out, contributing to the confirmation of the association between COVID-19 and Type 1 Diabetes (T1D). The patient developed Latent Autoimmune Diabetes in Adults (LADA) following a bout of the coronavirus. Surprisingly, the patient's initial diagnosis was NPDR (non-proliferative diabetic retinopathy), which later progressed to PDR (proliferative diabetic retinopathy). While there is no conclusive evidence supporting the idea that COVID-19 directly triggers PDR, this unforeseen revelation hints at a potential link between the two. However, additional research is necessary to validate this discovery.**

Keywords: **Type 1 Diabetes, Type 2 Diabetes, LADA, COVID-19, Insulin, NPDR, PDR, Immunity**

INTRODUCTION

Overview of Type-1 Diabetes

Type 1 Diabetes, often referred to as insulin-dependent diabetes or juvenile diabetes, is a chronic autoimmune disease characterized by the body's inability to produce insulin (*Mayo Clinic, 2023)*. Insulin is a hormone produced by the pancreas that plays a crucial role in regulating blood sugar (glucose) levels in the body. It allows glucose to enter cells, where it is used for energy, and helps maintain stable blood sugar levels.

In individuals with Type 1 Diabetes, the immune system mistakenly targets and destroys the insulin-producing beta cells in the pancreas. As a result, the pancreas is unable to produce insulin or produces very little, leading to elevated blood sugar levels. High blood sugar levels can cause various health problems and complications if not managed properly.

People with Type 1 Diabetes require lifelong treatment with insulin therapy to regulate their blood sugar levels. They must monitor their blood sugar levels regularly, usually by using a glucose meter, and adjust their insulin doses accordingly. Management of Type 1 Diabetes also involves maintaining a healthy diet, engaging in regular physical activity, and making lifestyle choices to optimize blood sugar control and prevent complications.

Unlike type 2 diabetes, which is often associated with lifestyle factors like obesity and can sometimes be managed with lifestyle changes and oral medications, Type 1 Diabetes is typically not preventable and requires ongoing insulin treatment for survival. It usually develops in childhood or early adulthood but can occur at any age.

Michael Dansinger, MD (*2023)* in his paper on “Type 1 Diabetes” concluded that Type 1 Diabetes can manifest with a range of symptoms, and its diagnosis typically involves a combination of clinical evaluation and laboratory tests. Common symptoms of Type 1 Diabetes may include:

1. Excessive Thirst (Polydipsia): Individuals with Type 1 Diabetes may feel extremely thirsty and drink large quantities of water.

2. Frequent Urination (Polyuria): Increased blood sugar levels can lead to increased urination, especially at night.

3. Extreme Hunger (Polyphagia): Despite eating, individuals may feel constantly hungry because their cells are not getting the necessary glucose due to the lack of insulin.

4. Unexplained Weight Loss: Despite increased hunger and food intake, people with Type 1 Diabetes may experience unexplained weight loss because their body is breaking down muscle and fat for energy in the absence of insulin.

5.Fatigue: A lack of glucose in the cells can lead to fatigue and weakness.

6. Blurred Vision: High blood sugar levels can affect the eyes, causing blurred vision.

7. Irritability and Mood Changes: Fluctuating blood sugar levels can lead to mood swings, irritability, and difficulty concentrating.

8. Frequent Infections: Type 1 Diabetes can weaken the immune system, making individuals more susceptible to infections.

9. Ketoacidosis: In severe cases, especially when diabetes is undiagnosed or untreated, individuals can develop diabetic ketoacidosis (DKA), a life-threatening condition characterized by high blood sugar levels, the presence of ketones in the urine, dehydration, and acidosis.

Diagnosis of Type 1 Diabetes typically involves the following steps:

1. Medical History and Physical Examination: The healthcare provider will ask about symptoms, family history, and conduct a physical examination.

2. Blood Tests: Blood tests are crucial for diagnosing diabetes. The primary tests include:

- Fasting Blood Sugar Test: A fasting blood sugar level of 126 milligrams per deciliter (mg/dL) or higher on two separate occasions is indicative of diabetes.

- Random Blood Sugar Test: A random blood sugar level of 200 mg/dL or higher, along with symptoms of diabetes, may also suggest diabetes.

3. Glycated Hemoglobin (A1c) Test: This test measures the average blood sugar levels over the past two to three months. An A1c level of 6.5% or higher indicates diabetes.

4. Autoantibody Tests: These tests can help differentiate Type 1 Diabetes from other forms. They check for the presence of autoantibodies that attack the body's insulin-producing beta cells.

5. C-peptide Test: This measures the amount of C-peptide in the blood, which is produced when insulin is made. Low C-peptide levels in the presence of high blood sugar suggest that the body is not producing much insulin, consistent with Type 1 Diabetes.

Once a diagnosis of Type 1 Diabetes is confirmed, individuals will need to start insulin therapy immediately to manage their blood sugar levels and prevent complications. They will also receive education on self-monitoring of blood sugar, dietary management, and lifestyle adjustments to effectively manage their condition (*Cleveland Clinic, 2022)*.

In his paper on “Latent Autoimmune Diabetes”, *Venkatraman Rajkumar* concluded that Latent autoimmune diabetes of adults (LADA) is a form of autoimmune diabetes that initiates during adulthood and, in the initial six months following diagnosis, doesn't require insulin for managing blood sugar levels. It exhibits similarities in terms of genetics, immune system response, and metabolic characteristics with both type 1 and type 2 diabetes mellitus (DM).

Latent Autoimmune Diabetes of Adults (LADA) may present with symptoms typical of diabetes, including increased thirst, frequent urination, unexplained weight loss, and fatigue. However, unlike traditional Type 1 Diabetes, LADA often progresses more slowly.

Diagnosing LADA involves assessing clinical symptoms, conducting blood tests for autoantibodies associated with autoimmune diabetes, and monitoring the need for insulin over time. Patients with LADA often have autoantibodies, such as GAD antibodies, that are characteristic of autoimmune diabetes.

The management of LADA involves a combination of lifestyle modifications, oral medications, and eventually, insulin therapy. Initially, lifestyle changes such as a healthy diet and regular exercise may be recommended. Oral medications like sulfonylureas or metformin may be prescribed. As the condition progresses and insulin production declines, insulin therapy becomes necessary for maintaining optimal blood glucose levels.

Regular monitoring of blood glucose levels, close collaboration with healthcare providers, and adapting treatment strategies as needed are crucial for effectively managing LADA.

Overview of COVID-19

The *World Health Organisation (WHO)* in their paper on “Coronavirus disease (COVID-19)” concluded that COVID-19, short for "Coronavirus Disease 2019," is a highly contagious respiratory illness caused by the novel coronavirus SARS-CoV-2. It was first identified in Wuhan, China, in December 2019 and has since spread globally, leading to a pandemic. COVID-19 is characterized by a wide range of symptoms, with some individuals remaining asymptomatic (showing no symptoms) while others develop mild to severe respiratory symptoms and, in some cases, fatal complications.

Common symptoms of COVID-19 include fever, cough, shortness of breath, fatigue, muscle or body aches, headache, sore throat, loss of taste or smell (anosmia), congestion or runny nose, nausea or vomiting, and diarrhea. In severe cases, the virus can lead to pneumonia, acute respiratory distress syndrome (ARDS), organ failure, and death, particularly in older adults and individuals with underlying health conditions.

The virus primarily spreads through respiratory droplets when an infected person coughs, sneezes, talks, or breathes, and these droplets can be inhaled by others who are in close proximity. It can also spread by touching surfaces contaminated with the virus and then touching the face, especially the mouth, nose, or eyes.

Preventative measures to reduce the spread of COVID-19 include vaccination, wearing face masks, practicing physical distancing, frequent handwashing, and following public health guidelines. Several vaccines have been developed and authorized for emergency use to provide immunity against SARS-CoV-2, helping to control the spread of the virus and mitigate the impact of the pandemic.

Efforts to manage and combat COVID-19 have involved widespread testing, contact tracing, quarantine and isolation protocols, travel restrictions, and public health campaigns to promote safety measures. The situation regarding COVID-19 continues to evolve, with ongoing research, vaccination campaigns, and public health efforts aimed at controlling and ultimately ending the pandemic.

COVID-19 treatment involves supportive care for mild cases, including rest and hydration. Severe cases may require hospitalization with oxygen therapy, antiviral drugs like remdesivir, monoclonal antibodies, steroids, and blood-thinners. Vaccination is crucial for prevention. Treatment should be based on individual circumstances, and guidance from healthcare authorities should be followed.

Intersection of COVID-19 and t1D

Type 1 Diabetes (t1D) typically results from the immune system's attack on islet β cells, potentially triggered by genetic and environmental factors. There is strong evidence linking viruses to t1D development, and during the COVID-19 pandemic, there was an increase in cases of high blood sugar, diabetic ketoacidosis, and new-onset diabetes, suggesting that SARS-CoV-2 might either provoke or reveal t1D *(Yichen Wang, 2023)*. Possible mechanisms for harming β cells include virus-induced cell death, immune-mediated β cell destruction, and damage to β cells due to infection in neighboring cells. In this article, we explore how SARS-CoV-2 could impact islet β cells in these three aspects. Specifically, we highlight that SARS-CoV-2 may trigger t1D through various autoimmune mechanisms, such as epitope spread, molecular mimicry, and bystander activation. However, it's challenging to definitively conclude whether SARS-CoV-2 causes t1D since the development of t1D is usually a long-term process. This area requires sustained attention for long-term outcomes. More comprehensive studies with larger patient groups and extended clinical monitoring are essential.

Procedure

This paper aims to find the link between COVID-19 and Type 1 Diabetes via an in-depth case study of a patient who developed LADA (Latent Autoimmune Disease in Adults) after first having contracted the COVID-19 virus. The patient has no family history of Type 1 Diabetes. Though both of her parents developed Type-2 Diabetes after crossing the age of 45 years. The patient was overall quite healthy with a strong immune system prior to contracting the corona virus. Post COVID-19, however, her immunity weakened significantly, with her catching the common cold quite easily. Almost a year after developing COVID-19, she was diagnosed with LADA and a year after that with Prolific Diabetic Retinopathy (PDR).

Discussion

This study seeks to investigate the impact of on individuals with Type 1 Diabetes. It involves a detailed analysis of a previously healthy person with no family history of Type 1 Diabetes developed LADA after contracting COVID-19. Their immune system weakened post-COVID, leading to easy cold susceptibility. About a year later, LADA was diagnosed, followed by PDR another year after. This suggests a possible connection between COVID-19, autoimmune diabetes, and complications like diabetic retinopathy.

According to *S. Genç* in her paper “Could COVID-19 Trigger Type 1 Diabetes? Presentation of COVID-19 Case presented with Diabetic Ketoacidosis”, in 2020, the world confronted COVID-19, a novel viral disease caused by SARS-CoV-2, declared a pandemic by the World Health Organization. This global health crisis has affected over 300 million individuals and resulted in more than 5 million deaths. There is evidence suggesting that COVID-19 may trigger the onset of Type 1 Diabetes (T1DM) and could potentially obscure nonspecific symptoms of Diabetic Ketoacidosis (DKA) such as nausea and vomiting, leading to delays in DKA diagnosis. Additionally, literature reports indicate a connection between COVID-19 and the development of new autoimmune diseases, including T1DM and autoimmune thyroid diseases.

The patient herself mentioned, “I think maybe the shot that we took, the vaccine that we took aggravated this situation.” After having taken the COVID-19 vaccine and contracting the virus, as mentioned earlier in the paper, the patient’s immunity had decreased drastically. Less than a year later she was diagnosed with LADA. Even her endocrinologist had said that there might have been a link between the patient contracting the corona virus and then developing LADA.

LADA, also known as type 1.5 diabetes, exhibits features of both traditional type 1 and type 2 diabetes. This distinction highlights its autoimmune nature, similar to Type 1 Diabetes, but with a later onset more typical of type 2 diabetes (*Anselmo M. Manisha*, 2022). The treatment of Latent Autoimmune Diabetes in Adults (LADA) typically involves a gradual progression in therapeutic approaches. Initial management may involve lifestyle modifications, including a healthy diet and regular exercise. As LADA shares features with both type 1 and type 2 diabetes, oral medications like sulfonylureas or metformin are sometimes prescribed to help control blood sugar levels.

However, as LADA is characterized by autoimmune processes leading to the destruction of insulin-producing beta cells, insulin therapy becomes a crucial part of the treatment as the disease progresses. Over time, individuals with LADA often require insulin to manage blood glucose effectively. This is evident in the patient's case as well. She mentioned that she takes oral pills as well as injections. Her doctor had tried to get her off injections, however, it had only resulted in the patient developing hyperglycaemia. Hence, she stated, "I cannot survive without insulin."

This paper presents an in-depth examination of a specific individual, and therefore, the symptoms, treatment, and experiences discussed may not necessarily be generalizable to a broader population. The noteworthy occurrence of the patient developing Proliferative Diabetic Retinopathy (PDR) subsequent to contracting COVID-19 suggests a potential association between the two. However, it is essential to underscore that further research is needed to substantiate and explore this connection thoroughly.

Future researchers are advised to enhance the robustness and applicability of their studies by diversifying participant samples, conducting longitudinal investigations, and prioritizing replication studies for result validation. Emphasizing the importance of multidisciplinary approaches, integration of advanced technologies, and methodological rigor is crucial for obtaining comprehensive insights. Encouraging open data sharing and collaborative endeavors within the scientific community fosters transparency and accelerates knowledge advancement. Cultural sensitivity in research design is paramount, ensuring relevance across diverse backgrounds. Exploring intervention strategies and practical applications of findings contributes to real-world impact. Upholding ethical standards, staying abreast of emerging trends, and actively engaging with the public through effective communication further enrich the research landscape, promoting innovation and meaningful contributions to societal understanding.

Conclusion

This study delves into the impact of COVID-19 on individuals with Type 1 Diabetes, specifically exploring the case of a previously healthy individual without a familial history of Type 1 Diabetes. Following a bout of COVID-19, the person's immune system weakened, rendering them more prone to common colds. A year later, LADA was diagnosed, succeeded by Proliferative Diabetic Retinopathy (PDR) another year thereafter. These findings suggest a plausible connection between COVID-19, autoimmune diabetes, and complications like diabetic retinopathy. What is surprising, however, is the patient being diagnosed first with NPDR (non-prolific diabetic retinopathy) and then later on with PDR (prolific diabetic retinopathy). While there is no solid proof that COVID-19 triggers PDR, this unexpected finding suggests a conceivable association between the two. This discovery, however, requires further research.

Acknowledgements

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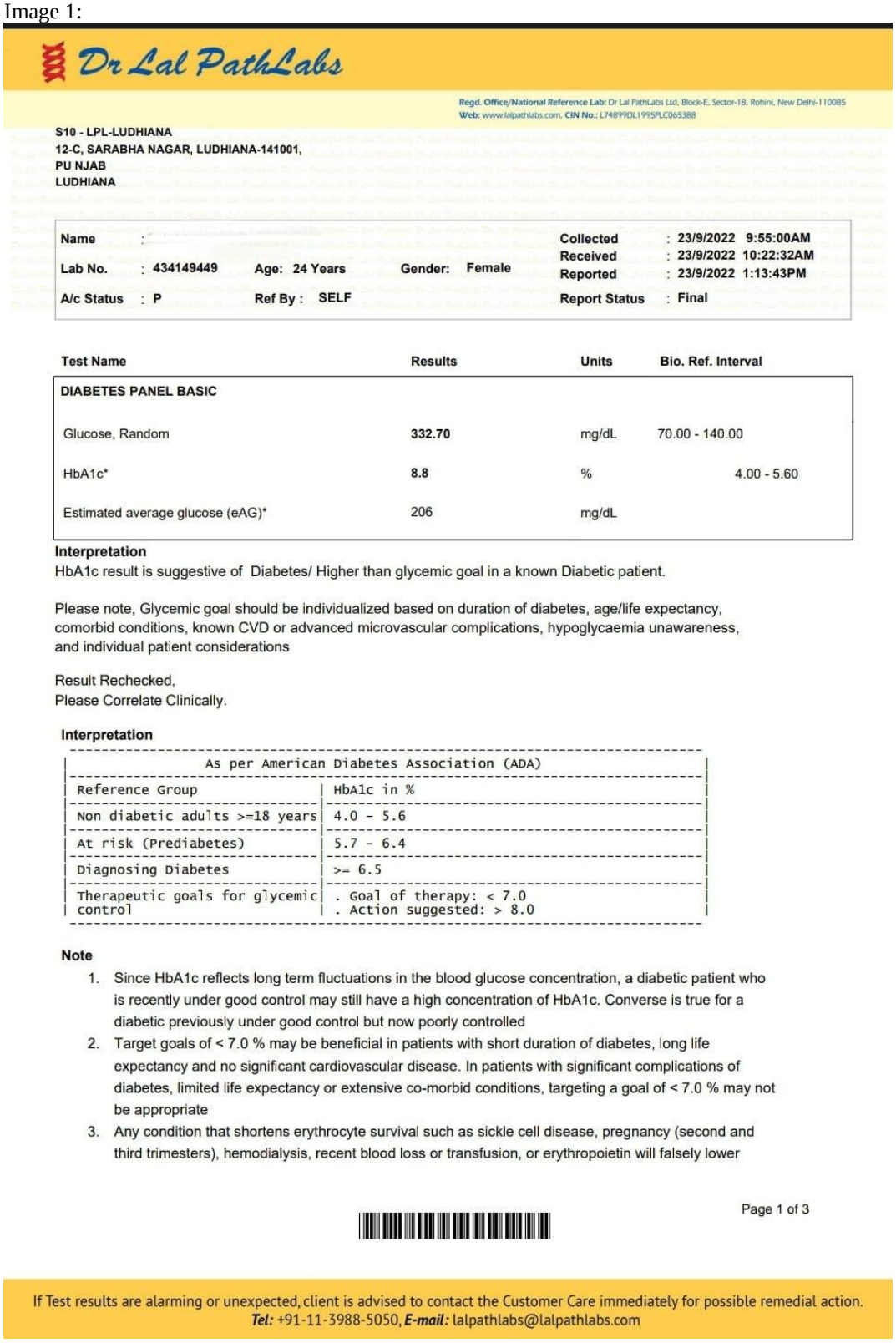
Appendix 1

Image 1:



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S10 - LPL-LUDHIANA
12-C, SARABHA NAGAR, LUDHIANA-141001,
PU NJAB
LUDHIANA

Name	:			Collected	: 23/9/2022 9:55:00AM
Lab No.	: 434149449	Age: 24 Years	Gender: Female	Received	: 23/9/2022 10:22:32AM
A/c Status	: P	Ref By : SELF		Reported	: 23/9/2022 1:13:43PM
				Report Status	: Final

Test Name	Results	Units	Bio. Ref. Interval
DIABETES PANEL BASIC			
Glucose, Random	**332.70**	mg/dL	70.00 - 140.00
HbA1c*	**8.8**	%	4.00 - 5.60
Estimated average glucose (eAG)*	206	mg/dL	

Interpretation

HbA1c result is suggestive of Diabetes/ Higher than glycemic goal in a known Diabetic patient.

Please note, Glycemic goal should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycaemia unawareness, and individual patient considerations

Result Rechecked,
Please Correlate Clinically.

Interpretation

As per American Diabetes Association (ADA)	
Reference Group	HbA1c in %
Non diabetic adults >=18 years	4.0 - 5.6
At risk (Prediabetes)	5.7 - 6.4
Diagnosing Diabetes	>= 6.5
Therapeutic goals for glycemic control	. Goal of therapy: < 7.0 . Action suggested: > 8.0

Note

1. Since HbA1c reflects long term fluctuations in the blood glucose concentration, a diabetic patient who is recently under good control may still have a high concentration of HbA1c. Converse is true for a diabetic previously under good control but now poorly controlled
2. Target goals of < 7.0 % may be beneficial in patients with short duration of diabetes, long life expectancy and no significant cardiovascular disease. In patients with significant complications of diabetes, limited life expectancy or extensive co-morbid conditions, targeting a goal of < 7.0 % may not be appropriate
3. Any condition that shortens erythrocyte survival such as sickle cell disease, pregnancy (second and third trimesters), hemodialysis, recent blood loss or transfusion, or erythropoietin will falsely lower

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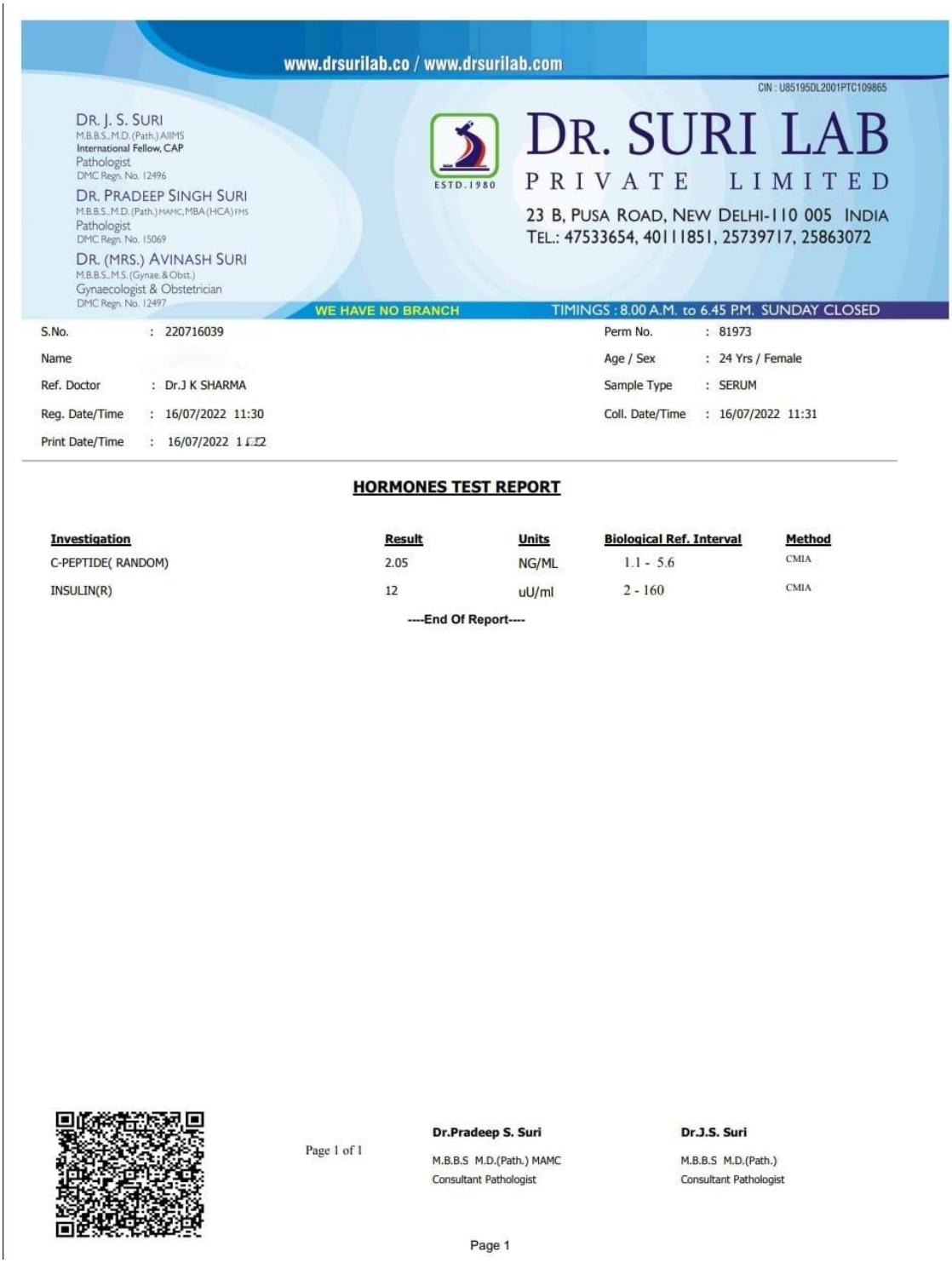
If Test results are alarming or unexpected, client is advised to contact the Customer Care immediately for possible remedial action.
Tel: +91-11-3988-5050, ***E-mail:*** lalpathlabs@lalpathlabs.com

Image 2:



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WE HAVE NO BRANCH

TIMINGS : 8.00 A.M. to 6.45 P.M. SUNDAY CLOSED

S.No.	: 220716039	Perm No.	: 81973
Name		Age / Sex	: 24 Yrs / Female
Ref. Doctor	: Dr.J K SHARMA	Sample Type	: SERUM
Reg. Date/Time	: 16/07/2022 11:30	Coll. Date/Time	: 16/07/2022 11:31
Print Date/Time	: 16/07/2022 1 [illegible]2		

HORMONES TEST REPORT

Investigation	Result	Units	Biological Ref. Interval	Method
C-PEPTIDE(RANDOM)	2.05	NG/ML	1.1 - 5.6	CMIA
INSULIN(R)	12	uU/ml	2 - 160	CMIA

----End Of Report----

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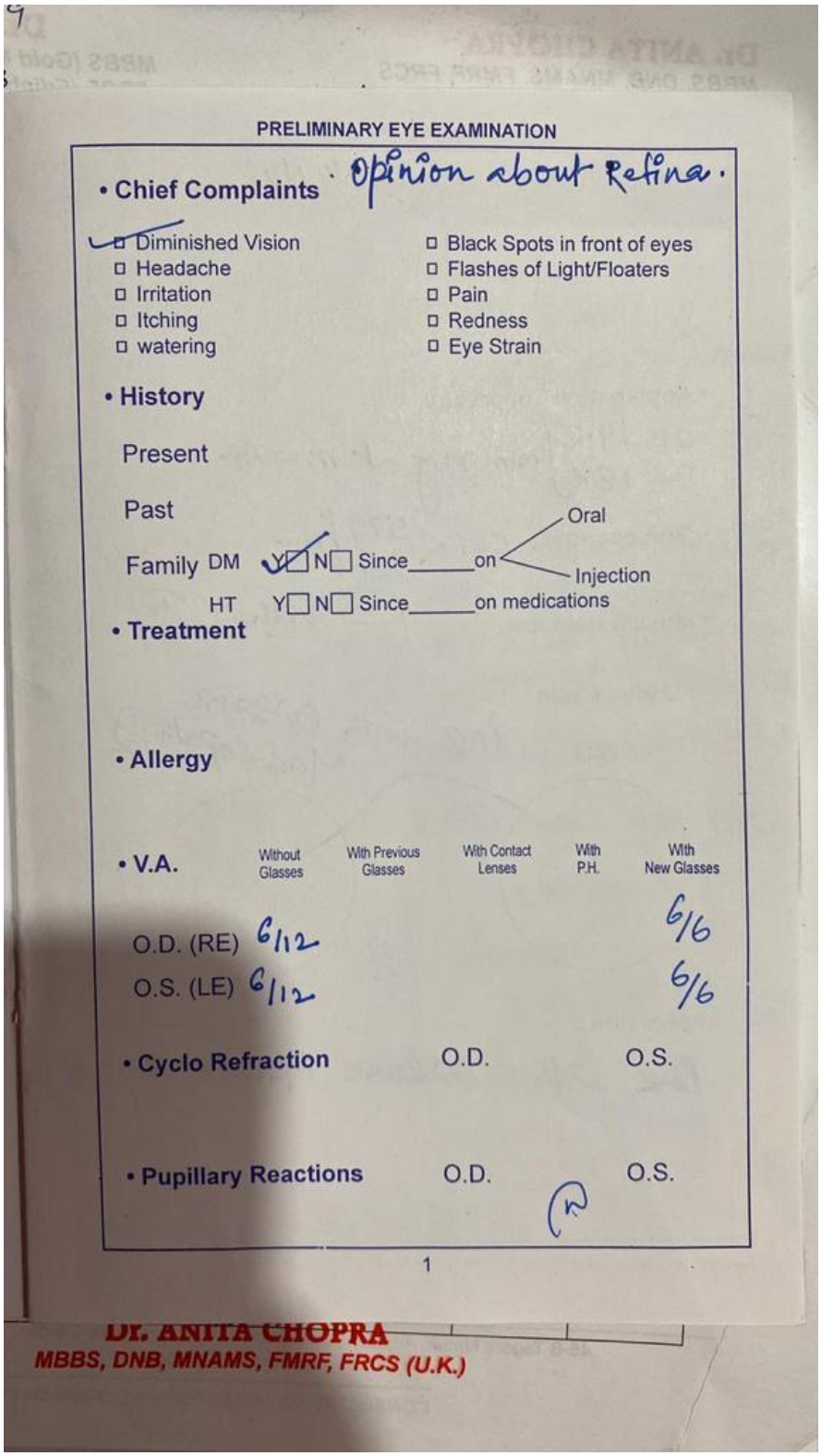
Page 1

Image 3:



PRELIMINARY EYE EXAMINATION

• Chief Complaints · Opinion about Refina.

- ☑ Diminished Vision
- ☐ Headache
- ☐ Irritation
- ☐ Itching
- ☐ watering
- ☐ Black Spots in front of eyes
- ☐ Flashes of Light/Floaters
- ☐ Pain
- ☐ Redness
- ☐ Eye Strain

• History

Present

Past

Family DM ☑ Y ☐ N ☐ Since _____ on — Oral / Injection

HT Y ☐ N ☐ Since _____ on medications

• Treatment

• Allergy

• V.A.	Without Glasses	With Previous Glasses	With Contact Lenses	With P.H.	With New Glasses
O.D. (RE)	6/12				6/6
O.S. (LE)	6/12				6/6

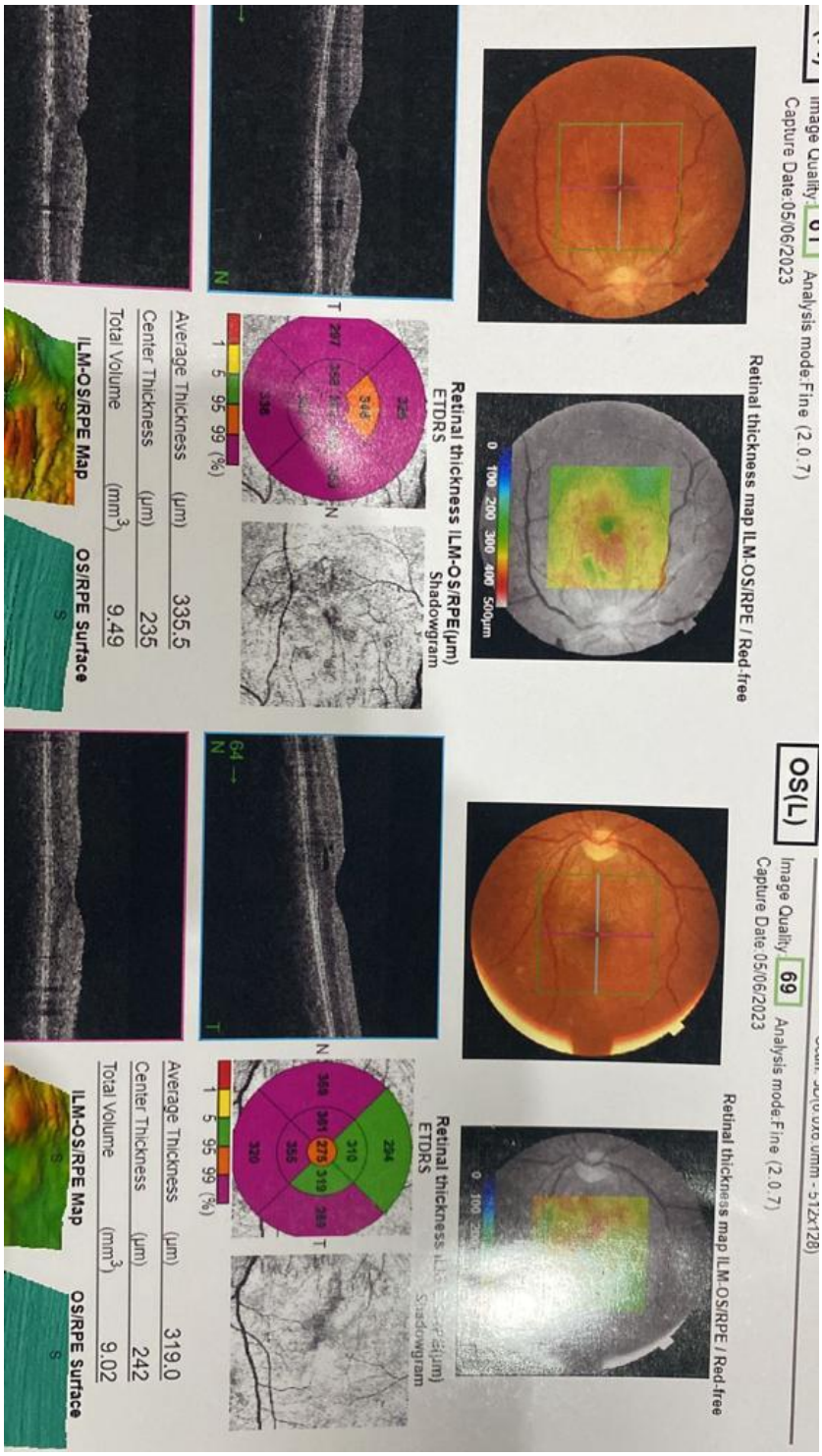
• Cyclo Refraction O.D. O.S.

• Pupillary Reactions O.D. O.S.

1

DR. ANITA CHOPRA
MBBS, DNB, MNAMS, FMRF, FRCS (U.K.)

Image 4: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Retinal thickness ILM-OS/RPE(μm)
ETDRS
Shadowgram
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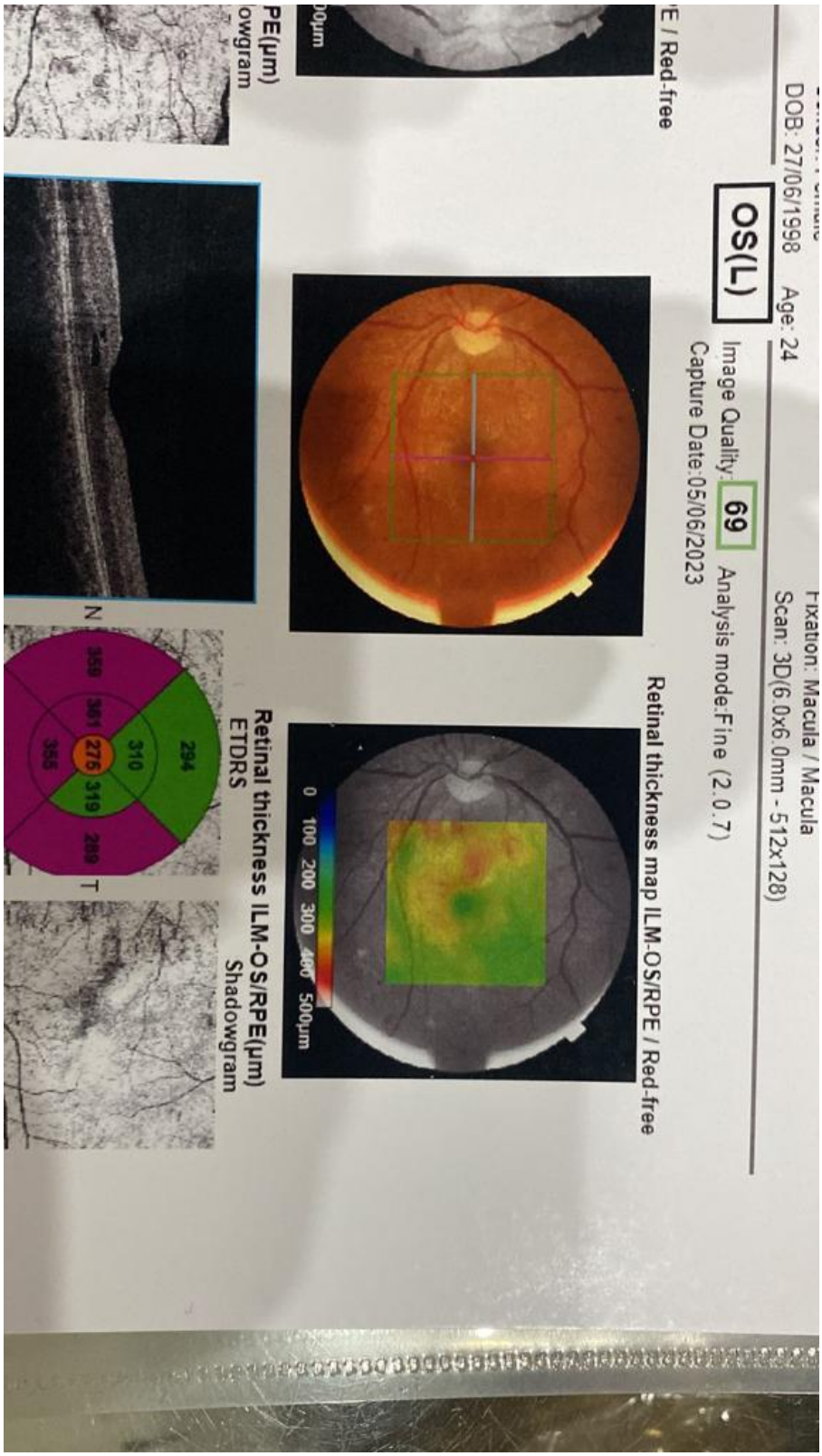
ILM-OS/RPE Map
OS/RPE Surface

Image 5:



Appendix 2

Interviewer

My first question is, can you briefly share your experience with COVID-19, including when you were diagnosed and your overall symptoms?

Appe

Patient

Sure. Okay, so I was diagnosed with COVID back in 2021, around the second wave. That was, I think, in January when the wave hit badly in Delhi. I actually belong to Ludhiana, that's in Punjab. So I think it was the winter season in January. And my parents, who both are senior citizens, they're 60 plus and me, so all of us face the symptoms of high fever, distasteness, all of these symptoms, weakness. And yeah, so we don't really have it really bad like the other people in India did, but we did have some of these symptoms. So we self-tested the kids that we used to get back then. So we self-tested and we tested positive for COVID. That was how COVID

was for us. And for diabetes, do you want me to tell you about my diabetes as well? Yes, I'll get back to that. Yeah, so this was briefly how he got COVID. And probably in two weeks, we got better. So it wasn't really that bad. But I think that this tastelessness and the weakness was in about one to two months. So yeah, that's how it was. Okay.

Interviewer
How soon after recording from COVID-19 did you start noticing symptoms associated with Type 1 Diabetes?

Patient
Okay, so not very close. Actually, I got COVID in early 2021, and I got diagnosed properly in 2022. That's just last year in July. But since I got COVID, I never really had a proper immune system. So I got back to office. I started working in, I think, April or May 2021, I moved to Delhi for that. And whenever anybody in my office got like a cold or a cough or anything of that sort, I was the first one to catch it. And usually, this is not a normal thing for my body, I'm usually very strong. My immune system was pretty strong before that. But it got very weak after that. But we never really detected as to why it was happening because all during COVID, all during lockdown, I was working out really well and I was eating. My appetite was really well. I used to get thirsty a lot at night. So I used to drink two liters of water at night specifically. So that definitely was happening. I don't recall since when it started, but now that I recall it was happening and urination was happening, but we couldn't really detect it.

And my parents are actually doctors. So they also couldn't really notice the fact that this was happening because my weight wasn't really dwindling. I was losing weight, but they thought that because I'm exercising so much, which I was not doing before, that is why it's happening. But I was eating also a lot. My appetite was a lot, so I wasn't gaining also. So nobody really detected that weight gain, weight loss is still happening, even though I'm eating so much. Yeah, so that happened. And I think how it got detected in 2022 was also the fact where every month you wouldn't believe like I was taking so many sick days, like my boss was commenting, everyone was noticing that something's wrong in my immune system. System. So I didn't really have the normal, so to say, symptoms. The weight loss was not great. The urination was not that significant. Every 15 minutes, I wasn't going to the washroom like usually people do in diabetes. Those symptoms were not there. But I think the main symptom was my immune system got really, really, really weak. So while I was getting tested for COVID again in June 2022, so COVID tested non-negative.

But then my parents thought let's do an all-body checkup because something is definitely wrong. There might be some deficiency. Of course, they didn't really think that the sugar would be really high. But as soon as I got tested, the whole body test was done. So my sugar was, I think, 350. That was fasting. And my Hb even C was 12. So that was really really high. And as soon as I reached the doctors as well, their first diagnosis was that... I'll tell you. So how I got to know that it was not immediate was when I got my eye checkup done in last year, December or Jan this year. And that's when my retina specialist told me that you don't have diabetes in July, you have a lot earlier. So how I guess it is like maybe I got it during COVID-19 or maybe I got it a year and a half or at least two years back. That's when I got it because I am already a diabetic retinopathy patient as well. I'm dealing with severe PDR, which is proliferative diabetic retinopathy. I'm already on antivagive injections and lasers and whatnot. So usually if a person is detected, usually I'm saying, of course, diabetes is very complicated and everyone's body is very different.

So actually what happened was my reading wasn't that bad. My Hb1C was really bad, 12 is not good at all. But I think what really hit me was when I got retinopathy, I got detected with retinopathy. I don't know if you know about retinopathy or not, but retinopathy is when your eyes get affected. So my eyes are severely gotten affected. And I have very small and new veins in my eyes because of sugar. And I recently got detected. In June, I was NPDR, which in layman terms when you say you're prediabetic. So in retinopathy also, there's a phase where you are just on the borderline, but you can still reverse it. And I was NPR in June, which is nonproliferative diabetic retinopathy. And I was working on it, February, March, April, I was reversing it. And suddenly, you know how it happens like your body just gives up. And then in June, June seventh, to be exact, I got admitted for PDR. So since then, my treatment has been on. So that is really scary. Of course, diabetes itself is a wholesome disease, but getting retinopathy, getting two chronic diseases in one year was too much.

Interviewer
When you consulted your endocrinologist when you first developed Type 1 Diabetes, what was their opinion? Did they think that there was some link with you getting COVID and then you later developing COVID-19 a year, Type 1 Diabetes a year later?

Patient
Okay, so I have been approximately to four endocrinologists in the past one year, all right? Because I got never really... So I'm also a very curious person. I'm 25. So I think I'm at that age where I want to get all answers for myself. So It's just that I went to one doctor when I was just starting. So 16th of July 2022, I just went to one doctor. That's when I started my diabetes. And he is actually a good doctor. He tried to link it. He asked me if I got COVID or not. I said, yeah, I did. He said there might be a link. There might be like I have seen a lot of patients who have gotten diabetes after COVID. Of course, endocrinologists didn't really know that it was a late diagnosis or it was like a normal diagnosis, what came to him, he had to just treat that. So he didn't really ask me a lot of questions about... We don't want definite question is about medical history. And then they do these tests like anti-gad and C-peptide, and hormone tests and all of that. So he did that. And then he just started my medication because I was on 12. So first thing was that to save me, of course, to get the sugar in control. So that was the first doctor. Then after that, after every three, four months that I started seeing doctors, no, nobody really asked me how it happened, or what's your history, and everything. They just asked me my labs for at the moment, like what is the HbA1c this quarter and how are you planning to control it in the next quarter and all of

that. But yeah, they did not really put specific significance to the fact if I got COVID or not.

Interviewer
Okay. And do you yourself believe that do you think that COVID did lead to Type 1 Diabetes, your opinion on this?

Patient
Now that I talk about it, see, every day is a new day. And in diabetes, you try to link it to a hundred reasons that could have happened or could not have happened. I'm sure it must have happened with you also. So maybe we would avoid that. They to try to make a way to avoid the two. So it's a very complex disease. That's why it's incurable. And COVID is itself very, what do you say, new as well as very complicated, right? So we don't know what the facts are, but maybe like they used to say COVID, but I think maybe the shot that we took, the vaccine that we took aggravated this situation. I know that it was necessary at the moment to get the vaccination. But as we know that this vaccination is also very new. It's lab-grown and it's very new. You don't know the side effects yet. It's not been studied that much. But to save us from COVID, it was very necessary. But I'm sure that it could have affected badly on some specific people as well. I'm sure that in the past, my immune system was affected. Maybe that's why it got to me. So it could have happened because my parents are 60 plus, nothing happened really happened to them. It's just normal for them. So I don't know why it affected specific people only, but I think it could have a certain level of side effect. Because see, COVID, I did not get that bad. So I think it was a vaccine which could have maybe affected. Okay. So you mentioned that you.

Interviewer
Okay. So you mentioned that you Have LADA. So do you still use injections like everyone? Or do you use oral tablets?

Patient
So I'm on a Mix of both. I take Metmorphins like type 2 people. I take twice in the day. But I also take insulin when my sugar is very high because... Okay, so I'll tell you that story as well. Last year when I started my treatment, then, of course, I had to be on insulin because I was at a very high sugar rate. But in a couple of months, I had control it. And the doctor asked me to leave insulin for some time. So then they thought I'm completely tired, too, because type I people cannot survive without insulin, right? But in two weeks of me leaving the insulin, my sugar is shot up to again 200, 250, like that. So we just thought maybe it's the lack of exercise and you start blaming yourself, the doctors start blaming you. And that's how the process goes that you know or you know whatever, like stress, they lay on the ground. And then so it took me another eight, nine months to control it again. And this time around, in fact, the same timing happened in July, I was just on two units. And then my doctor said to stop taking insulin injections altogether.

Recently, my sugar again shot up to 230, 250 again. So we saw a pattern here. We saw that I am not a type II. I cannot survive without insulin. So what I am on right now is 20 units of insulin, 10 in the morning, 10 in the evening. And I'm on metmorphins as well as I am on dapa, which is again... It's an oral tablet which controls sugar. So yeah, I am on a couple of medications, a mix of oral and insulin. So I am on both type 1 and type 2 medication.

Interviewer
Do you have any Family history of Type 1 Diabetes?

Patient
No, I don't have any family history of Type 1 Diabetes. My parents are type 2 diabetics, both of them. But they also as type 2 is, they also got it up after 45 years of their life.

Interviewer
Do you feel any abnormal symptoms?

Patient
I mean, I'm still learning. I don't know if I faced or not, but what abnormal is to me was just the eye getting affected so soon. Yeah, that was the only abnormal thing. I think the rest of the things keep happening to other diabetics as well. So yeah, like you mentioned abnormal, like abnormal. But your unusual was I think the retinopathy happening. Yeah. Sure. So like I told you, I got diagnosed in July 2022. And for the first six months, I was just... So I live outside of my home. I live by myself in a flat in Delhi and work. So for the first six months, it was just managing diabetes. And I know that as soon as you get diabetes, you should get your kidney, you should get your eyes, you should get your teeth, everything checked up, right? But I think for the first six months, I've over and so much that you have to handle so much insulin and medication and all of that that you just get used to that along with your normal life. So I think I was just getting a little bit of vision problems like all of that, which obviously in my wildest of my dreams, I couldn't have imagined that I might be suffering from something.

So I went to a normal ophthalmologist in January this year, and he's my family friend. So he just told me he just get the retina checked as well. And retinal specialists are different from normal opthamologists, right? So I went to a retina specialist and I didn't tell him that I have diabetes. He just checked my retina. And he himself guessed that you don't have diabetes from six months you have from a couple of years. It's been a while because your retina is already affected. So they declared NPR at the moment. So I didn't have a problem in my retina, but I was on the verge of having it. So it was non-proliferative diabetic retinopathy, which means

NPR. Now on NPR, they tell you very strictly to control your sugars to do everything possible because slight variation in sugar also might convert NPR to PDR, and PDR is severe. So I was in complete control. And in fact, in February, my HbA1C was 5.7. My HbA1c in June was 5.5. So I was on complete control. But they say whatever is in the card, you get it. So every month I was getting myself checked with the retina, and it was actually getting better by April.

And May, I didn't get checked. And June, I just got checked after I came back from a vacation because I was happy that everything's getting in control and I can live a normal life again. But in June, first week, I got checked. And it's sad key for PDR. So it was that bad, that aggressive that you know. So what PDR actually mean is, I make vessels, which are supposed to be there, thick vessels. But PDR, what happens is, after I make new vessels, when they start to get to that with any amount of exertion, exhaustion, even pressure, will start to bleed because they don't get enough oxygen to survive in your eye. And they're not supposed to be there. So I had thousands of them in my eye, and some had already blood because maybe in the vacation, I would have exhausted myself. So when I came back, they were like, it was an aggressive case of PDR, and they had to start the treatment right away. So I went to a lot of doctors to get a second opinion, third opinion, but all of them said the same thing. And yeah, so I was detected on the fifth, and I was getting my first treatment done on the seventh. And it's quite aggressive, the treatment. It takes a toll on your mental health as well, because you get a couple of lasers done on your eye, you get a couple of injections on your eye, and it's not subsequent. You have a three, four months treatment. I'm actually in the third month of my treatment, and still they say it's a long way to go. So it's a good timeline being in. Until that gets reversed. So again, diabetes, retinopathy is also incurable. So it's a major disease that anything related to diabetes, any disease that you get through diabetes, retinopathy, nephropathy. They're not treatable, but they're not curable. So yeah, I have to live with retinopathy as well. But yeah, treating it. So let's hope it gets better. I have to take care of it.