INCIDENCE OF NEWLY DETECTED DIABETES AMONG COVID-19 PATIENTS IN ATERTIARY CARE HOSPITAL

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ARTICLE INFO	ABSTRACT
Key words: Newly detected diabetes, COVID-19, Hyperglycaemia Access this article online Website: https://www.jgtps.com/ Quick Response Code:	With an increased population getting affected by COVID-19 virus, there are reports of newly detected diabetes among them. This retrospective cohort study was conducted among 300 COVID-19 patients in a tertiary care hospital in Kerala for a period of four months from February 1st to May 30th, 2021 to study the incidence of newly detected diabetes in COVID-19 survivors. Out of 300, 34(11.3%) patients were diagnosed with diabetes on admission and 21 patients (61.7%) had HbA1c level >6.5. Mean D dimer levels were 1326. Newly detected diabetes can be a risk factor for poor prognosis in COVID-19 patients' hence proper care and follow-up is treated to control glycaemic levels in these patients.

INTRODUCTION

The world is currently going through the biggest pandemic COVID-19 and its aftermath has left a deep impact on the healthcare situation. In the current scenario there are many studies regarding diabetes in COVID-19 patients and their poor prognosis but fewer documentation on newly emerged diabetes in post COVID-19 patients. [1] Use of steroids are believed to be the main culprits for post COVID diabetes mellitus, however few meta-analysis and case reports regarding the same explain the possibility of pancreatic B cell injury and inflammatory cytokine response in these patients that could lead to hyperglycemic episodes. [2,3] The potential pathway of COVID dependent diabetes is as follows. SARS-COV-2 utilises angiotensin-converting enzyme 2 to gain entry into human cells. On entering a cell, it could damage pancreatic β cells by

Triggering proinflammatory cytokines and acute phase reactants. Insulin deficiency plays a key role in this SARS-CoV-2 induced destruction of β cells. SARS-CoV-2 infection activates inflammatory molecules that could impair insulin signalling and inhibit insulin-stimulated glycogen synthesis and glucose uptake in the skeletal muscle and liver, as well as lipogenesis in the adipose tissue. Insulin resistance along with glucotoxicity to β cells can result in hyperglycemia. [2] There is also a possibility of new-onset diabetes (NOD) due to lifestyle changes in lockdown. Sedentary lifestyle along with unhealthy eating habits can accelerate progression of prediabetes to diabetes among individuals.[4] This study conducted in Believers Church Medical College Hospital, Kerala, focuses on determining the incidence of newly

diagnosed type 2 diabetes mellitus among COVID-19 patients and its effect on treatment outcome and disease prognosis.

METHODS

This retrospective cohort study was conducted among 300 COVID-19 patients admitted under the general medicine departments in a tertiary care hospital in Kerala from February 1st to May 30th, 2021.The study was approved by the ethics committee of Believers Church Medical College Hospital, Kerala, India. The patient informed consent was waived by obtaining approval from institutional review board committee due to the retrospective nature of the study. Reverse transcription polymerase chain reaction (RT-PCR) test was carried out to diagnose COVID-19 patients. The data was retrieved from the patient case sheet which includes demographics, medical and medication history, laboratory investigations, clinical signs and symptoms, treatment given and clinical outcome. Blood samples were taken at the time of admission and after the administration of steroids. Fasting blood glucose, mean blood glucose and HbA1c levels were measured using standard assays and protocols. Newly diagnosed diabetes were determined based on fasting blood sugar FBS $\geq$126 mg/dl or HbA1c $\geq$ 6.5% in those without a prior history of diabetes.[5]

RESULTS

Out of 300 patients that were admitted during the study period, 34(11.3%) patients were diagnosed with newly detected diabetes on admission. Among them, 18 (52.9%) were male and 16 (47%) were female patients. Mean age of patients admitted was 59. Around 12(35%) patients were prediabetic with an HbA1c level between 5.8 -6.1 and 21 patients (61.7%) had HbA1c level>6.5. The common manifestations in these COVID-19 patients were fever, cough, breathlessness and headache. Around 25 patients had moderate COVID-19 symptoms, 8 had severe COVID-19 and 1 patient with mild symptoms. The common comorbid conditions seen in these patients include hypertension, dyslipidemia and asthma. Around 11 (32.5%) patients with no other known comorbid conditions were diagnosed with newly detected diabetes. The mean D-Dimer levels in patients was 1326. Patients with moderate to severe symptoms were treated with antibiotics, low molecular weight heparin and IV steroids like methylprednisolone or dexamethasone during COVID care. 6 patients were treated with rivaroxaban during the hospitalization. In patients with HbA1c level >6.5 or FBS > 126 mg/dl, short acting insulin or human mixtard was administered. 2 CKD patients were prescribed teneligliptin and 3 patients with persistent hyperglycemia were started on metformin. The patients were advised to follow diabetic diet and lifestyle modifications and monitor fasting blood glucose levels on discharge.

DISCUSSION

In this study conducted in 300 patients, 11.3% had newly diagnosed diabetes mellitus on admission. Around 62% of patients had HbA1c level > 6.5. This implies the patients had previously undiagnosed diabetes. The comorbid conditions seen in these patients include CVA, CKD and hypertension. Sathish.T*etal*., conducted a meta- analysis of eight studies depicting a proportion of 14.4 % newly diagnosed diabetes among hospitalized COVID-19 patients.[4] The hyperglycemic effect could be explained by stress caused by infection, prolonged duration of steroid use as well as the inflammatory effect of COVID-19 on inducing diabetes in patients.[4,6] Our study showed increased D-Dimer levels with mean levels to be 1326. Diabetic patients have comparatively higher D-dimer levels than non-diabetic ones. Prolonged hyperglycemia can result in thrombus formation as a result of endothelial dysfunction and inflammation in the body. It is likely that SARS-CoV-2 infected patients with diabetes could be a risk factor for coagulopathy and thrombosis.[7] Novel studies indicate that newly diagnosed diabetes could confer greater risk for poor prognosis in COVID-19 patients compared to no diabetic or pre-existing

diabetic patients. Hence these patients should be detected and managed appropriately as well as monitored for development of further complications. [8, 9]

CONCLUSION

There is an increased incidence of newly detected diabetes among COVID patients and care should be taken to detect and monitor glucose levels early to prevent further complications.

REFERENCES

1. Sathish T, Chandrika Anton M. Newly diagnosed diabetes in patients with mild to moderate COVID-19. Diabetes Metab Syndr. 2021;15(2):569–71.

2. Sathish T, Tapp RJ, Cooper ME, Zimmet P. Potential metabolic and inflammatory pathways between COVID-19 and new-onset diabetes. Diabetes Metab. 2021;47(2):101204.

3. Ghosh A., Misra A. Marked hyperglycemia and ketosis in a non-obese patient with new onset diabetes and very mild COVID-19 symptoms: a case report. Diabetes Metab Syndr. 2020;15:213–214.

4. Sathish T, Kapoor N, Cao Y, Tapp RJ, Zimmet P. Proportion of newly diagnosed diabetes in COVID-19 patients: A systematic review and meta-analysis. Diabetes Obes Metab. 2021;23(3):870–4.

5. American Diabetes Association 2. Classification and diagnosis of diabetes: standards of medical care in diabetes-2020. Diabetes Care. 2020;43:S14–s31.

6. Suwanwongse K., Shabarek N. Newly diagnosed diabetes mellitus, DKA, and COVID-19: causality or coincidence? A report of three cases. J Med Virol. 2021;93:1150–1153.

7. R. V. Anil Kumar, P. Dwarakanadha Reddy, M. Pramod Kumar , A Review on Current Therapeutic Options for COVID-19 , Int. J. Pharm. Sci. Rev. Res., 65(2), November - December 2020; Article No. 25, Pages: 160-164

8. Meda Venkatasubbaiah, P. Dwarakanadha Reddy, Suggala V. Satyanarayana, Literature-based review of the drugs used for the treatment of COVID- 19, *Current Medicine Research and Practice*, 10 (2020) 100- 109

9. Mishra Y, Pathak BK, Mohakuda SS, Tilak TVSVGK, Sen S, P H, et al. Relation of D-dimer levels of COVID-19 patients with diabetes mellitus. Diabetes Metab Syndr. 2020;14(6):1927–30.

10. Sathish T., Cao Y. What is the role of admission HbA1c in managing COVID-19 patients? J Diabetes. 2021;13:273–275.

11. Sathish T., de Mello G.T., Cao Y. Is newly diagnosed diabetes a stronger risk factor than pre-existing diabetes for COVID-19 severity? J Diabetes. 2021;13:177–178.