Diabetes Mellitus: A Growing Health Challenge and Its Complications

Dr. R. G. Wiseman Pinto

World Diabetes Day is observed on 14 November every year, marking the birthday of Sir Frederick Banting, one of the discoverers of insulin.

Diabetes Mellitus has been known since ancient times. However, the discovery of insulin revolutionised its treatment. Insulin was discovered at the University of Toronto, Canada, by Dr Frederick Banting and medical student Charles Best, assisted by biochemist Dr James Collip and his assistant John Macleod.

This landmark medical discovery earned Dr Banting and Dr Macleod the 1923 Nobel Prize in Medicine or Physiology. Both generously shared their prize money with Charles Best and Dr Collip. Dr Banting received worldwide acclaim. The first patient to receive an insulin injection was Leonard Thompson, a 14-year-old boy. The two major pharmaceutical companies that initially produced and marketed insulin were Eli Lilly of the USA and Novo Nordisk of Denmark.

India and China have the highest numbers of diabetes patients and these numbers are rising alarmingly due to lifestyle, genetic and environmental factors.

Diabetes Mellitus is classified into several types. Type 1 Diabetes results from autoimmune destruction of the beta cells of the islets of Langerhans in the pancreas. These patients require lifelong insulin. Type 2 Diabetes accounts for 90 to 95% of cases and is characterised by insulin resistance. Gestational Diabetes occurs during pregnancy. Other types include Type 3 Diabetes caused by chronic pancreatitis, pancreatic surgery or trauma, MODY (Maturity Onset Diabetes of the Young) caused by a single-gene mutation, steroid-induced Diabetes and LADA (Latent Autoimmune Diabetes in Adults). Diabetes can also result from certain drugs, endocrine disorders and severe stress.

Uncontrolled Diabetes over many years can cause serious complications, particularly in patients diagnosed at a younger age and those with lower BMI. Almost every organ and system can be affected. The disease damages small blood vessels (microvascular complications) and large blood vessels (macrovascular complications).

Kidneys: Diabetic nephropathy affects the glomeruli and renal blood vessels. It can cause pyelonephritis, papillary necrosis and diffuse or nodular lesions. The basement membranes of capillaries and tubules become thickened. Ischaemic changes, atherosclerosis and arteriolosclerosis may also occur.

Eyes: Diabetic eye complications include cataracts, glaucoma, optic nerve damage and retinal damage.

Nerves: Diabetic neuropathy causes tingling, numbness and abnormal sensations. Approximately 80% of patients may develop this complication when Diabetes has been present for more than 15 years.

Diabetic Foot: Nerve damage, poor blood supply and infections cause pain, numbness, loss of sensation, dry skin, blisters and poorly healing ulcers. Tissue destruction may eventually require amputation. At Goa Medical College, at least one amputation is estimated to be performed every day due to Diabetes. Proper foot care is therefore essential. Patients should regularly inspect their feet, particularly the soles and undersides of their toes.

Cardiovascular System: Complications include coronary artery disease, atherosclerosis, heart attacks which may occur silently without pain, stroke and peripheral vascular disease.

Brain: Diabetes can cause cognitive impairment, memory loss, dementia and an increased risk of stroke. Diabetic coma is another serious complication.

Digestive System: Gastroparesis, gut microbiome imbalance, chronic infections, bloating, nausea, fullness and constipation can occur. Leaky Gut may allow toxins and bacteria to enter the bloodstream.

Sexual Health: Men may experience erectile dysfunction, reduced libido, delayed ejaculation and retrograde ejaculation, where semen enters the urinary bladder. These problems result from nerve damage, poor blood flow and hormonal imbalance. Anxiety and depression may also occur. Women may experience vaginal dryness, lubrication problems and frequent fungal infections.

Lungs and Liver: Pneumonia, asthma, COPD, sleep apnoea, reduced lung function and increased fibrosis are associated complications. Non-Alcoholic Fatty Liver Disease, now called MASLD (Metabolic Dysfunction-Associated Steatotic Liver Disease), is also common, particularly among young IT professionals and others.

PMOS (Polyendocrine Metabolic Ovarian Syndrome), formerly called PCOS, is another associated metabolic concern.

Acute complications include hypoglycaemia, diabetic ketoacidosis and Hyperosmolar Hyperglycaemic State (HHS).

Once Diabetes Mellitus is diagnosed, patients must adopt healthy lifestyles, follow a proper diabetic diet, exercise regularly, sleep adequately, practise meditation, maintain good oral hygiene and drink plenty of water.

Regular blood glucose and HbA1C tests, lipid profiles, renal function tests, microalbuminuria screening, ECGs, chest X-rays, medical examinations and eye check-ups are essential.

Early detection, regular monitoring and appropriate management are crucial to preventing complications and maintaining a good quality of life.

Dr. R.G. Wiseman Pinto is a Professor of Pathology, former Head of Department at Goa Medical College, former Dean of Goa University, and the current President of the Asian Society of Cytopathology (SACH)