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Vascular complications in type 2 diabetes mellitus in children and adolescents

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ype 2 diabetes in in children and adolescents is different, not only from type 1 diabetes, but also from type 2 diabetes in adults, as it has a more rapidly progressive reduction in β -cell function and accelerated development of diabetes complications. Accordingly, secondary comorbidities like hypertension, nephropathy, the leading cause of end-stage renal disease, hyperlipidaemia, stroke, 2- to 4- fold increase in cardiovascular mortality, cardiovascular disease, diabetic neuropathy, a leading cause of non-traumatic lower extremity amputations and retinopathy, the leading cause of blindness in working age adults, are anticipated and their development and progression might be especially rapid because of the early onset of type 2 diabetes in such patients. This will raise the possibility of a serious publichealth challenge in the next few decades and we must begin to understand the extent of this upcoming challenge. Risk factors for development of diabetic angiopathy are disease duration, poor metabolic control, hypertension, hyperlipidemia, smoking, puberty and genetic factors. Furthermore, the mechanism by which poor glycemic control predisposes to vascular disease is incompletely understood. The pathogenesis of diabetic vascular complications include accumulation of advanced glycosylation end products in plasma, induced by hyperglycemia, that contribute to microvascular disease, accumulation of cellular sorbitol, which interferes with cellular metabolism because of a rise in cell osmolality and a decrease in intracellular myoinositol, end-organ response with activation of cytokines, profibrotic elements, vascular growth factors, inflammation, and protein kinase C. Specific end organ responses include mesangial matrix expansion and glomerular hypertension in the kidney, and impairment of retinal blood flow and microthrombus formation in the eye. The role of these factors in advancement of diabetic vascular problems and the feasible therapeutic goals for these illnesses has been explained within this presentation. Improved glycemic control and control of hypertension delay the progression of microvascular disease. Therefore, all patients with T2DM should be screened for microvascular complications to identify those with microvascular disease and initiate treatment when complications are discovered to delay or prevent further progression of disease. The role of growth factors in the pathogenesis of diabetic angiopathy and their relation to later development of microalbuminuria in a pathway to vascular complications will be illustrated. This presentation will review the contribution of dysfunction of the vascular endothelium to the pathogenesis of diabetic micro- and macroangiopathy in children and adolescents with type 2 diabetes. The biochemical basis for the effects of hyperglycemia on the pathogenesis of diabetic angiopathy will be discussed. Recently, it is found that the metabolic milieu that are the key factors leading to vascular complications in T2DM. In this lecture, an attempt has been made to comprehensively compile updated information available in context of endothelial and platelet dysfunction in T2DM in children and adolescents. The data presented in this presentation were obtained from published literature presented at scientific meetings, clinical trials and review articles using the search terms Hyperglycemia, Insulin resistance, Inflammation, Oxidative stress, vascular complications, 'type 2 diabetes mellitus', 'children', and 'adolescents' in a MEDLINE search from 1995-2018. Additionally, the bibliographies in the identified articles were reviewed.

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