CHAPTER 7

EMERGING TYPE 2 DIABETES IN YOUNG ADULTS

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Abstract: Type 2 diabetes mellitus (a disease normally appears in the post 40 age group people) now seems to emerging in young adults at the level of global epidemic driven by the increasing burden of obesity. Evidence is accumulating to suggest that this young diabetic cohort is an aggressive phenotype which leads to the premature development of complications that not only have impact on the quality of life but also unfavourably influence the long term outcome, raising the possibility of a serious public health challenge in the next few decades. This chapter reviews the current understanding of the phenomenon of T2DM in the young adults and discusses the clinical challenges in managing this high risk group.

INTRODUCTION

The age of onset of Type 2 diabetes mellitus (T2DM) is falling and this condition is now not uncommon among children, adolescents and young adults. In the UK, the National Institute for Health and Clinical Excellence (NICE) defines early-onset T2DM as those subjects with current age below 40 years. Early-onset T2DM has been reported in countries with different ethnic and cultural backgrounds. The driving force behind this phenomenon is the increasing prevalence of the sedentary lifestyle and obesity that affect societies globally. The pathophysiology of early-onset T2DM subjects is similar to the later-onset cohort (aged above 40 years) and is characterised by pancreatic β cell impairment and obesity-induced insulin resistance; however, the rate of decline in β-cell function appears to be more rapid. Recent evidence suggests that these young people with T2DM are at high risk of developing premature microvascular (nephropathy, retinopathy and neuropathy) and macrovascular (cardiovascular) disease driven by the existence of
adverse atherogenic risk factors and poor diabetes control. The clinical management of this young cohort is challenging. As there is a paucity of clinical trial evidence in this population, clinical judgement is often required particularly in treatment initiation for the prevention of cardiovascular disease. Future research strategies should include population-based studies to explore its natural history and the development of complications, and outcomes studies pertaining to structured patient education, screening for diabetes in at risk groups, intensive treatment of glucose control and associated cardiovascular risk factors.

EPIDEMIOLOGY

The global burden of T2DM is significant and rising, with most increase occurring in the last two decades. The worldwide prevalence of diabetes in adults is expected to rise from 6.4% to 7.7% (though this figure can change from country to country) between 2003 and 2025. Whilst most of the increase in the prevalence of T2DM has been seen in the middle-aged and elderly, there is strong evidence that it is becoming more common among young adults.

Most evidence for the epidemic of T2DM in younger people originated from paediatric data in Japan and USA. Newly diagnosed T2DM has been reported in up to 45% of certain groups of young children in the USA and this is clustered in certain ethnic groups such as Pima Indians, Hispanics, Asians and Afro-Carribeans. In Japan, the prevalence of T2DM among junior high school children has doubled between 1976-1980 and 1991-1995 and T2DM is now the most likely diagnosis in a child presenting with diabetes. Among Japanese diabetic subjects, aged between 10-19 and 20-29 years, the prevalence of T2DM was approximately 50% and 75% respectively. Early-onset T2DM has also been reported in China, Mexico, India and Australia. However, available data from Europe are insignificant as a European survey in 2005 identified only 184 children and adolescents with T2DM, the majority of which were Caucasian, females and had positive family history for T2DM. A population study in Germany identified 562 children with T2DM representing 1.4% of the diabetic population under the age of 20 years.

In the UK, most of the data on the incidence and prevalence of early-onset T2DM has originated from a questionnaire survey of hospital paediatric units, analysis of general practice prescription of oral diabetes medication and a national survey in England. A cross-sectional questionnaire survey of every UK paediatric centres in year 2000 identified 25 patients under the age of 16 years suffering from T2DM with a crude prevalence of 0.21/100,000. The analysis of oral diabetes medication prescription between 1998 and 2005 for 505,754 young adults aged below 18 years showed an eight-fold increase in its usage with the prevalence of T2DM estimated at 1.9/100,000. The most recent data on early-onset T2DM comes from the national survey of England in 2009 which identified 328 youths under the age of 18 years with T2DM, representing 1.5% of the total diabetic population in this age group with the estimated prevalence of 3.0/100,000 with peak prevalence in 10-14 year-olds. The collective data from these studies clearly demonstrates a progressive rise in the burden of early-onset T2DM in many countries including the UK.

The onset of T2DM at younger age is driven by the increasing obesity in this group. This is supported by the observation that an inverse relationship exists between obesity and age of diagnosis of T2DM. In the last 2 decades, obesity has increased by 70% in