

Short Communications

Mortality and Morbidity of Diabetes in Papua New Guinea

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Summary. A 95% follow-up of all known diabetic patients in one racial group in Papua New Guinea was performed. Mortality was high with an average life-span of 4–5 years from the time of diagnosis. Microvascular diabetic complications were detected in over half of the surviving diabetic patients whose average duration of known disease was 3.8 years. At present,

diabetes mellitus is both a rapidly fatal and morbid disease in Papua New Guinea.

Key words: Non-insulin – dependent diabetes, Papua New Guinea, mortality, morbidity, microvascular complications, atherosclerosis, familial tendency.

Obesity, a low fibre high carbohydrate diet and physical inactivity may unmask a genetic predisposition to diabetes in the inhabitants of developing nations who adopt a Western lifestyle [1]. The distinguishing clinical features of diabetes in Papua New Guinea are the low prevalence of the disease in children and adolescents and the rarity of associated atherosclerosis [2]. The characteristic metabolic features are hyperglycaemia without ketosis and the presence of an insulin response to a carbohydrate load [3].

Most recent studies of diabetes in Papua New Guinea have been concerned either with defining the prevalence of the disease or the distinguishing clinical and biochemical features [3, 4]. This report records for the first time the morbidity and mortality of diabetes in a Melanesian population whose clinical and metabolic characteristics suggest that this syndrome is a form of Type 2 (non-insulin-dependent) diabetes.

The Tolais are the Melanesian inhabitants of the Gazelle Peninsula (population = 160,000) on the island of East New Britain in Papua New Guinea. Copra plantations were established here a century ago and locally grown copra is now one of the major national exports. This accounts for the relative affluence of the area and allows the average villager to supplement his traditional diet of sweet potato and bananas with tinned fish, meat and other processed goods. The adult Tolai male has a daily caloric intake of about 2,500 Kcal, consisting of 70% carbohydrate, 20% fat and 10% protein (A. Bond personal communication). Although no survey of the prevalence of diabetes has been performed in this population, it is recognized that diabetes mellitus is relatively common and increasing [5, 2].

Methods

The Base Hospital at Rabaul, serves the entire Peninsula although travel from outlying villages is difficult. Records had been kept of the names and villages or origin of all diabetic patients who were diagnosed between 1965 and May 1981. Each village was visited, and if the patient had died, the year of death was ascertained. All surviving patients subsequently attended the Base Hospital for review and were asked about a family history of diabetes and their compliance with the treatment prescribed when previously under medical care. Age, weight and height were recorded, and compared with standards for age and sex in this population [6]. Patients were then examined to determine specifically the presence of complications.

Hypertension was defined by the conventional Western criterion of a blood pressure $\geq 140/90$ mmHg in the sitting position, the optic fundi were carefully examined after dilatation of the pupils and the presence of a typical diabetic retinopathy (exudates, haemorrhages or new vessel formation) or cataracts was recorded. Neuropathy was defined as the absence of ankle reflexes and clinically-diminished vibration sense. The absence of palpable peripheral arterial pulses in the feet was noted as evidence of peripheral vascular disease. Urine was tested for proteinuria with Albustix (Ames). The cumulative survival curve of this population was calculated using the method of Kaplan-Meier [7].

Results

A total of 124 diabetic patients were diagnosed during the period of review, the average age at onset of the disease was estimated to be 40 years (range 15–65 years). At review, 74 patients had died, 44 were alive and six could not be traced. The year of death was ascertained in 66 of those who had died. The median survival of Tolai diabetic subjects is between 4 and 5 years (Fig. 1).

Of the 44 examined, there were at least ten in whom another family member also had diabetes. Only one patient was under the age of 20 years. Using height: weight²

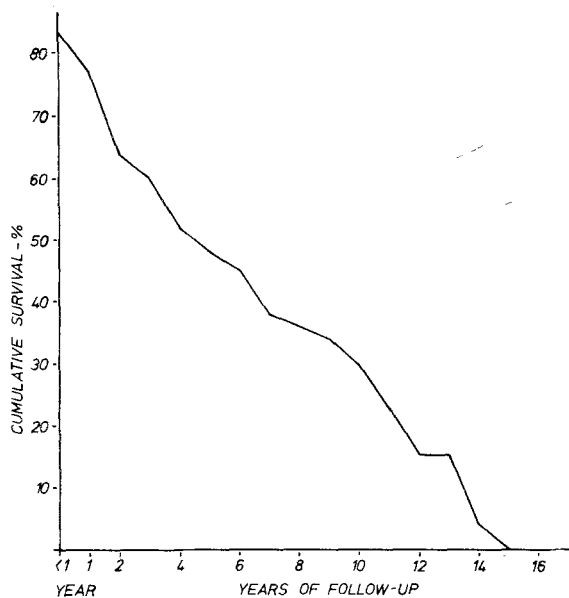


Fig. 1. Percentage cumulative survival in relation to length of follow-up (years) in 66 Tolai diabetic patients in Papua New Guinea

according to age and sex, seven (16%) of surviving diabetics patients were thin, 21 were of medium build (52%) and 16 (36%) were obese. In the 44 survivors whose average duration of known diabetes was 3.8 years, 34 (77%) had evidence of microvascular complications. Retinopathy was present in 18 (41%), peripheral neuropathy in 18 (41%), and proteinuria in 9 (20%). Hypertension was present in 15 (34%), cataracts in 21 (48%) but only in four subjects (9%) were peripheral pulses not palpable. Only 11 of the 29 who had been commenced on insulin to control hyperglycaemia in hospital were continuing treatment at review.

Discussion

The strong family history, the rarity of this disease in children, the association with obesity and the insulin response to a carbohydrate load all suggest that diabetes in this population is a form of Type 2 diabetes. The mortality of this disease is usually related primarily to ischaemic heart disease and peripheral vascular disease.

We believe that the present study is the first in which a complete follow-up (95%) of all known diabetic subjects within a homogeneous racial group of a developing nation has been achieved. A similar review of patients treated at the Joslin Clinic between 1897 and 1961 achieved a 98% follow-up [9]. The life span of 4–5 years in our population is similar to that of the Joslin Clinic in the pre-insulin era.

The prevalence of microangiopathic complications in the surviving 44 patients is comparable to that recorded in other Third World countries in diabetic subjects of similar disease duration [8], although retinopathy appears to be more frequent than in India and Hong Kong.

Atherosclerotic vascular disease is rare, which may be at least partly attributable to the low plasma chole-

sterol and triglyceride levels found in Papua New Guinea [4]. Recorded deaths in diabetic patients were usually due to infection, gangrene and metabolic complications.

The high morbidity and mortality of the Tolai diabetic patients of Papua New Guinea has several explanations. The known diabetic patient may clinically represent the severest end of the spectrum; epidemiological evidence in similar populations has suggested that the actual prevalence of diabetes may be up to eight times that number already diagnosed [10]. Patients typically seek medical help late, being relatively asymptomatic because of the resistance to ketosis in Type 2 diabetic patients; hence, microangiopathic complications are frequently noted at the initial presentation. Subsequently, compliance with treatment is difficult because of limited medical facilities, the asymptomatic nature of the hyperglycaemia and the pattern of meals and customs of the people.

The results of the present study indicate that diabetes mellitus is at this time a rapidly lethal disease in the population of Papua New Guinea.

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