Clinical and metabolic characteristics
of newly diagnosed diabetes patients

Experience of a university hospital in Tunis

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SUMMARY
Purpose: The aim of our retrospective study was to explore the clinical and metabolic characteristics of newly diagnosed diabetes patients over the age of 30 years.

Methods: Study participants were consecutive, newly diagnosed patients with diabetes, over the age of 30 years, presenting to our university hospital department between January 1999 and June 2003. Clinical and metabolic data were collected retrospectively by medical record review.

Results: Three hundred seventy patients were included; mean age was 54.1±14.0 years; 49% were women and a family history of diabetes was reported in 52% of patients. Patients presented with acute complications in 40% of cases. Symptoms of polyuria-polydipsia and weight loss were present at diagnosis in 87% and 76% of cases respectively. 58% of our patients were obese or overweight (BMI ≥ 25 kg/m²), hypertension was present in 22%, hypertriglyceridemia in 27% and high LDL cholesterol in 27%. Neuropathy was diagnosed in 24%, nephropathy in 13%, coronary heart disease in 9%, retinopathy in 8% of cases, stroke in 3% and peripheral arterial disease in 2%. Insulin was prescribed initially in 47% of cases.

Conclusions: Our results demonstrate that clinical symptoms and acute ketosis are the most common presenting features of diabetes mellitus in adults at the hospital level. Associated chronic complications are frequent.

Key-words: Diabetes · Cardiovascular risk factors · Complications.

RÉSUMÉ
Présentation clinique et métabolique du diabète de découverte récente : expérience d’un hôpital universitaire de Tunis

Objectif : Le but de cette étude rétrospective était d’apprécier les caractéristiques des patients adultes atteints de diabète sucré nouvellement diagnostiqué.

Méthodes : La population de l’étude était constituée des patients diabétiques consécutifs (âge ≥ 30 ans) hospitalisés, au moment de la découverte de la maladie, entre janvier 1999 et juin 2003, dans un hôpital universitaire. Les données cliniques et biologiques ont été recueillies à partir des dossiers des patients.

Résultats : Trois cent soixante-dix patients ont été inclus ; l’âge moyen était de 54,1 ± 14,0 ans, 49 % étaient des femmes et les antécédents familiaux de diabète étaient rapportés par 52 % des patients. Une décompensation métabolique aiguë inaugurale a été observée dans 40 % des cas. Les symptômes rapportés étaient un syndrome polyuro-polypépisique dans 87 % et une perte de poids dans 76 % des cas. Parmi nos patients, 58 % étaient obèses ou en surpoids (IMC ≥ 25 kg/m²). L’hypertension artérielle était présente chez 22 %, l’hypertriglycéridémie chez 27 % et un taux élevé de LDL cholestérol chez 27 % des patients. Une rétinopathie a été diagnostiquée dans 8 % des cas, une néphropathie dans 13 %, une neuropathie dans 24 %, une insuffisance coronaire dans 9 %, une artéropathie oblitérante des membres inférieurs dans 2 % et un accident vasculaire cérébral dans 3 %. Une insulinothérapie a été initialement prescrite dans 47 % des cas.

Conclusions : Ces résultats montrent, qu’en milieu hospitalier, le début aigu et les symptômes sont fréquents dans le diabète de l’adulte et ils sont souvent associés à des complications chroniques.

Mots-clés : Diabète · Facteurs de risque vasculaire · Complications.

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Introduction

Diabetes mellitus is a heterogeneous disease with varying clinical presentations depending on the type of diabetes, ethnicity, relative insulinopenia, age at onset of hyperglycaemia and level of glycaemia [1,2]. Type 2 diabetes is the most common form in adults, but it may have diverse presentations depending on the degree of insulin secretion and insulin resistance [2-4].

Chronic complications of diabetes may be present at the time of clinical diagnosis and their frequency is affected not only by the degree and the duration of hyperglycaemia but also by the presence of other cardiovascular risk factors [5-7]. Presenting features at diagnosis may also be influenced by broader, national factors such as the presence of screening programs.

In Tunisia, most patients with type 2 diabetes initially attend primary care health facilities. The majority of patients presenting without acute symptoms or complications would be expected to initially consult at the primary care level. Our university hospital department generally receives acute cases of newly diagnosed patients from emergency departments and less acute cases from other hospital departments, often presenting with chronic complications or prior to surgical intervention.

Although many studies have been undertaken in developed countries on the presenting features of newly diagnosed diabetes patients, fewer have been undertaken in low-middle income countries. The aim of this study, therefore, was to describe the clinical features of newly diagnosed diabetes patients presenting to a university teaching hospital in a North African country.

Patients and methods

We undertook a retrospective study involving consecutive patients aged 30 years or over, with newly diagnosed diabetes, who were admitted to our department between January 1999 and June 2003. Pregnant women were excluded. Data were collected by medical record review regarding patients age, gender, family history of diabetes, symptoms reported at the time of presentation, clinical examination and results of any requested investigations (ECG, biological tests, etc…).

Hypertension was diagnosed if SBP/DBP ≥ 140/90 mmHg or if the patient was taking anti-hypertensive medication. Retinopathy was diagnosed according to the eye examination carried out by an ophthalmologist using fundoscopy and nephropathy was identified if there was microalbuminuria or proteinuria present. Coronary heart disease (CHD) was diagnosed based on the results of a resting or exercise ECG, if available, or if the patient was on treatment for previous CHD. The diagnosis of stroke was based on the medical history and clinical examination. Peripheral arterial disease was diagnosed according to the medical history (claudication) and clinical examination (absence of pulses) or echo Doppler if undertaken. Peripheral neuropathy was defined as a lack of sensation or absent leg reflexes on clinical examination.

Data was analysed using the Epi-info 6 database program. Results are expressed as mean +/- SD values. ANOVA or the Kruskall-Wallis test was used to compare means and Chi²-test to compare proportions.

Results

370 patients (182 women and 188 men) were included in our study; mean age was 54.1±14.0 years (30-90 years).

Presenting clinical features

40% of patients presented with an acute episode, predominantly ketosis. Table I shows the characteristics of patients presenting with acute ketosis in comparison with other patients. They were younger and more symptomatic but less likely to have microvascular or macrovascular complications. 22% of patients were diagnosed by systematic screening, usually prior to surgical intervention. In 3% of cases, a diagnosis was made in patients presenting with a chronic complication.

Clinical characteristics

Although only one in three patients presented due to symptoms, on direct enquiry, the majority of patients admitted to having classic symptoms of diabetes. Polyuria and/or polydipsia were reported by 87.3% of patients, with a mean duration of 12.1±14.5 weeks (1-52 weeks). Weight loss was noted by 75.9% of patients, the mean weight loss being 10.8±6.5 kg. A family history of diabetes was reported in 52.2% of cases. 38.6% of patients were smokers (71.3% of men, 4.9% of women, P<0.001).

27.8% of patients were obese at the time of diagnosis and a further 30% were overweight (table II). BMI was significantly higher in women than in men (27.9±6.3 versus 25.7±5.1 kg/m², P<0.001).

Metabolic characteristics

The initial mean glycaemia of the patients was 3.53±1.37 g/l and hypertension was present in 21.9% of cases, more frequently in women (26.9% vs 17.0% in men, P<0.03). Dyslipidaemia was also common: 65.2% had low HDL cholesterol (<0.40 g/l), 50% had high LDL cholesterol (>1.3 g/l) and 27.3% had hypertriglyceridemia (≥ 2.00 g/l).

Chronic complications

Chronic complications in our patients were common. One or more microvascular complications were diagnosed
in 36.5% of patients: Neuropathy in 24.3%, nephropathy in 13.1% and retinopathy in 8.1% of cases. 11.9% of patients presented with one or more macrovascular complications: Coronary heart disease in 8.6%, stroke in 2.7% and peripheral arterial disease in 2.2% of patients.

**Table I**
Characteristics of patients with and without ketosis-onset (%).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Ketosis (n=149)</th>
<th>No ketosis (n=221)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>48.4±12.5</td>
<td>58.0±13.6</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>Sex (M/F)</td>
<td>75/74</td>
<td>113/108</td>
<td>NS</td>
</tr>
<tr>
<td>Polyuria/polydipsia (%)</td>
<td>92</td>
<td>84</td>
<td>&lt;0.03</td>
</tr>
<tr>
<td>Weight loss (%)</td>
<td>78</td>
<td>75</td>
<td>NS</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.0±6.3</td>
<td>26.6±5.4</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Complications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microvascular complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retinopathy (%)</td>
<td>5.8</td>
<td>9.1</td>
<td>NS</td>
</tr>
<tr>
<td>Nephropathy (%)</td>
<td>9.8</td>
<td>14.6</td>
<td>NS</td>
</tr>
<tr>
<td>Neuropathy (%)</td>
<td>13.1</td>
<td>30.6</td>
<td>&lt;0.0002</td>
</tr>
<tr>
<td>Macrovascular complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coronary heart disease (%)</td>
<td>6.2</td>
<td>10.4</td>
<td>NS</td>
</tr>
<tr>
<td>Peripheral arterial disease (%)</td>
<td>0</td>
<td>3.2</td>
<td>NS</td>
</tr>
<tr>
<td>Stroke (%)</td>
<td>0.6</td>
<td>4.1</td>
<td>NS</td>
</tr>
</tbody>
</table>

**Initial anti-diabetic treatment**

Almost half (46.3%) of patients were initially treated with insulin including 5% in combination with metformin. 18.4% were treated with metformin alone, 15.1% with a sulfonylurea alone and 9.5% with a combination of metformin and a sulfonylurea. Only 9.7% of patients were not treated with any form of anti-diabetic medication.

**Discussion**

Our results demonstrate that clinical symptoms and acute ketosis are the most common presenting features of diabetes mellitus in adults at the hospital level. Acute ketosis is more common in younger patients who are more likely to have symptoms and less likely to have complications.

We have also confirmed findings from other studies that illustrate that microvascular and macrovascular complications are common at the time of presentation of diabetes in adults [5-8]. In particular, the relatively high prevalence of retinopathy, the most specific complication of hyperglycaemia, suggests a delay between the onset of hyperglycaemia and the time of diagnosis of diabetes. The high number of patients with clinical symptoms and weight loss in our study would also confirm a delay between onset and diagnosis [9]. It is well known that type 2 diabetes is characterized by an asymptomatic phase between the actual onset of diabetic hyperglycaemia and clinical diagnosis [10]. Nephropathy may be more frequently reported than retinopathy because it is a component of the metabolic syndrome, according to the 1998 WHO definition [11], and is not a specific consequence of chronic hyperglycaemia [12,13].

Although a significant proportion of our patients had cardiovascular risk factors and macrovascular complications at the time of diagnosis, the rates are lower than reported in other studies [7,14]. This may be partly explained by the younger mean age of our patients compared to other series. The prevalence of chronic complications, especially macrovascular, was likely to be underestimated because systematic screening was not performed and diagnosis of these complications was often based on clinical features only [7,15]. In addition, microvascular complications, as well as macrovascular, have been shown to be influenced not only by hyperglycaemia but also by hypertension and other components of the metabolic syndrome [16,17], and so a low level of cardiovascular risk factors may contribute to the lower level of

**Table II**
Distribution of patients according to BMI value and gender (%).

<table>
<thead>
<tr>
<th></th>
<th>Men (n=188)</th>
<th>Women (n=182)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;22</td>
<td>22.9</td>
<td>18.7</td>
<td></td>
</tr>
<tr>
<td>22-25</td>
<td>24.4</td>
<td>18.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>25-30</td>
<td>33</td>
<td>26.9</td>
<td></td>
</tr>
<tr>
<td>&gt;30</td>
<td>19.7</td>
<td>36.3</td>
<td></td>
</tr>
</tbody>
</table>
Characteristics of newly diagnosed diabetes in Tunis

A high proportion of our patients were treated initially with insulin. This may be due to the need for temporary insulin therapy in patients who were to undergo surgery, as well as to the advanced stage of diabetes in many of our patients.

In conclusion, our results provide a useful insight into the clinical and metabolic features of newly diagnosed diabetes patients presenting to a university teaching hospital in a low-middle income country.

References

2. Sobngwi E, Gautier JF. Adult-onset Type I or ketosis-prone Type II diabetes: evidence to revisit diabetes classification. Diabetologia 2002;45:283-5.