

INHERITED FACTORS INVOLVED IN DIABETES MELLITUS DETERMINISM

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INTRODUCTION

In the last years, huge progresses were made in the understanding of diabetes mellitus multifactorial determinism; candidate genes were proposed for both I and II types of diabetes and the polygenic transmission pathway of genetic predisposition was described (Hattersley and Pearson, 2006).

Still, diabetes remain a disease which surprises us by its high morbidity rates and its complications; despite the permanent progress of its treatment diabetes is a social disease, an important problem of public health and a permanent problem for the clinician and geneticist (Patraș et al., 2003).

The major classes of diabetes mellitus are classified as follows:

- insulin-dependent diabetes (type I)
- insulin-independent diabetes (type II)
- altered tolerance to glucose (“chemical diabetes”)

The risk factors for diabetes must be classified in accordance with the type of the disease (Tudose et al., 2000).

Factors of risk for type I diabetes:

- Genetic predisposition (first degree relatives with diabetes type I, especially with identical HLA haplotypes)
- The presence of antibodies anti-pancreatic insular cells
- Diminished insulin response to glucose
- Fetus microsomia
- Delayed menarche.

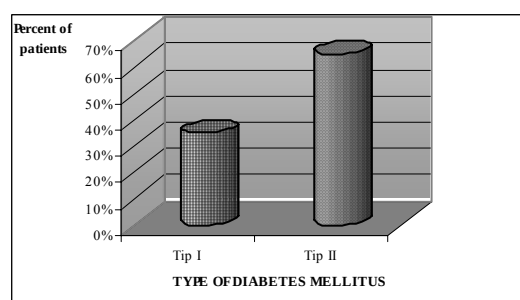
Factors of risk for type II diabetes:

- Genetic predisposition (first degree relatives with diabetes type II)
- Obesity,
- Fetus macrosomia (risk for mothers)
- Transitory high levels of blood glucose during pregnancy, diseases, treatments etc.

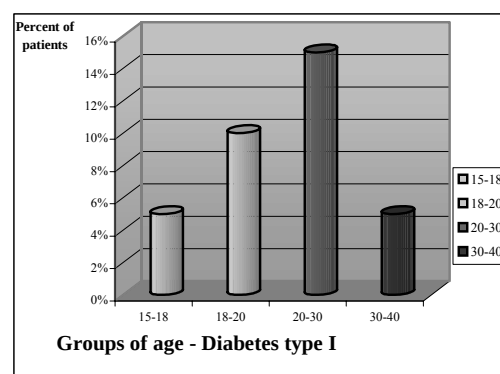
MATERIAL AND METHOD

The group of study was composed of 20 patients with diabetes mellitus selected from the evidences of Piatra Neamț County Hospital. The group is composed of all the new patients with diabetes, diagnosed for the first time in the Internal Medicine Clinic between January 2001 and April 2002. The distribution of patients in what regards the

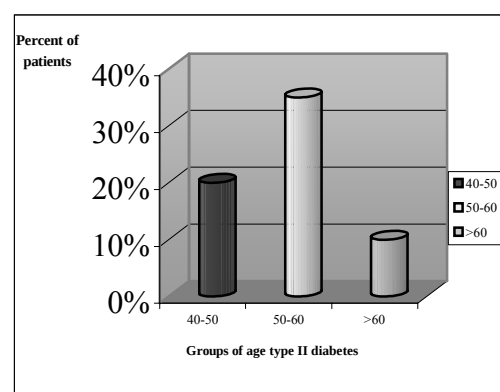
type of diabetes and age groups are depicted in figures 1 and 2.



A.



B.



C.

Fig. 1. Graphical representations showing patients distribution on diabetes types (A) and age groups (B and C).

We have gathered all the useful clinical and paraclinical data from the medical observation sheets; we have performed family inquiries, drawn pedigrees and estimated the importance of genetic versus environmental factors.

The patients were monitored for periods of one to five years after the first diagnose and their medical and biological data were analyzed in their natural dynamic.

Eventually, we have calculated recurrence risks and performed genetic counseling where required/necessary.

RESULTS AND DISCUSSIONS

We have analyzed some of the most important factors involved in the multifactorial determinism of diabetes mellitus.

The distribution of patients in accordance with the socio-economic environment is depicted in figure 2A; this parameter is important from the point of view of the ecological component of multifactorial determinism and of the medical addressability. Even the addressability to specialized medical services is much diminished in rural regions, the prevalence of diabetes showed to be 10 times bigger in the urban environment. Many of the urban habits of life are diabetogenic: dietary habits, inversion of day/night biorhythms, nervous stress, sedentary occupation etc. The same causes can be mainly invoked to explain the distribution of patients in function of occupation.

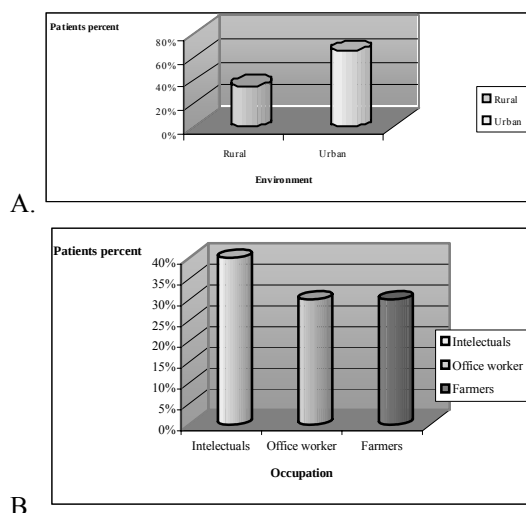


Fig. 2. Graphical representations showing patients distribution according to their socio-economic environment (A) and occupation (B)

Analyzing the sex ratio one may observe that diabetes mellitus affects both men and women with a significant predominance of men (65 males: 35 females). These data are in accordance with the general values from literature (for Romania 59% males and 41% females) (Covic et al., 2004).

The study of family histories for the studied patients proved the importance of both genetic and environmental factors (approximately 50% heritability) for both types of diabetes with a slight predominance of genetic factors in the determinism of type II diabetes (McCarthy and Zeggini, 2005). Figure 3 shows the percentages of patients with affected relatives of first degree for each type of

diabetes. Recurrence risks were estimated for each patient and varied between 5 and 10%.

Even the group of study is relatively small, it is significant because it gathered all the new diagnosed cases from a delimited region in a given time interval.

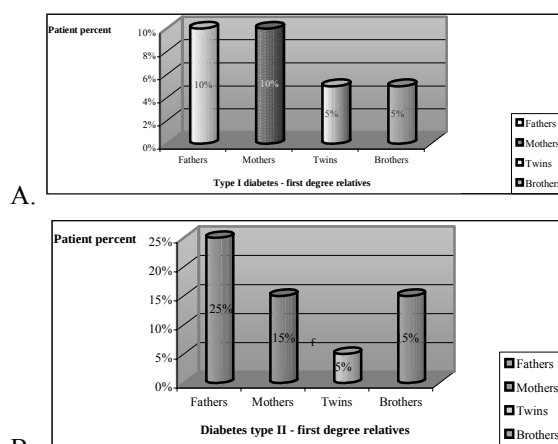


Fig. 3. Graphical representations showing the results of family inquiries and the importance of inherited factors in the determinism of type I (A) and type II (B) diabetes

CONCLUSIONS

1. Diabetes mellitus has a multifactorial determinism. Our study confirms the equal importance of genetic and environmental factors for diabetes type I and a slight predominance of inherited factors for diabetes type II.
2. The most important environmental factors pointed out by our study were the socio-economic conditions and occupation.
3. The recurrence risks estimated for all patients varied between 5 and 10%.
4. Despite the permanent progress of its treatment diabetes is a social disease, an important problem of public health and a permanent problem for the clinician and geneticist.

REZUMAT

Deși s-au făcut progrese enorme, mai ales în ultimele decenii, diabetul zaharat rămâne în continuare o maladie care, cu toate ca modul de transmitere este partial elucidat, iar posibilitatea de a-l preveni sau de a preîntâmpina complicațiile este din ce în ce mai clara, surprinde prin morbiditatea sa în continuă creștere și care cuprinde grupe de vârstă variate, devenind o boală socială, care ridică o serie de necunoscute, pe care atat clinicianul, cât și cercetătorul sunt chemați să le rezolve.

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