Male aged 64, referred urgently from the urology service for showing a glycemia of 362 mg/dL. He did not know about his diabetes and he hardly refers symptomatology.

**Personal history**
Born in Chile, is more than 20 years in Spain, ex-smoker for more than 10 years, drinker of 1-2 beers/day and a glass of wine during the meals. He has had an excellent health and exercises daily. He has never undergone surgery, does not show allergies and does not take any medication. He is very proud of not having to see the physician and when he has a cold he gets his medication from the herbalist shop. He has a sedentary work in a non-governmental organization (NGO) and he admits being a great eater of meat.

He submits an analytics of 7 days before, in which it can be observed a systematic of blood, biochemistry (with hepatic profile and PSA) and a systematic of normal urine, except for the glycemia 362 mg/dL, total cholesterol 273 mg/dL, triglycerides 308 mg/dL, cHDL 42 mg/dL, uric acid 8.6 mg/dL, creatinine 1.5 mg/dL and glycosuria, but without ketonuria.

**Current disease**
Since "always" he shows polyuria and polydipsia, but during the last weeks he started with nycturia, reason why he went to see the urologist. He does not refer asthenia, weight loss, cramps, leg discomfort, nor any other symptomatology. He says that such value of diabetes could not be true. During the consultation, the glycemia, ketonemia and the glycosylated hemoglobin (HbA$_1c$), capillary are determined, which results are 326 mg/dL, 0.1 mmol/L and 11.4% respectively.

**Current exploration**
Weight 95 kg, height 174 cm, blood pressure 142/87 mmHg, abdominal waist 113 cm. Head, neck, ACP and abdomen without alterations. Peripheral vascular failure could not be observed nor peripheral neuropathy signs.

**How would the diabetes of this patient be dealt with?**
He is an immigrant patient (group of high prevalence of diabetes mellitus [DM]),$	extsuperscript{1,2}$ of mature age, subjectively healthy, not too much symptomatic and with a clear hyperglycemia. The increase of the glycosylated hemoglobin (HbA$_1c$) confirms the diagnosis$	extsuperscript{4,5}$ and demonstrates that his DM has several months of evolution. He shows obesity of visceral predominance, probable blood hypertension (BHT) (only one measurement), dyslipidemia, hyperuricemia and moderate renal failure (level 3 of the National Kid-
ney Foundation [NKF]). Therefore, his DM is associated to high cardiovascular risk in the context of a metabolic syndrome. All this entails an intensive and comprehensive approach and with a special care of his target organs due to the long life expectancy considering his age. The treatment of the patient has to be supported on the four classic pillars –education, diet, physical exercise and drugs– with special attention on education. Table 1 sums up the general control objectives according to the American Diabetes Association (ADA).

**Which is the treatment you would implement?**

**Education**
The education is the main part of the treatment, especially because the patient attributes the findings to a mistake due to the absence of disability or pain. As an immigrant, he left a health culture without abandoning it and has acquired another one without understanding it. He has then to change his present habits and trust our therapeutic proposal after accepting the existence of his disease. We will deal with the contents later on.

**Diet**
We would propose a Mediterranean style diet with 5 daily intakes, hypo caloric, rich in fresh vegetables, limited in refined sugar and red meat, low in fats (especially saturated fats), low in sodium (≤6 g/day), low in purines and restricted in proteins and alcohol. According to the Guideline of the National Institute of Clinical Excellence (NICE) (table 2), we would adapt the diet to the subject’s needs, his culture and beliefs, trying to affect the life quality minimally and integrating it to a healthy lifestyle (HLS), with an increase of the physical activity.

**Physical exercise**
The exercise improves the glycemia control, increases the sensitivity to the insulin, reduces the CVR and helps to lose weight. Due to his sedentary work, we recommend the patient to perform aerobic exercise of moderate intensity during 150 min/week (approximately 30 min/day) according to the diet and the pharmacotherapy. As he does not show serious BHT, serious neuropathy, advanced retinopathy or ischemic cardiopathy, we would not consider insulinization. We will deal with the contents later on.

**Drugs**

**Glycemic control**
The control of the glycemia reduces the micro vascular and neuropathic impairments. Table 3 sums up the control criteria and the treatment according to the ADA-EASD. The NICE guideline proposes the achievement of HbA1c levels of 6.5%. If the HbA1c is kept high in spite of showing a fasting glycemia of <126 mg/dL, the capillary glycemia self-measurement is recommended (SMCG) in order to detect increases of the postprandial glycemia (PPG). The adoption of HLS is recommended and it would be necessary to start a guideline with metformin if the targets are not achieved in an obese patient as the one of this case. Another alternative the early and transitory insulization, is not considered advisable, and might cause rejection from the patient. Therefore, we propose to start a treatment with 850 mg/day of metformin and increase to 1.700 mg/day in two doses after 6-10 days. Unfortunately, we do not count in Spain with preparations that facilitate the ideal dosage of 2 g/day.

If the objectives are not achieved, we would add another antidiabetic drug. A sulphonylurea would be strong, but the ponderal increase and the hypoglycemia risk discouraged us to implement? Early insulinization (transitory or definitive, depending on the evolution) in patients who do not reach the objectives control or whom evidence an important decompensation in a state of catabolism or ponderal loss.
though with the inconvenient of its parenteral administration. The DPP-4 inhibitors (sitagliptin or vildagliptin) offer a greater comfort as regards to its oral administration concomitant with metformin BID, but its effect on the weight is neutral and its hypoglycemicant strength, lower. If the SMCG demonstrates an increase of the PPG, the metformin could be combined with a fast secretagogue as the repaglinide. The NICE guideline recommends the acarbose with metformin only if the mentioned drugs could be used.14

Lipid control
The glycemic control and the ponderal decrease will improve the lipid levels. Anyway, a statin (e.g. 40 mg/day of simvastatin) will improve the lipid levels and will reduce the CVR.5,14 Associated to a fibrate, it will also reduce the probability of a pancreatitis. In order to minimize the risk of rhabdomyolysis, we would choose a phenofibrate.19 If the cholesterol targets are not achieved, the dose of simvastatin could be increased, another stronger statin could be changed for or be combined with ezetimibe.4,14 Omega-3 fatty acids would also be administered for the triglycerides.14

Control of the blood pressure
The condition measurements of psychophysical rest should be repeated in order to confirm the diagnosis of BHT. If a blood pressure (BP) of ≥130/80 mmHg persists, we could confirm the diagnosis20 and we would start pharmaotherapy with angiotensin-converting enzyme inhibitors (ACEI) or an aldosterone receptor antagonist (ARA). If the targets are not achieved, a diuretic would be associated or a calcium antagonist. The sodium and potassium levels will be controlled and action will be taken according to the results. Probably, we should need to add a third drug.

Platelet antiaggregation
The guidelines recommend antiaggregates in low doses in diabetic patients, as primary prevention of the cardiovascular disease.4,14 Recent studies have questioned its efficiency and have ignored its systematic use.21,22 In our patient, the presence of cardiovascular risk factors leads us to recommend antiaggregation with low acetylsalicylic.

Treatment of the hyperuricemia
Probably, the asymptomatic hyperuricemia will be corrected with the diet and HLS.

Which kind of diabetology education do you believe the patient should receive?
The intention is to encourage the patients to get involved and commit themselves to their health care with education in the DM, and they are taught how to do it. In this patient, “proud of not having to see a physician” and who acquires herbal products, the information should be transmitted in a simple and understandable language, to progress in the subjects gradually, observing the cultural and subjective factors, and keeping a bidirectional-patient-educator interaction.

There is not much known about the diabetes in the immigrant population in Spain; the IDME study, currently ended, will contribute to its better knowledge.23 Meanwhile, we know that the accessibility of the primary care helps to promote an approach between the health team and the patient, offering confidence and stating bonds that will help the patient to be the artificer of his own treatment. According to Dr. Gregorio Marañón, the chair is the key instrument of the medical assistance, “the chair to sit on and listen to the patient”,24 undoubtedly, this will be the main tool to determine a good communication. To reply the queries and fears, to state a good empathy in order to avoid the clash with his beliefs or prejudices and observe his culture will help to encourage the patient’s self-care. For this, it is good that the professionals start undertaking a self-examination of our cultural competency aptitude according to the article of Semergen,25 using tools as the ASKED26 questionnaire (Awareness-Skill-Knowledge-Encounters-Desire) (table 4).

As regards to the contents, the common knowledge to the education of all the patients with T2D has to be provided27 (table 5). Initially, it would be convenient to held individual interviews while adapting the treatment guidelines to the needs of the patient. Then, the group education might help the patient to share his experiences, though there are doubts about the real usefulness of this type of intervention, that sometimes they enjoy more from the conformism of their actors than from the scientific demonstration of its efficiency at long term.

Which are the numbers of glycemic and tensional controls you would consider appropriate for this patient?

Glycemic controls
The bibliography is contradictory regarding to the benefit of the self-analysis in patients treated with oral antidiabetic drugs, and comprises from the favorable assessment to its consideration as inefficient method and even negative.28 But it might be useful as a support tool in the therapeutic education in order to reinforce the knowledge.

Table 4. Self-examination for the evaluation of the cultural competence of the profession. ASKED questionnaire (Awareness-Skill-Knowledge-Encounters-Desire)26

<table>
<thead>
<tr>
<th>Question</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Awareness): Are you conscious of the possible prejudices as regards to other cultural groups, as well as of the possible racism in the health services?</td>
<td>Awareness-Skill-Knowledge-Encounters-Desire</td>
</tr>
<tr>
<td>(Skill): Do you know how to carry out a cultural assessment?</td>
<td>Awareness-Skill-Knowledge-Encounters-Desire</td>
</tr>
<tr>
<td>(Knowledge): Can you describe the difference between different cultural groups? Which aspects do you know about the cultural bio-ecology?</td>
<td>Awareness-Skill-Knowledge-Encounters-Desire</td>
</tr>
<tr>
<td>(Encounters): Do you try that your interviews with individuals of other cultural groups are clinically efficient?</td>
<td>Awareness-Skill-Knowledge-Encounters-Desire</td>
</tr>
<tr>
<td>(Desire): Do you really want to be competent from the cultural point of view?</td>
<td>Awareness-Skill-Knowledge-Encounters-Desire</td>
</tr>
</tbody>
</table>
We would indicate SMCG before breakfast, lunch and dinner and, when it tends to normalize, the complete profile of 6 points would rule out an increase of PPG. In the treatment with metformin, once the sustained control has been achieved (HbA1c ≤6.5-7%), pre-prandial glycemia in 70-130 mg/dL and PPG <180 mg/dL), the SMCG of 6 points each 2 weeks or each month would be sufficient. We would increase the frequency of controls if potentially hypoglycemic antidiabetics are indicated, as the sulphonylureas. The first control of HbA1c will be done after 2-3 months and will be repeated each 6 months if it is within the proposed targets. If adjustments to the treatment are done, the HbA1c shall be measured after 2-3 months.

**Blood pressure controls**

Frequent takings (weekly) are necessary at the beginning in order to confirm or rule out the diagnosis of BHT. Should we suspect a “white coat hypertension”, the taking each 3 minutes, the blood pressure self-measurement (BPSM) or if the doubt persists, the ambulatory blood pressure monitoring (ABPM) would help to determine the diagnosis. If the pharmacological treatment starts, controls can be made each 10-15 days until adjusting the BP to values of <130/80 mmHg. Once compensated, the takings would be done each 1-2 months.

**Would you do the patient any complementary test?**

We directed the complementary tests in order to determine the possible systemic repercussion of the DM.

**Cardiopathy.** No symptoms of cardiac impairment are referred to and the exploration does not demonstrate a neuropathy of the autonomous system. An electrocardiogram shall be requested and if the result is not normal, we would assess the referral of the patient to the cardiology service in order to undertake complementary studies.

**Peripheral arteriopathy.** There are no disturbances in the exploration of the lower limbs: we would indicate an assessment of the ankle/arm index in order to rule out a sub-clinical vascular pathology.

**Ophthalmology exploration** (funduscopy, intraocular pressure, etc.) in order to rule out diabetic or hypertensive complications.

**Nephropathy.** The albumin urine excretion or the albumin/creatinine relation shall be measured. Should it be positive, it will be repeated after ruling out possible mistake sources. In case of confirming it, even in the absence of BHT, the patient should be treated with ACEI or ARA. As there is a moderate renal failure, we would indicate an echography in order to know the renal morphology.

**Other tests.** Though the transaminases are normal, the abdominal echography would allow ruling out a hepatic steatosis.

### Table 5. Health education in diabetic patients (adapted)

<table>
<thead>
<tr>
<th>Immediate phase. Essential contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What is the diabetes?</td>
</tr>
<tr>
<td>• Diabetes complications</td>
</tr>
<tr>
<td>• Which is the treatment?</td>
</tr>
<tr>
<td>• The importance of the diet and the exercise</td>
</tr>
<tr>
<td>• Oral pharmacological treatment</td>
</tr>
<tr>
<td>• Self-controls</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extension phase. Basic contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Extension of general concepts about the diabetes</td>
</tr>
<tr>
<td>• Basic diet</td>
</tr>
<tr>
<td>• Feet care</td>
</tr>
<tr>
<td>• Exercise and weight maintenance</td>
</tr>
<tr>
<td>• Action before special situations (sports, journeys, diseases)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deepening phase, optimal training</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use of tables of food equivalences</td>
</tr>
<tr>
<td>• Self-control</td>
</tr>
<tr>
<td>• Late complications and prevention</td>
</tr>
</tbody>
</table>

References


Declaration of potential conflict of interest

I. Dujovne Kohan states that he received economic compensations for teaching, investigation and consultancy from Abbott, Bayer, Boehringer, Lilly, MSD, Novartis, Novo-Nordisk, Pfizer and Sanofi-Aventis.
How would the diabetes of this patient be dealt with?

The case of a patient aged 64 is presented with the diagnosis of "starting of diabetes mellitus", suggesting the result of several years of a progressive worsening in the function of the pancreas, according to new measurements, high hypertriglyceridemia and hypercholesterolemia. Thus, he complies with the metabolic syndrome criteria according to the guidelines of both of the National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) and the International Diabetes Federation (IDF).

The patient shows a level I obesity (body mass index [BMI] of 31.38), “risk” waist (113 cm), high blood pressure (BP) that has to be confirmed with new measurements, high hypertriglyceridemia and hypercholesterolemia. He complies with the metabolic syndrome criteria according to the guidelines of both of the National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) and the International Diabetes Federation (IDF).

The Steno-2 study demonstrated a reduction of the macro/micro vascular events by means of modifications of the lifestyle and pharmaceutical treatment of the diabetes, the blood hypertension (BHT) and the dyslipidemia. The CARDS study, performed only in patients with T2D without previous cardiovascular disease, showed a reduction of the cardiovascular events in these patients under primary prevention being treated with atorvastatin 10 mg/day. The low density lipoprotein cholesterol (cLDL) of this patient, estimated through the formula of Friedewald, is of 169.4 mg/dL, higher than the recommended reference value (<100 mg/dL) in patients with diabetes or with a determined cardiovascular disease. The risk of suffering a coronary disease in this patient after 10 years is of 17% according to the tables REGICOR, or the Framingham tables calibrated and adapted to the Spanish population. In view of the above, it is justified to start the treatment with statin. The BP has to be controlled

List of acronyms quoted in the text.

ADA: American Diabetes Association; BP: blood pressure; BHT: blood hypertension; BMI: body mass index; cHDL: high density lipoprotein cholesterol; cLDL: low density lipoprotein cholesterol; cVLDL: very high density lipoprotein cholesterol; CVD: cardiovascular disease; CVRF: cardiovascular risk factor; GP: glomerular filtration; HbA1c: glycated hemoglobin; IDF: International Diabetes Federation; NCEP-ATP III: National Cholesterol Education Program-Adult Treatment Panel III.

Answer of Dr. Celestino Rodríguez Jiménez
during successive visits. Values lower than 130/80 mmHg has been determined as recommendable control objective in diabetic patients according to the guidelines ESH/ESC (European Society of Hypertension and European Society of Cardiology) of 2007\textsuperscript{8} and the American Diabetes Association (ADA) of 2009.\textsuperscript{9}

### Diet

We will implement a diet with the aim of losing weight, achieving an adequate metabolic control (glycemia, dyslipidemia and hyperuricemia) and helping the control of the BP.\textsuperscript{11} It has to be a balanced diet, with a proportion of immediate principles according to the recommendation of the different guidelines (a 50-60\% of carbohydrates, a 15\% of proteins and less than 30\% of fats).\textsuperscript{12} We would state a hypocaloric diet low in salt in this patient (<3 g/day) of 1800 kcal, estimated for an adjusted weight of 76 kg with a high content in fiber (>20 g/day), which has to be distributed in 6 intakes of food/day. We recommend him to eat more fish (especially blue) than meat and to avoid entrails and seafood in order to try to reduce his hyperuricemia (<7 mg/dL). To limit the protein contribution would allow the improvement of his renal function. To achieve a higher proportion of polyunsaturated/saturated fats in the diet is related to a reduction of the mortality risk by ischemic cardiopathy.\textsuperscript{13} The polyunsaturated fats improve the lipid profile of the diabetic patients and reduce the triglycerides and the very high density lipoprotein cholesterol (cVLDL) but they do not modify the concentrations of the high density lipoprotein cholesterol (cHDL) nor the cLDL.\textsuperscript{14} To reduce or abandon the consumption of alcohol would improve the hyperuricemia and would allow the development of hypoglycemias.

### Exercise

The patient should go on regular aerobic exercise adapted to his possibilities (e.g. 30-60 min/day during 5 days a week) in order to improve the glycemia and the triglyceride levels.

### Insulin

We would start the insulin treatment with 16 IU of insulin NPH (neutral protamine Hagedorn) before breakfast and 8 IU of insulin NPH before dinner (0.25 IU/kg of weight). A recent consensus suggest the use of insulin mixtures when starting the insulinization in patients when the glycosylated hemoglobin (HbA\textsubscript{1c}) is higher than 10\%.\textsuperscript{19} The breakfast dose and/or dinner would be increased in 2 IU each 3 days until achieving an optimal glycemic control (basal capillary glycemia and pre-intake <130 mg/dL). Should hypoglycemias appear at dawn, the dose of night insulin NPH might be reduced 4 IU or change the insulin NPH by an analogue of slow insulin (glargine/detemir) in 1-2 doses.\textsuperscript{16}

### Hypoglycemiants treatment

With atorvastatin 10 mg/day or simvastatin 40 mg/day. With the diet and achieving the LDL objectives, it is probable that the patient might normalize the triglyceride values (<150 mg/dL); if not, a fibrate should be added.

### Blood pressure treatment

Once the pressure values are confirmed, I would start a first choice treatment with an angiotensin converting enzyme inhibitor or an angiotensin II receptor antagonist.

### Antiaggregation

We would also start a treatment with acetylsalicylic acid in doses of 100 mg/day, once the BHT has been ruled out or controlled, as recommended by the main therapeutic guidelines.\textsuperscript{9,10}

### Which kind of diabetology education do you believe the patient should receive?

The education should include basic concepts of the diabetes physiopathology in order to help the patient to know about the disease; we should inform the patient about the benefits that report a strict control of all the cardiovascular risk factors, as the glycemia, the lipids, the BP and the tobacco habit.

During the first visit, in collaboration with the educator nurse in diabetes, the diet shall be submitted and explained so that the patient can undergo it, the way of insulin self-administration is taught and how to perform the capillary glycemia self-analysis. In later visits, the capillary glycemia controls are assessed, as well as the compliance of the diet and the patient keeps on receiving education about the handling of the complications associated to diabetes, about the care of the feet and the way of acting in case of special situations (intercurrent diseases, trips, etc.), in the promotion of healthy habits and the patient is encouraged to take an active role in his self-control in order to achieve better results.\textsuperscript{17}

### Which are the numbers of glycemic and tensional controls that you would consider appropriate for this patient?

According to the ADA/EASD\textsuperscript{16} recommendations, the self-determination of the capillary glycemia is recommended in order to adjust the insulin dose and the later handling. In this patient, as he is under the insulinization phase, determinations of the basal capillary glycemia and pre-intake should be done while we increase the insulin dose until achieving glycemia objectives. Then, I would recommend him the performance of pre-postprandial controls in one of the main meals each 3 days (“gradual” control) until achieving the HbA\textsubscript{1c} objectives. Once the BHT is confirmed, a weekly pressure control should be done in order to verify an adequate response to the treatment. Then, a weekly control might be sufficient.

### Would you do the patient any complementary test?

As screening method of the diabetic retinopathy, the non mydriatic retinal chamber or an exploration of the funduscopy with pupil dilation is recommended, if not done previously, it has to be
repeated each 2-3 years if the examinations are normal. An electrocardiogram should also be done in order to rule out a silent cardiovascular disease.

During later visits, a careful examination of the foot should be done: visual inspection, palpation, use of monofilament and tuning fork. If the physical exploration is abnormal, the ankle/arm index should be determined by means of an echo-Doppler in order to rule out a peripheral vascular pathology or an electromyography of the lower limbs in order to rule out a diabetic polyneuropathy.

Declaration of potential conflict of interest
There are no conflicts of interest for the performance of this manuscript.

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