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11. SPECIAL PROBLEMS IN DIABETES MANAGEMENT

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11.1 COMAS

Diabetics as non-diabetics are exposed to conditions that may lead to a state of coma. Cranial traumatism, brain tumours, cerebrovascular accidents and meningoencephalitis; alcoholism and intoxications; uraemia and hepatic coma, are some of the most frequent causes leading to such a state (excluding those more specific to diabetes, as: hypoglycaemic and keto-acidotic coma; nonketotic hyperosmolar and lactic acidosis coma).

This association may occur in two situations, i.e. in an already known diabetic or in a comatose patient who presents hyperglycaemia. In general terms, management of a diabetic in coma does not differ from that of a non-diabetic, but some measures require particular emphasis.

1. The following general measures are applicable to every coma: (i) bedfast patient care (bed posture changes, hygiene, cleanness of cavities); (ii) permeable airways and respiratory assistance, if necessary; (iii) nasogastric and vesical catheter; (iv) maintenance of physiologic homeostasis (i.e. hydromineral, nutritional and caloric equilibrium); (v) strict knowledge of vital organs function (monitoring of respiratory function, blood pressure, pulse and cardiac rhythm; serial ECG, chest X-rays and renal function tests). Extreme care should be taken to prevent the appearance of sloughs which are easily produced in these patients and may act as septic foci to further complicate the clinical picture. Besides, specific measures will also be applied to diseases already present in each particular patient.

2. While treating a diabetic in coma hydromineral equilibrium, nutrition and metabolic control, as well as renal and hepatic function assessment for a rapid diagnosis of their failure, deserve special attention.

2.1 The main objective of metabolic control should be to maintain acceptable blood sugar levels to prevent both hyperglycaemia, that could lead to further deranged hydromineral equilibrium, acidosis and/or hyperosmolarity, and a dangerous non-diagnosed hypoglycaemia that could worsen the condition of a patient already in coma and lead to possible myocardial or brain damage. Cholesterol and triglyceride levels should also be assessed.

2.2 Hydromineral balance: A strict hydromineral balance should be performed every 12 hours (input and output of liquids, their composition, body weight, losses and intakes of electrolytes, blood and urine electrolyte determinations); when a liver or kidney failure is in cause, the check-up should be done every eight hours. Ketonaemia, lactate/pyruvate rate and gasometric study should be daily routine procedures, but if a respiratory or acid-base equilibrium disorder exists more frequent determinations are indicated.

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3. Nutritional requirements

According to the patient's condition, oral feeding through a nasogastric catheter or parenterally, can be used to maintain adequate nutrition.

If there is no contraindication, human hyposodic albumin administration is advisable if parenteral feeding is foreseen later.

3.1 During the first few days enough carbohydrate will be supplied to cover body needs for glucose in order to avoid decreasing liver glycogen, increasing glyconeogenesis and body fat and protein utilization. Therefore + 125 g glucose for 24 hours in a 5% dextrose solution and daily requirements for electrolytes (about 70 mEq of sodium chloride and 40 mEq/potassium) will be used guided by ionogram and electrolytic balance results.

3.2 If oral via is used, a liquid diet - in equal aliquots - will be given every four hours to ensure energetic balance as well as the adequate amount of calories and proportion of nutrients (carbohydrate, protein and fat), vitamins and minerals, with the necessary periodicity.

3.3 Should prolonged intravenous nutrition be required, it becomes necessary to follow accepted schemes applicable to diabetic patients for parenteral feeding with a 24-hour sequence:

- (i) From first to fourth day: glucose solutions will be given with progressive increase in osmolarity together with 20 g of human hyposodic albumin daily.
- (ii) Fourth day: amino acids will be added and can be administered in simple or compound form, if there are no contraindications from a renal or hepatic point of view.
- (iii) Seventh day: if necessary to continue parenteral nutrition, intravenous lipids will be added. From here on, it is essential to keep a strict observation of the serum obtained every 12 hours and kept in the fridge, since the appearance of milky serum determines the suspension of fat administration.

4. Management of insulin

To achieve adequate metabolic control, small and multiple doses of Regular Insulin should be used in these cases, according to blood sugar levels that should be available at regular intervals (every four hours). On the basis of glycaemia results, the necessary insulin dose can be estimated to ensure the utilization of nutrients supplied, prevent the increase of glyconeogenesis, lipolysis, proteolysis and ketoacidosis, while avoiding hypoglycaemia. The utilization of an insulin continuous infusion to control diabetes is useful.

5. Other aspects

- (i) If coma is due to exogenous intoxications by dialysable substances a strict control of glycaemia is essential with Regular Insulin; if it becomes necessary to dialyse the patient, it should be borne in mind that solutions generally used are hypertonic in relation to plasma in glucose content and the risk of a hyperosmolar coma may be present.
- (ii) In patients with urinary sepsis and/or kidney failure the vesical catheter essential in a comatose patient, should be used with extreme antiseptic conditions, as well as disposable urinary sterile bags that should be changed every four or six hours (never use bottles with exterior communication nor reusable). Should the catheter be maintained for several days, vesical washings with antiseptic solutions are mandatory as a routine procedure to avoid urinary sepsis that would further worsen the clinical picture.

11.2 PREGNANCY

The association of diabetes and pregnancy is a medical problem involving about 10% of known diabetic population, it is estimated that one per 500 deliveries concerns a diabetic mother. The increased foetal morbidity bearing an inverse relationship to severity of diabetes in the pregnant mother, indicates deficiencies in early diagnosis.

1. Classification

The classification of a pregnant diabetic is a dynamic one. In some instances this cannot be effected at the first visit. The importance of a complete, general clinical history must be emphasized. The physician should actively look for "subclinical" alteration in carbohydrate metabolism in those women presenting symptoms of the so-called pre-diabetic syndrome; we consider as such those women showing three or more of the following elements:

- (i) Direct family history of diabetes mellitus (father, mother, siblings).
- (ii) History of unexplained glycosuria during pregnancy, prematurity, toxemia, hydramnias, obesity, and repeated unexplained abortion.
- (iii) History of foetal macrosomia (4.2 kg weight); unexplained perinatal mortality; certain foetal findings at necropsy, as islets hyperplasia, among others.

A prognostic classification - by an integral evaluation of the patient - must guide the medical-obstetrical conduct; this classification should be based on: (i) evolutive stage of the diabetic condition; (ii) duration of diabetes and presence or absence of vascular complications (see Annex 1 - P. White's classification - United States of America); (iii) previous obstetric history, severity of maternal diabetes and socio-cultural characteristics (see Annex 2 - A. Márquez's classification - Cuba).

2. Management of pregnant diabetic

2.1 Management should be carried out by a multidisciplinary team involving a trained clinician or endocrinologist, an obstetrician and a neonatologist with the following objectives:

- (i) To establish adequate diagnosis of diabetes mellitus during pregnancy.
- (ii) To establish a prognosis on the basis of integral medical, obstetrical and socio-cultural characteristics of the patient (see Annex 2 - A. Márquez's classification).
- (iii) To achieve a strict metabolic control with special emphasis on diabetologic education and instruction with specific handling of each case.
- (iv) To detect and treat both medical and obstetrical alterations developed during pregnancy.
- (v) To select the adequate timing for termination of pregnancy and mode of delivery.
- (vi) To ensure proper care of the newborn.

2.2 Although a brief hospitalization is frequently required to achieve the abovementioned objectives at the time of diagnosis, the ambulatory treatment of the pregnant diabetic is preferred for both, the non-treated recently diagnosed clinical and subclinical diabetics, and the known pregnant diabetics as well.

Visits to the clinic should be fortnightly for cases with Good Maternal-Foetal Prognosis (GMFP), and weekly for cases with Bad Foetal Prognosis (BFP).

2.3 Medical ambulatory management

- (i) Diet will be estimated according to weight and height of pregnant diabetic. It will be allowed a weight gain of less than 8 kg throughout pregnancy.
- (ii) Insulin. Oral hypoglycaemic compounds are not advisable. A multiple dose of Regular Insulin is preferred in order to achieve a mean glycaemic profile below 5.0 mM/l; it is sometimes advisable to use "prehypoglycaemic" insulin scheme treatment, in three daily doses.

Patients with BFP will receive insulin treatment, regardless of previous treatment.

- (iii) Vitamins - minerals as usual in pregnant women, increasing the amounts of B complex factors.
- (iv) Education and instruction on diabetes, specifically on this association.
- (v) Clearance of endogenous creatinine assessment for monitoring renal function. Dietetic salt restriction or diuretic administration is not beneficial to the foetus and its use is questionable.

2.4 Obstetrical ambulatory management

Directed to the detection of evolutive disturbances of pregnancy and to be aware of the foetus-mother binomial status, intrauterine growth check-up by measuring uterine height and ultrasound cephalometry should be performed every three weeks.

2.5 Admission should be advised according to mother's prognosis, i.e. (i) patients with BFP between the twenty-eighth and thirtieth week, regardless of metabolic status; (ii) patients with GMFP with overt diabetes between the thirty-second and thirty-fourth week; (iii) patients with GMFP but in subclinical stage will be admitted at thirty-sixth week. Besides advisable unprogrammed admission caused by medical, obstetrical or socio-cultural situations must be taken into account.

2.5.1 Hospital medical management

Insulin requirements must be monitored through glycaemic profiles on a twice weekly basis and serial glycosuria. Checks should be made for signs of toxemia through daily monitoring of proteinuria, blood pressure, weight and for the presence of oedema.

2.5.2 Hospital obstetrical management

Foetal ultrasound cephalometry, amnioscopy and amniocentesis with determination of lecithinsphingomyelin coefficient, and simple and stressed cardiotachography (oxytocin challenge test - Pose) are indicated. A study of foetal wellbeing HPL and 24 hour urinary and plasma estriol determinations have proved of no value in our hands.

2.5.3 Time of delivery

A strict metabolic control and current diagnostic auxiliary means such as the above-mentioned tests, determinations of amniotic fluid phosphatidylglycerol as well as HPL, and total plasma and non-conjugated estriol, along with daily urinary estriol permit the postponement of the date of delivery while foetal maturation is being gained.

However, prefixed schemes based on mother's prognosis classification should be maintained in all cases where an intensive care antepartum department is not available. A decrease in insulin requirements maintains its value as indicator of placental dysfunction.

2.5.4 Mode of delivery

Transpelvic delivery would be the best choice, but always avoiding as much as possible a prolonged labour. In general terms caesarean section should be ordered according to obstetrical indications.

2.6 Labour management

Good metabolic control should be maintained with Regular Insulin every four hours according to glycaemia levels in both induction and caesarean section; feeding will be ensured by providing 5% glucose by venoclysis. This approach would prevent hypoglycaemias. Electronic foetal monitoring is important to evaluate foetal status.

2.7 Puerperium management

2.7.1 Diet

A prompt return to oral feeding is advisable adjusting calories to the metabolic tolerance.

2.7.2 Insulin

(i) Known diabetic patients on insulin treatment: once oral feeding is restored, insulin will be likewise restarted by two-thirds of pre-gestational dose.

(ii) Patients treated for the first time during current pregnancy: Insulin therapy will not be restored and the metabolic status will be assessed with daily glycaemic profiles; diabetes treatment will be decided later on.

2.8 Care of the newborn

All these babies, regardless of maternal classification, will be handled in an intensive care unit to detect and treat possible complications such as hypoglycaemia, respiratory distress syndrome, hyperbilirubinaemia, sepsis and obstetrical trauma.

3. Family planning in diabetes and pregnancy

It is convenient to avoid pregnancy in women with Bad Maternal Prognosis or in cases where both partners are diabetic. Likewise, efforts should be made to limit the size of the family to a maximum of two to three children, independently of maternal classification.

With regard to contraceptive methods, we prefer the intrauterine device (IUD) or a trans-abdominal sterilization. It is yet controversial whether glucose tolerance or vascular status are impaired by oral contraceptives. The diabetic patient may take hormonal contraceptives since in most cases the management of the clinical status seems not to be affected, although in all cases frequent check-up is advisable. Each case should be evaluated individually. If hormonal contraceptives are to be used, we prefer the "progestogen only" type derived from 19-Nortestosterone e.g. Norethisterone enanthate and acetate.

ANNEX 1

P. WHITE'S CLASSIFICATION (BOSTON - UNITED STATES OF AMERICA)

Class A includes patients with chemical diabetes only; they have abnormal blood levels when tested by a glucose load, but fasting values are normal or near normal and the diabetic condition is asymptomatic.

Class B includes patients who have had diabetes for less than 10 years, in whom the onset of the disease took place when they were 20-years-of-age or older, and who have no clinical evidence of angiopathy.

Class C includes those who have no clinical evidence of angiopathy but who have had diabetes for 10 to 19 years or who were 10 to 19-years-of-age when diabetes became manifest.

Class D is comprised essentially of those with early angiopathy, benign retinopathy, or calcified vessels of the feet and legs. Suspects for this classification are patients with diabetes of more than 20 years' duration or in whom the onset of the disease took place before they were 10-years-of-age.

Class E, not sought today, includes those whose pelvic vessels, iliac or uterine show calcification.

Class F designates those with clinical evidence of diabetic nephropathy without pyelonephritis.

Class R includes those with malignant retinopathy, preretinal or vitreous haemorrhages, and neovascularization or collagen scars; usually, but not necessarily, they also have the lesions of Class F.

Class FR denotes those with the characteristics of both Class F and Class R.

Class G indicates those women who have had multiple failures in pregnancy.

CLASSIFICATION OF THE INSTITUTE OF ENDOCRINOLOGY - CUBA (DR A. MARQUEZ)

Good Maternal-Foetal Prognosis (GMFP)

- (a) Diabetes with a duration of less than 10 years.
- (b) Less than 30-years-of-age.
- (c) Normal or overweight.
- (d) Control with oral hypoglycaemic compounds or with less than 50 units of insulin, stable with no tendency to ketoacidosis.
- (e) Previous foetuses alive with normal or overweight.
- (f) Absence of hypertension.
- (g) Absence of coronary insufficiency.
- (h) Absence of renal damage.
- (i) Absence of neuropathy.
- (j) Absence of peripheral-vascular disorders.
- (k) Diabetic retinopathy grade I and II.
- (l) Good intellectual level.
- (m) Good cooperation of the patient.

Bad Foetal Prognosis (BFP)

- (a) Diabetes with more than 20 years duration.
- (b) 30 or 40-years-of-age.
- (c) Body weight below normal.
- (d) Control with insulin only.
- (e) Requiring more than 50 units daily, unstable with tendency to acidosis.
- (f) Loss of previous foetuses, abortions, intrauterine death.
- (g) Small foetuses.
- (h) Signs of placental sensitivity.
- (i) Arterial hypertension.
- (j) Neuropathy.
- (k) Peripheral vascular disorders.
- (l) Severe retinopathy.
- (m) Low intellectual level.
- (n) Bad cooperation of the patient.

Bad Maternal Prognosis (BMP)

- (a) Coronary insufficiency.
- (b) Severe renal failure.
- (c) Proliferating retinopathy.
- (d) Lowest intellectual level.
- (e) Absolute absence of cooperation.

ANNEX 3

PROGNOSTIC INDEXES ASSOCIATED WITH INCREASED RISK OF FOETAL MORBIDITY

1. Mother

Age of pregnant diabetic patient.

Previous obstetric history.

Severity of diabetes, poor metabolic control, ketoacidosis.

Degree of vascular complications, or presence of infections (pyelonephritis).

2. During pregnancy

Toxaemia; placental insufficiency; foetal distress; foetal maturity; S/L index, fat cells, creatinine, etc.

3. Labour

Maturity, size, ultrasound.

Gestational age less than 35 weeks.

Gemellary.

Oxytocin challenge test.

4. Foetal condition at birth

11.3 ACUTE ILLNESS

The diabetic patient is not free from developing acute intercurrent diseases, which may bring about a negative impact on the patient's metabolic control and vice versa, thus compelling special management of the patient during that time. Hospitalization of the patient is frequently advisable.

Whichever the intercurrent disease, the necessary caloric intake, hydro-mineral equilibrium and the insulin requirements must be guaranteed at all times, fixing the dose as necessary that could be higher or lower according to each case. Omission of hyperglycaemia treatment is one of the most frequent causes leading to ketoacidosis and coma in diabetics with acute intercurrent diseases and especially those associated with anorexia and/or digestive symptoms.

Hypoglycaemic medication must not be omitted nor the dose decreased unless glycosurias determined every four hours show negative results. Whereof the usual dose should be continued and in case of overdose, reduced by 25%. Regular Insulin is our choice in acute situations following a schedule in relation to glycaemia, ketonaemia, glycosuria and ketonuria determinations which are compulsory in the presence of acute intercurrent diseases.

As a rule, oral feeding in liquid form is preferable - 90-120 ml - every three hours or a soft diet. Electrolytes contained in foods, e.g. fruit juices, may supply part of the potassium or sodium daily requirements. If there is vomiting or nausea indicating an impending occurrence, oral feeding should not be forced because repetition of vomiting could result in further water and electrolytes losses. Parenteral feeding is then preferable.

Management for some of the acute intercurrent diseases frequently affecting the diabetic patient, will be briefly described.

Acute pyelonephritis

1. Identification of the causal germ and its sensitivity. Application of chemotherapy and antibiotic treatment in adequate dose and time in order to eliminate the infection is compulsory and should be guided by urine culture and corresponding germ sensitivity. Once the acute phase has relapsed, the necessary cyclic treatment in dose and time should be maintained to prevent chronicity.

Semiquantitative culture methods as Dip-slides (such as Oxoid-Till-U-Test) and pad culture (such as Microstix) are easy, reliable methods and can be done by the physician or patient as soon as urine is passed, avoiding delay in transporting and testing urine. Unfortunately they are expensive.

2. Evaluation of any systemic disease or infection out of the genitourinary tract whose adequate treatment would correspond to the cure of pyelonephritis.

3. Treatment of female genital infections, and autonomic bladder involvement.

4. Assessment of urinary tract morphology (radiographic study) once the acute phase has receded.

Acute hepatitis. The requirement of insulin may increase (due to increased cortisol, production of anti-insulin antibodies and increased insulin degradation). There is no convincing evidence in favour or against the use of traditional measures such as bed rest, high protein diets and vitamins supplement; however, they are still in use. The patients treated with oral hypoglycaemic drugs must be shifted to insulin and the duration would depend on the course of the disease. Corticoid therapy may be inevitable in some instances, therefore, insulin dose must be adjusted to increased requirements. All medications in use should be evaluated to detect false-positive glycosurias.

Acute respiratory processes. Besides those measures mentioned in the above described conditions, such as insulin therapy and adequate caloric intake, the following should be guaranteed.

1. Bed rest; abundant liquid consumption.
2. Antithermic measures, symptomatic treatment of myalgias and general discomfort; salicylate therapy is frequently useful.
3. Vitamins, especially vitamin C in high doses.
4. Antibiotic or chemotherapy depending on the consecutive germ. Antibiotics are not indicated for viruses unless a superimposed bacterial infection is present.

Acute gastroenteritis. It may have a toxic or infectious origin, and conveys in both cases the danger of ketoacidosis particularly in insulin-dependent diabetics. The search for the etiologic agent is mandatory since the specific treatment depends on the diagnosis. However, the short duration of the process and its solution with nonspecific measures prevents the detection of the exact cause in most cases.

The quicker the acute gastrointestinal process is solved, the greater the possibility of avoiding metabolic decompensation or worsening one already present.

Nausea, vomiting, anorexia, abdominal pain and diarrhoea interfere with liquid and food absorption which contributes to dehydration and hypoglycaemia and leads to a vicious circle.

General measures are to be applied in all cases to ensure hydromineral equilibrium. If oral feeding is tolerated, small amounts of liquid (sugared beverage, salted broths, soups or similar) or soft foods (cereals, preserves, fruits, etc.) are given to ensure the consumption of \pm 125 g carbohydrate daily. If intolerance to oral feeding, dehydration must be prevented by the administration of glucose in saline solution by venoclysis, especially if fever is present.

The treatment must be established with Regular Insulin in doses depending on glycosuria and/or glycaemia results - determined four to six times daily or more frequently if necessary; ketonaemia and/or ketonuria determination is compulsory. If hypoglycaemia is present, this should be adequately treated. Symptomatic treatment must be prescribed as opium tincture (not exceeding four doses in 12 hours), atropine if necessary (0.5 to 1.1 mg every six hours) or diphenoxylate (drops or tablets 2.5 mg every six or eight hours). If pain is intense: codeine sulfate (30 to 60 mg) or Meperidine 100 mg parenterally and antispasmodic drugs are useful. Medications such as kaolin, pectine, bismuth, although used, have not proved to be effective.

Hyperthyroidism. The presence of this disease aggravates diabetes and vice versa exerting among them reciprocal negative influences. With the purpose of achieving metabolic control, patients so far under control with oral hypoglycaemic drugs should receive insulin or increase previous insulin dose as much as necessary.

Hospitalization is advisable in cases of insulin-dependent diabetes during the first few weeks of treatment. A strict metabolic control is difficult to achieve in this condition.

Hyperthyroidism treatment would depend on: (i) the basic cause (diffuse toxic goitre, toxic multinodular goitre, toxic uninodular, single hyperfunctioning nodule, hyperthyroidism by increased TSH release, chromophobe adenoma or any other pituitary tumour); (ii) age of the patient; (iii) associated medical problems; (iv) degree of toxicity; (v) thyroid gland size.

The treatment could be based on thiocarbamide derivatives, subtotal thyroidectomy, or radio-iodine as the case warrants, similar to that of non-diabetics. However, if the diabetic condition has worsened considerably, hyperthyroidism should be vigorously treated with thiocarbamide derivatives to achieve a quick reduction of toxicity.

Beta blocking agents such as propranolol are used in thyrotoxicosis treatment. However, since these drugs may mask the hypoglycaemia adrenalin phase, there is a risk of interfering with diagnosis.

11.4 DIABETIC CHILD AND ADOLESCENT

Diabetes in children and adolescents is not frequent, and its clinical picture and treatment have particular characteristics in relation to this period of life.

1. The main objectives in the management of the diabetic child and adolescent are:

- (i) to attain full physical and emotional development of the patient;
- (ii) to avoid or delay complications;
- (iii) to protect pancreatic reserves of insulin.

Therefore, the medical care should be integral, and fulfilled through specific treatment (insulin, diet, exercise, diabetologic education and instruction) and habilitation and rehabilitation programmes.

2. These objectives are better accomplished with:

- (i) the attention to the diabetic child in specialized services, to assure the quality of the specific treatment, diabetologic education and instruction, dietary advice and better care of the emotional, and social aspects of each patient in particular;
- (ii) integration of an "attendance group" including: specialized paediatricians or endocrinologists; psychologists, nurses, dietitians and social workers, specially trained in the management of this condition;
- (iii) the diabetic child or adolescent should always be attended by the same Group so that the patient and the family acquire full confidence and security and better relationships between the patient and the "Attendance Group" are established and maintained. Without the support and qualified professional guidance the rude transition from a healthy to a diabetic child can be disastrous for the child and relatives.

3. General aspects of treatment

3.1 Control criteria

An adequate control has been obtained when the patient grows and develops normally without further complications and emotional disorders, with good physical activity, adapted to his disease and maintaining correct relationships with his environment.

3.2 Self-control

The patient must participate actively in his treatment.

As he grows and as the possibilities so indicate, a higher action in the treatment should be placed as his own responsibility; he must carry on and interpret his own urine tests, know the management of the diet and insulin doses, and inject himself. He must learn how to live a self-independent life.

3.3 Hospitalization

The hospitalization of the diabetic child and adolescent of recent diagnosis constitutes the ideal way to attain: (i) a better and faster metabolic control; (ii) an adequate identification of patient and parents with the Attendance Group that will follow his care; (iii) the initiation - with tact and discretion - of his habilitation, and (iv) the early detection of other problems that could be associated to the diabetes or influence it.

In time, all this can be attained on ambulatory basis, but frequently the Attendance Group is highly pressed by the initial metabolic imbalance, and the anxiety and strain that the disease generates in parents.

The hospital stay should be as short as possible and in special services for children and adolescents apart from adult diabetics. On the other hand, admissions for checking or controlling the patient's condition are not justified unless the environment is adverse.

3.4 Attendance in the outpatient department

The diabetic child and adolescent should have follow-up visits in special clinics, every three months or less, if necessary. Each time the following aspects should be assessed: degree of metabolic control, growth and development rhythm, detection of complications, immunization programmes, stomatologic attendance, emotional status, diabetologic education and instruction, and laboratory tests. Confidence and security in himself, and in his Attendance Group, should be encouraged in the patient.

4. Specific aspects of treatment

4.1 Diet

The diet should supply the daily energy and nutritional requirements to ensure a normal growth, development and physical activity of the patient.

The daily total calories are given: one-fifth at breakfast, two-fifths at lunch and according to: age, weight, height, sex and physical activity. A method to be followed is to supply 1000 kcal for the first year of age and 100 kcal for each additional year. During puberty 100-200 kcal more are added per year of age, especially in males. We prefer the following diet composition: 50-60% carbohydrates, 15-20% proteins and 20-35% fats (reduced saturated fat and cholesterol and increased intake of plant fibre).

The daily total calories are given: one-fifth at breakfast, two-fifths at lunch and two-fifths for dinner. Ten to 15 g of carbohydrates are taken from lunch and dinner to fulfil the middle-morning and afternoon luncheons and the last supper.

The menu should be agreeable to sight and palate, and satisfy the appetite. Daily intake should be kept at a relatively constant rate from one day to another.

The patient and other members of the family must know adequately the type of diet used, possible modifications and exchanges in nourishment.

Diet should be supplemented with minerals and vitamins, especially B complex factors.

It is necessary to maintain equilibrium of diet, exercise, stress and insulin doses in order to keep blood sugar levels as stable as possible.

4.2 Insulin treatment.

Insulin therapy is the corner-stone in the treatment of the diabetic child and adolescent, and has to be administered when first diagnosed.

Various types of insulin are available together with different therapeutic schemes.

Multiple doses of Regular Insulin during the day, in relation to the principal meals, is the ideal scheme; nevertheless, this is difficult to attain due to the rejection of injections. Therefore, insulins of intermediate action are administered in two sub-doses. Occasionally it is necessary to mix different types of insulin. We consider that the best schedule is that which accomplishes as close as possible normoglycaemia for most of the time, without the development of hypoglycaemia, as over-insulinization is not desirable either. In practice this is difficult to attain in these patients.

The highly purified insulins (single peak insulin or monocomponent pork insulin) are used with good results, though their high cost limits their use. Because of their lesser antigenicity they are indicated - especially - in patients with lipodystrophy, allergy or high insulin requirements.

4.3 Oral hypoglycaemic compounds

The sulfonylurea derivatives are only employed in the rare cases of non-insulin dependent diabetic children (MODY).

4.4 Exercises

This aspect of the treatment must be stressed because physical activity contributes to a lesser insulin need, together with its inherent benefits in this age. Programmed exercises or the practice of sports are desirable with the precaution of taking some nourishment previously, to avoid a hypoglycaemia crisis. The child or adolescent should be encouraged to keep on the same activities as before the onset of the disease. Sports like submarine fishing, scuba-diving, parachute jumps, auto rallies and similar should be avoided due to the risks of severe hypoglycaemic episodes.

4.5 Habilitation

The diabetologic education and instruction of children and adolescents and their relatives constitutes the fundamental bases for habilitation of these patients.

It should look upon:

(i) Individual education and instruction

Directed to the patient's relatives and teachers, through courses and personal discussions. Each medical consultation should be used to transmit new knowledge and reinforce that already existing.

The patient and both parents should get acquainted and be responsible for diet, the dosage of insulin, its regulation and administration, the identification of hypoglycaemia and its prevention and treatment. They should know how to look for glycosuria and ketonuria and how to cope with situations which could affect the course of diabetes, before attending the physician; all this knowledge will result in security and confidence of the patient.

(ii) Collective education

This aspect can be accomplished through distribution of booklets and books concerning diabetes, special courses to groups of patients and relatives, and the utilization of mass media.

4.6 Rehabilitation

For diabetic child and adolescent rehabilitation it is indispensable to have a team of specialized workers composed of: clinicians, nurses, dietitians, psychologists and social workers or sociologists able to offer an integral attendance.

This should include vocational, medical, psychological and, in its time laboural orientation.

For this purpose some special institutions are useful:

(i) Vacational camps for diabetic children: They represent one of the best ways for the habilitation and rehabilitation of diabetic children and adolescents as well as for the training of the related health personnel.

In these camps the diabetic carries on a near normal collective life. Inasmuch as they are separated transiently from the family environment an improvement of the psychological attitude of the patient and its relatives is foreseen; moreover, the patient acquires or reinforces his independence and theoretical and practical knowledge for the management and self-control of the disease; together with a deepening of the confidence and security in himself.

(ii) Anti-diabetic centre (or special diabetic clinics)

This institution offers: (a) specialized medical attention as well as vocational, social and psychological orientation; (b) education and instruction on diabetes for patients and their relatives; (c) personnel well trained and specialized in diabetes care.

The contact with other diabetic children and their relatives, with similar problems, contributes to the social support of these patients. The adolescents can benefit from specialized diabetic clinics that include themes related to this age. Outpatient departments for children, adolescents and adults should be separated.

(iii) Home for diabetic children

It is a boarding house for diabetic children and adolescents with socioeconomical or emotional difficulties which impair a better management of diabetes at home.

In these homes the child lives transiently in an institution that assures the specialized personnel and the proper environment for his problems (better metabolic control, psychological support, better scholastic yield, and optimal environmental conditions). This rehabilitation enables his reincorporation to home and society in a better condition.

5. Other situations

5.1 Remission period

Arises generally around the third month of insulin treatment and could last up to 18 months. Its end is related with diet excesses, infections or puberty onset.

Even though insulin requirements diminish, sometimes, up to two units, we prefer to continue injections in order to maintain the habit and to avoid the development of false hopes of cure of the disease. Hence, it is important to inform them concerning these aspects.

5.2 Psychosocial aspects

A minimum of socioeconomic conditions should be assumed so that the patient can fulfil the fundamental aspects of treatment. This should be supported through the State and/or institutions established for the assistance of the diabetic patient (see 4.6), parent and young diabetics associations, etc.

The diabetic child and adolescent care represents a true challenge to any National Health delivery system due to the requirements for specialized and long-term continuous treatment.

The special services for young diabetics are expensive and as organized for relatively small groups of patients, the cost per patient is high; therefore, none of these services are usually undertaken or supported on a charged basis.

The adolescence, due to characteristics, constitutes a period of time especially hard for a diabetic. Reinforcement of social and psychological support is unavoidable. Psychological, vocational and laboural counselling is very important.

A tolerant, stable family is perhaps one of the most essential factors for the control of the diabetic and the development of an adequate personality.

Juvenile diabetes is so stressful that, potentially it is capable of showing significant weaknesses in patient personality or in that of his closest relatives.

5.3 Complications

Complications of the diabetic in this period of life are mainly related with inadequate metabolic control and time of evolution of the disease.

- (i) Infections (e.g. vulvovaginitis, balanitis, pyodermitis, etc.) and neuropathies are frequent.
- (ii) Vascular complications are infrequent in this period, although this does not exclude its systematic search.
- (iii) The ketoacidosis is more often found at the onset of the disease. Later it develops in relation with infections, dietetic transgressions, inadequate management of insulin, and other factors. All this, conditioned and impaired, by the psychosocial status, low or difficult access to specialized medical services, unfavourable economic conditions, emotional disorders, etc. Ketoacidosis treatment must be considered as urgent. It implies: restitution of the hydroelectrolitic equilibrium, administration of multiple microdoses of Regular Insulin, and correction of the original cause.
- (iv) The growth and development of the diabetic child can be affected by: inadequate control of the disease or an onset at early age, with long-term evolution.
- (v) Hypoglycaemias are frequent as complications of insulin treatment. It is important that from the very first moments the patient learns to recognize its manifestations and how to avoid and treat them. The excessive fear of hypoglycaemia impedes an adequate metabolic control, even though the chronic over-insulinization is not desirable either.
- (vi) The insulinic lipodystrophy is also a complication of the treatment. The zones of lipatrophia are more frequent in the spot of injections. We insist in a daily rotation of the place of the injection as a preventive measure for this complication; the treatment with highly purified insulins restores the loosened adipose tissue.

11.5 DIABETES IN THE ELDERLY

Management of diabetes mellitus in the elderly has its own peculiarities, that have to be considered in order to offer the proper attention, attaining at the same time the most pleasant and balanced conditions that should characterize this period of life.

1. Diagnosis

To suffer this disease, implies for the aged important changes in life; therefore caution has to be exerted when making a diagnosis. This has to be based on a complete clinical examination and laboratory tests; in the analysis of the results of OGTT, the same criteria established for the rest of the population should be followed in spite of the known normal decrease of glucose tolerance as a result of aging.

2. Types of diabetes mellitus

The great majority of the elderly diabetics (over 60 years) are non-insulin dependent; however, some are insulin-dependent or plainly need insulin in order to feel better.

3. Treatment

The strictness of the treatment of the elderly diabetic will depend on the characteristics of his condition, real possibilities of following treatment, survival prospect (age and general condition) appraisal of the benefits and possible risks and/or undesirable side effects of the treatment. The ideal should be to obtain metabolic control with diet and exercise only, but sometimes hypoglycaemic treatment is needed. The strict metabolic control needed at other ages, is not so mandatory in the elderly, the treatment being somewhat more flexible, warranting

on one side a satisfactory state of health without impairing on the other the happiest possible old age. The characteristics of this disease should closely tie the patient and the medical team.

3.1 General considerations

As in any chronic disease, general measures, such as sedentarism, no smoking and limiting excessive alcohol ingestion should be followed. Obesity should particularly be taken in care. The patient has to participate in socially useful activities, in order to keep his self-respect.

3.2 Diet therapy

Besides the usual dietetic general principles, his life habits, preferences, daily routine, socioeconomic conditions, home resources, mental and physical conditions, especially the digestive system, as well as other associated pathologies should be borne in mind. The use of canned foods, pre-cooked and/or with low carbohydrate content could help treatment, as well as the possibilities of eating proper meals outside of home (dietetic dinner rooms). Frequently, diet cannot be too strict because of the abovementioned limitations; regularity in diet should be advised. Vitamins, minerals and protein supplements are indicated.

3.3 Physical activities

Age does not exclude physical activities; it is also important in the aged because it contributes to a better general and circulatory condition, less dietary restrictions and hypoglycaemic medication doses. Exercises should be adequate to age and physical capacity, especially helpful are short but frequent walks and other activities, like gardening, fishing, calisthenics, non-competitive nor extenuating sports, etc.

3.4 Medical therapy

The choice of a hypoglycaemic medicament, if necessary, will depend on the type of diabetes and individual conditions, including socioeconomic status.

The oral hypoglycaemic compounds to be used are the sulfonylurea derivatives; biguanides are not recommended.

The use of insulin makes the treatment more complex, meaning a greater dependence of family and institutions because it calls for a more constant and regular diet and activities and increases the risks of hypoglycaemia due to: improper food ingestion (quality, quantity, timetable, frequency, omissions), improper handling of insulin (syringe mishandling, bad injection technique, non-prescribed multiple doses due to confusion, etc.).

At the beginning insulin treatment requires greater medical supervision and sometimes the assistance of a specialized institution (hospital, day centres, homes for elderly, special clinics). A near normoglycaemic and asymptomatic condition should be attained, adjusting insulin doses like with other diabetics, but with a proper flexibility, in order to avoid hypoglycaemia (they are specially sensible to it), and related dangers without overlooking at the same time maintained hyperglycaemia. An impaired metabolic control due to infections, surgery, use of hyperglycaemic drugs and other stress conditions make transient insulin treatment sometimes necessary and even permanent. (The reader is referred to the pharmacology list of antidiabetic drugs for a more detailed description of the ones available.)

3.5 Treatment monitoring

At the beginning, and until a proper metabolic control is achieved (according to glycaemia levels) the patient should visit the physician frequently, later the visits can be spaced to one every one or two months during the first six months and later three times per year. In every visit blood sugar determination should be performed and the patient should bring the results of daily urine sugar tests made at home; remember that at this stage of life, there

is a diminished glomerular filtration rate, which affects the degree of glycosuria. It is also advisable to order the following tests: CBC, haemoglobin and haematocrit, ESR; creatinine, urea, uric acid, triglycerides and serum cholesterol; urine cultures, electrocardiogram and chest X-ray.

3.6 Education and instruction

Also in the aged diabetic, diabetic education and instruction are fundamental; at this age it should be clear, simple and easily accessible, bearing in mind age limitations and the educational level of the patient himself and close relatives. Instruction should be given at every visit by the physician and medical team through personal interviews, programmed courses, printed instructions, etc. using the technical resources available. Diabetic education and instruction are indispensable in achieving correctly fulfilled treatment by the patient with the greatest possible self-sufficiency.

3.7 Complications

There are complications that should be looked after and systematically treated: ischaemic cardiopathy, arterial hypertension, heart failure, peripheral vascular involvement, nephropathy, hepatopathy, non-evident infections, ophthalmopathy (even non-diabetic, like senile cataract and glaucoma) and neuropathy.

Some of these complications can further hamper the patient and increase the potential risk of an accident.

Prevention of hyperosmolar coma and lactic acidosis deserve special attention. Care of the feet in the elderly has the greatest importance; besides vascular lesions, lack of hygiene and proper foot care are the cause of complications and of avoidable amputations.

Caution has to be taken with the variety of drugs to be used, narcotics among others, and the risks of certain non-diabetic medicines (aspirin, sulfamide, mono-amino-oxidase inhibitors, among others). An ophthalmological examination, even without clinical evidence of diabetic retinopathy is necessary.

With the advances achieved in the health science, each time there are more long duration diabetics who, in old age, have many important complications; at the same time there are cases of later onset diabetes that evolve early complications.

3.8 Psychosocial aspects

The integral medical care of an elderly diabetic should include his psychical condition, as in the younger one. As any human being he is subject to stresses and difficulties in his daily life. Besides depression, anxiety and feelings of defencelessness, frequent at this age, there are the worries due to his diabetic condition, pressing against his already changed psychicism and impairing the metabolic control. The non-working condition and negative attitude that sometimes are held against them, could make them underestimated. Their active participation in different groups (local social collective activities, artistic and cultural hobbies as philately, etc., animal protection society) improve their mental condition, because they feel themselves socially needed. It has to be taken in account that the aged and particularly diabetic ones, sometimes have big physical limitations; they are in need of care, moral and material support, economic stability, love and esteem. The public health organization through the social welfare has a relevant place in these circumstances. Society in general (the State, collectivity) should give the necessary resources for achieving what has been mentioned: economic aids, proper institutions dedicated, medical teams (physicians, nurses, psychologists, sociologists) without charge; and psychosocial support, the accessibility to industrial products that would simplify the fulfilment of treatment is advisable (diabetic foods, glucose tapes, easiness at home in order to fulfil treatment, special syringes).

Only in this way can the elderly diabetic be happy and physically and psychosocially balanced.

Possibilities of integral attention in Cuba

1. Economical, political and social organization that guarantees the fulfilment of the needs of the population.
2. National Health System, curative and preventive, free, that embrace the whole nation (even the most distant places).
3. Clinical attention of the diabetes mellitus in the policlinics (first level of attention); besides specialized office hours of doctors, and periodic home visits of doctors, visiting nurses, social workers.
4. Provincial endocrinology and metabolic diseases services in every province (second level of attention).
Antidiabetic centre and special clinics for diabetics.
5. Endocrinology and Metabolic Diseases Institute (third level of attention).
6. Geriatric Department of Medicine in the Public Health Ministry.
7. Mineral-medicinal and thermal bath resorts.
8. Old mens homes.
9. Social assistance, economical help for medicines; if low grade income may have free medicaments.
10. Right to retire at the age of 55 (women) and 60 (men).
11. Economical aids to old men without retirement rights.
12. Tourists plans.
13. Full social participation, through his active membership in political and mass organizations.

11.6 MANAGEMENT OF CHRONIC COMPLICATIONS

Chronic complications of diabetes mellitus can be found both in insulin-dependent as well as in non-insulin-dependent patients.

They are generally observed after 10 or more years of the disease's evolution. These complications may be due to lesions of vessels (heart, kidney, eyes, peripheral arteries), nervous systems or others, i.e. skin, osteomyoarticulary.

Regardless of the particular aspects regarding these complications, there are common management measures to be observed in these subjects.

1. Prevention

1.1 The prevention of these late complications - especially the vascular ones - through an early control of glycaemia from its onset has been widely discussed. However, it is of key importance to keep the best metabolic control in all patients. Any discussion on chronic complications must be based on the fact that what we call "diabetes" is a group of diseases with various etiologies.

1.2 Special interest should be laid upon risk factors in atherosclerotic disease in the diabetic patient, i.e. arterial hypertension, smoking, obesity, family background of early vascular disease, ECG anomalies, cholesterol and TG levels. Other coronary risk factors have been considered: hyperuricaemia, life style, personality and idleness.

These factors should always be taken into account and should be properly managed so as to prevent a greater vascular damage.

2. General therapy

2.1 Comprehensive care to the diabetic patient will be rendered by a multidisciplinary team. All factors influencing blood sugar levels must be considered (diet, exercise, insulin, education, etc.).

2.2 In chronic complicated diabetes insulin therapy is advisable, with the necessary doses and frequencies so as to warrant a proper metabolic control and prevent over-insulinization. Measurement of glycosylated haemoglobin (HbA_{1c}) might be, in the future, a better index in assessing the degree of metabolic control.

2.3 Important aspects to be considered are adequate psychological adaptation and social conditions. After chronic complications have been established, the patient starts to face emotional disturbances that can be overwhelming in front of unsolved previous problems. Depression, anxiety and guilt feelings are commonly found, which call for adequate and systematic psychological support. Social assistance is indispensable in these patients depending on the degree of invalidity attained.

2.4 In many instances, as in the case of important peripheral vascular compromise, with or without amputation, muscle atrophies or bone affectation and loss of visual sharpness, among others, rehabilitation and social support measures have a significant value.

In these cases, the physiotherapist, the psychologist and the sociologist turn into important elements in the comprehensive treatment of these ill subjects. Social welfare and the National Health Care System are to give help and security to these patients and their families.

3. Specific therapy

3.1 Eye problems

(i) Diabetic retinopathy is found in almost 50% of diabetic patients it is directly related to its duration and has a 90% occurrence in patients who have been suffering from the disease for over 20 years. Diabetes is a common cause of blindness - accounts for 8-16% of all cases, with an increasing trend.

There is no specific therapy at present, though photocoagulation with argon laser, ruby laser or xenon arch, hypophysectomy and vitrectomy are used. Argon laser seems to offer the best technical advantages and allows for the treatment of small areas in any place of the retina with minimal secondary effects. The actual value of vitrectomy in haemorrhagic vitreous complications has yet to be assessed. We do not preclude hypophysectomy. The greatest disadvantage of these methods is that they deal with symptoms and not with the basic process.

Calcium dobecilate has been successfully used in treating diabetic retinopathy and to prevent its development. In cases of "hard" exudates clofibrate and low saturated fats, diet may determine their reabsorption. If arterial hypertension is associated, it should be properly managed so as to prevent the progression of retinopathy. The presence and/or progression of retinopathy must be periodically assessed. Refraction study and the search for intraocular hypertension must not be overlooked in any diabetic patient.

(ii) Cataract and glaucoma are treated by lens removal and anti-glaucoma medication or surgery.

3.2 Nephropathy

Its incidence increases with the duration of diabetes (considering an evolution from 10 to 30 years), then a plateau is reached; about 40% of cases show azotaemia. Periodic determination of urine albumin is an important diagnostic index. Creatinine determinations have prognostic and diagnostic value.

The prognosis is poor. With conventional medical therapeutics, life span is about three years once azotaemia (creatinaemia over 2 mg) is established, and some six months once a marked azotaemia is present (creatinaemia over 8 mg).

The conventional medical management of kidney insufficiency in a diabetic does not vary in principle from the management of any other patient, though the presence of diabetes implies the use of insulin, which hampers the adoption of usual measures. The use of diuretics and antihypertensive drugs is useful for some time and may prevent greater kidney damage and insufficiency as well as worsening of the retinopathy, nevertheless, fluid intake restriction for diabetics - when necessary - is difficult. From the dietetic viewpoint, some patients accept a very low protein, high carbohydrate and fats diet, without significant impairment of their metabolic control. This programme could alleviate the uraemic state symptoms for many months, though it is open to question whether it prolongs life or not. A thorough search for urinary infections must be done with or without symptoms, since they worsen kidney damage and may facilitate kidney insufficiency and metabolic derangement.

Insulin needs usually decrease in these patients and the management of doses should be adjusted considering glycaemic levels and not glycosuria.

The limit of this conventional treatment of kidney insufficiency is attained in a few months or in one to two years; thereafter a programme of chronic haemodialysis or kidney transplantation is necessary. Survival rate is less in diabetics than in other subjects receiving haemodialysis, and their rehabilitation is poor. If blindness or neuropathy are also present, the quality of life is far from normal in these dialysed patients.

Kidney transplants show a greater survival rate than those of chronic dialysis, however, it is not as good as in patients bearing other kidney diseases.

3.3 Heart

The available therapy does not differ from that of the non-diabetic patient: digital, diuretics, salt restriction, vasodilators, anticoagulants and beta blocker agents, and others.

Myocardial infarct may occur in diabetics painlessly; death rate, arrhythmia and severity are greater than in the non-diabetic patient. They should be treated in an intensive care unit. Metabolic complications (diabetic ketoacidosis, lactic acidosis) may be present and call for a careful management; hypoglycaemias must be prevented, and heart failure treated as usual.

Aorto-coronary revascularizing surgery may positively influence the natural history of the ischaemic heart disease.

Diabetic cardiopathy itself might be the cause of arrhythmia and sudden death; at present there is no specific treatment for this questionable condition.

3.4 Arterial hypertension

The frequency of arterial hypertension in diabetic patients is greater than in non-diabetic ones. Nephropathy should always be excluded in diabetic hypertensive patients; the treatment does not differ from that of the non-diabetic patient.

The use of beta-adrenoceptor blocking agents (B-blockers) such as propranolol should be carefully controlled due to their blocking of hypoglycaemia adrenergic phase.

3.5 Cerebrovascular accidents

The prognosis is worse than in the non-diabetic patient, though management does not differ from the one for the non-diabetic patients, exception being made of the metabolic control. Care should be taken in insulin dosage so as to prevent hypoglycaemias that would worsen the situation; multiple injections of Regular Insulin are recommended. Early diagnosis of carotid artery wall thickening is treated by local endoarterectomy and vertebrobasilar failure with anticoagulant treatment, which may diminish the incidence of ischaemic brain infarct.

3.6 Peripheral vascular disease

This condition is most frequent in the diabetic patient; when associated with neuropathy, infections, plus local traumas frequently results in the so-called "diabetic foot".

Modern trends of treatment of peripheral vascular disease have decreased amputation rates due to: better education as to hygiene and special foot care, use of skilled podiatrists, prevention of infections, early and thorough antibiotic treatment, more conservative surgical debriding, use of transmetatarsic amputation, early consultation with an experienced vascular surgeon to consider angioplastic procedures, and finally the clinical application of the necessary time and patience and the desire of saving the patient's foot.

In case of established lesions, systemic and local medical treatment similar to that of the non-diabetic patient is to be used: no smoking, rest, Buerger's exercises, vasodilators, anticoagulants, antibiotic therapy, or foot baths, according to the case; Swedish dextran and hyperbaric oxygenation have been used.

Surgical treatment is suggested in some cases; sympathectomy, bypass, grafts, aimed at healing the lesions and improving the circulatory state of the limb, so as to reduce to a minimum the mutilation degree of an eventually necessary amputation. Amputation under the knee allows for a better rehabilitation.

Debridation of feet lesions can be satisfactorily carried out. An adequate orthopaedic care is mandatory in all of these cases. The insulin therapy is indicated in these patients, preferably in multiple doses with Regular Insulin; when infection factors predominate and there are good conditions, prehypoglycaemic insulin therapy should be used which renders good results.

The diabetic patient should be educated in preventing traumatisms and care for his feet. Psychosocial support in all cases is necessary.

3.7 Neuropathy

Neuropathy therapy is discouraging and the results are quite variable. In all cases the best metabolic control should be achieved. In the peripheral type, analgesics, tranquilizers and sedatives are used. High doses of vitamins, diphanilhidanteine, carbamazepine, amitriptyline, quinine sulfate, benadriline and other drugs have been tried. In cases of acute pain and/or predominance of motor manifestation, rest can give relief, together with the fore-mentioned measures, followed by physiotherapy and rehabilitation to prevent muscle atrophies. It should also be observed in cases of diabetic "myopathy".

Alcohol intake should be avoided; positions that may cause injury due to pressure over these highly vulnerable nerves should be prevented.

Many of the autonomous neuropathies require a specialized management and their adequate diagnosis and treatment may be critical in the patient's survival.

When visceral neuropathy affects the superior digestive tract (oesophagus, stomach or biliar vesicle) good results are attained with parasympaticomimetic drugs (bethanecol chloride, ambemony chloride). Autonomic diabetic gastroenteritis disorders besides chronic diarrhoeas may produce a malabsorption syndrome, which affects nutritional and metabolic control. Frequently a motor disturbance of the small intestine is associated to bacterial overgrowth further impairing malabsorption; antibiotic therapy, especially Tetracycline and symptomatic treatment is beneficial.

The medical treatment of the diabetic neurogenic bladder with: low abdomen manual pressure and periodical emptying of the bladder, the use of parasympaticomimetic drugs, such as distigmine, and the prophylaxis or urinary infections, improve this condition. Patients must be trained in the abovementioned manoeuvres.

If results are unsatisfactory transurethral resection of the bladder neck offers remarkable improvement; the installation of a bladder pacemaker has been used.

Associated or not with the abovementioned condition, coeundi impotence or retrograde ejaculation is seen. If no improvement with good metabolic control is obtained, psychological support will be used as single choice therapy. In cases of retrograde ejaculation and infertility, an homologous artificial insemination may be used. If impotent, a prosthesis could be tried. Postural hypotension has been successfully treated by increasing sodium chloride intake and administering 9-alpha-fluorhydrocortisone.

3.8 Diabetic dermopathy

1. The therapy of superficial mycoses is ruled by the results of the mycological study. As to the feet, their hygiene and care should be intensively observed.
2. Dermatitis punctata, generalized vitiligo or chronic itching do not have a specific treatment.
3. Necrobiosis lipoidica diabeticorum with no ulceration is treated so as to reduce inflammatory reaction with topic steroids, with Cordran Tape occlusion, or injections of low concentration steroid suspensions. As the dysfunction itself causes atrophía, care should be taken to avoid further impairment either by therapy or by permitting large quantities of steroid suspension, in a located area. This must be prevented.

Care of ulcerous lesions has the same routine procedures as any other ulcerated area in a diabetic patient. If there are infections, local treatment with antibiotics is prescribed. The use of steroid injections around the lesion has been tested.

4. If lipoatrophia occurs, single peak insulin or single component pork insulin should be used; besides insulin injections in the peripheral area of lipoatrophia are useful. Lipohypertrophy has no treatment.

3.9 Bone and joints involvement

In the case of Charcot's neuropathic joint the treatment will be aimed at the adequate feet support, control of body weight, use of special shoes with proper support and very careful feet hygiene. Diabetic osteopathy occurs as a radiographic finding; perhaps it represents osseous bone changes that may follow a septic joint involvement (metatarsophalangeal or interphalangeal) and imply an underlying bacterial osteomyelitis. Therefore when infection persists, it must be controlled.

3.10 Malignant external otitis

This condition is a dangerous complication of the elderly diabetic and accounts for a high death toll. In these cases surgical ablation of granuloma from the external hearing duct is recommended, along with the local application of antibiotics (streptomycin and/or gentamycin); both drugs will be simultaneously used through parenteral way. Regular Insulin is ordered in these patients, mostly in multiple doses and provided proper hospital conditions "prehypoglycaemic" insulin therapy scheme is the ideal one.

3.11 Liver changes

Hepatomegalia found in diabetic patients is due to an increase in liver glycogen and/or fat deposit due to a bad metabolic control. Usually it disappears with an adequate metabolic control though if hepatomegalia has long-term evolution, fibrotic changes may occur and the regression may not be complete. These patients must be treated with insulin. In cases of liver insufficiency, care should be taken in the administration of insulin, since its half life is usually prolonged and there is the potential hazard of hypoglycaemia.

3.12 Lipid changes

Lipid metabolism changes are associated to diabetes mellitus or are secondary to a bad metabolic control of this condition. In the first case, the therapy is aimed at both conditions simultaneously, by using antilipaemic drugs (chlofibrate, cholestiramine, beta-cytosterol, nicotinic acid, d-tiroxine) when indicated. Saturated fats must be ruled out of the diet; the proportion of carbohydrates is conditioned to the type of hyperlipaemias, and alcohol intake will be proscribed. Diabetes will be treated as usual.

If hyperlipaemia is secondary to a bad metabolic control, the treatment will be aimed at correcting such derangement and this measure usually solves hyperlipaemia. Exercises should be strongly recommended and over-insulinization prevented.

3.13 Chronic infections

The use of Levamisole stimulates phagocytosis and lymphocytosis increasing resistance to infections; this can be used for example in diabetic patients with relapsing forunculosis or uncontrolled Candida albicans infections. Two topic preparations Myconozole-2% and clotrimozole 1%, for fungus infections are used; these agents due to their broad spectrum reduce the importance of determining the type of fungus if Candida albicans or others.

The "prehypoglycaemic" insulin therapy scheme should be used, if proper conditions exist. Proper antibiotic therapy will be used.