mality. Blood glucose was 29.7 mM, potassium was 5.1 mM, blood sodium, chloride, urea, and creatinine were in the normal range. Arterial blood gas analyses were as follows: pH = 7.18, PCO^2 = 28 mmHg, PO^2 = 91 mmHg, and HCO^{3-} = 17 mM. Urinary ketones and glucose were found highly positive at (+++) and (++++), respectively. Anti-islet cell antibodies were not found in peripheral blood. CT scan revealed multiple metastases developed in the head and the corpus of the pancreas. No sign of local recurrence of the renal tumor was found. A histological examination was determined by fine needle aspiration of the pancreatic tumor and resulted in the diagnosis of a clear-type renal cell carcinoma. A technetium 99 MDP bone scan revealed a bone metastasis in one rib. Classical rehydration and optimalized insulinotherapy were effective rapidly. The patient refused any other treatment and was still alive 2 years later with an insulin total daily dose of 50 IU.

When renal cell carcinoma is diagnosed, metastases are present in ~25% (3–5). Most frequently, the involved sites are the lungs, lymph nodes, bones, and liver. However, metastatic renal cell carcinoma also occurs in a number of other organs and body regions, such as thyroid, spleen, bowel, and skin and rarely the pancreas (4–6). In most instances, pancreatic metastases are discovered at autopsy. Willis (7) found pancreatic metastases in only 3% of 500 patients with a malignant disease at autopsy. The primary tumor is a small cell carcinoma of the lung or renal cell carcinoma. With regard to renal cell carcinoma, Lubarsch (8) diagnosed pancreatic metastases in 1.3% of 320 autopsy cases. Pancreatic metastases also are diagnosed during life. The disease proved to be of metastatic origin in 4.5 (9) and 3.7 (10) of cases. Of these, the source was renal cell carcinoma in 1 and 1.7%, respectively. Clinical manifestations of pancreatic metastases vary: exocrine and/or endocrine function disturbances lead to exocrine and/or endocrine explorations (2,8). Jaundice, abdominal pain, weight loss, diarrhea, and digestive tract bleeding are the most common clinical features of these pancreatic metastases. Diabetes is exceptional, and sometimes an impaired carbohydrate metabolism is observed (1). Ultrasonography and CT-scan studies usually disclose nonspecific evidence of a tumor (11). Endoscopic ultrasonography seems promising because of its high sensitivity.

The occurrence of diabetes in a patient with a history of lung or renal neoplasia necessitates looking at pancreatic metastases. Pancreatic metastases of renal cell carcinoma carry a less grim prognosis because slowing evolution and surgical removal may be possible.

MARC DUQUENNE, MD
GEORGES WERYHA, MD
JACQUES HUBERT, MD
BRUNO PIERFITTE, MD
PHILIPPE MANGIN, MD
JACQUES LECLERE, MD

From the Department of Endocrinology and Internal Medicine (M.D., G.W., J.L.) and the Department of Urology (J.H., B.P., P.M.), CHU de Nancy, Hôpital de Brabois, Nancy, France.

Address correspondence to Marc Duquenne, MD, Department of Endocrinology, CHU d'ANGERS, 4 rue Larrey, 49033 Angers Cedex 01, France.

References

1. Tongio J, Peruta O, Wenger JJ, Warter P: Métastases duodénales et pancréatiques du néphro-épithéliome: a propos de quatre observations. *Ann Radiol* 20:641–647, 1977
2. Guttman FM, Ross M, Lachance C: Pancreatic metastasis of renal cell carcinoma treated by total pancreatectomy. *Arch Surg* 105:782–784, 1972
3. Holland JM: Cancer of the kidney: natural history and staging. *Cancer* 32:1030–1042, 1973
4. Ritchie AW, Chisholm GD: The natural history of renal cell carcinoma. *Semin Oncol* 10:390–400, 1983
5. Fuselier HA Jr, Guice SL III, Brannan W, Ochsner MG, Sangisetty KV, Beckman EN, Barnes CA: Renal cell carcinoma: the Ochsner medical institution experience (1945–1978). *J Urol* 130:445–448, 1983
6. Klugo RC, Detmers M, Stiles RE, Talley RW, Cerny JC: Aggressive versus conservative management of stage IV renal cell carcinoma. *J Urol* 118:244–246, 1977
7. Willis RA: *The Spread of Tumours in the Human Body*. 3rd ed. London, Butterworths, 1973, p. 216–217
8. Lubarsch O: Handbuch der speziellen. In *Pathologischen Anatomie und Histologie Niere*. Vol. 6. Berlin, Springer-Verlag, 1925, p. 607–720
9. Whittington R, Moylan J, Dobelbower RR, Kramer S: Pancreatic tumors in patients with previous malignancy. *Clin Radiol* 33:297–299, 1982
10. Opocher E, Galeotti F, Spina GP, Battaglia G, Hernandez C: La diagnosi dei tumori secondari del pancreas: analisi di 13 casi. *Minerva Med* 73:577–581, 1982
11. Wernecke K, Peters PE, Galanski M: Pancreatic metastases: U.S. evaluation. *Radiology* 160:399–402, 1986

Dorchy's Recipes Explaining the "Intriguing Efficacity of Belgian Conventional Therapy"

In the January 1993 issue of *Diabetes Care*, Bougnères et al. (1) published the results of a French multicenter study comparing a three-injection insulin regimen (called intensified insulin therapy) with a conventional two-injection therapy in patients aged 7–18 years with >1-year duration of insulin-dependent diabetes mellitus. They were evaluated after 1 year of treatment. The mean HbA_{1c} levels decreased from 9.8% (i.e., 146% of normal values) in the two-injection group to 9.3% in the three-injection group (i.e., 139% of normal values).

In the September 1993 issue of *Diabetes Care*, I published a letter (2) that presented my personal results in terms of HbA_{1c} levels that can be achieved in an unselected population of young diabetic patients, but without residual endogenous insulin secretion. Patients were followed during 1 year, and I compared them with data from recent literature. In my study, mean ± SD HbA_{1c} levels were 6.9 ± 1.5%, i.e., 115% of normal values. No statistically significant difference was observed in metabolic control between the patients on only twice daily insulin injections and those on four injections using the basal-bolus regimen (113 and 118% of normal values, respectively).

In a reply to my letter, Pierre Bougnères (3) seemed especially impressed when considering the HbA_{1c} levels obtained with only twice daily injections, and ironically asserted that my results were "out of reach for most (all?) groups" in the world, and concluded "unless it remains a secret, every diabetologist/pediatrician will eagerly wait for H. Dorchy's recipe."

First of all, it is inadequate to systematically assimilate the multiple-insulin injection to an "intensified insulin therapy" and the "conventional" two-injection regimen to a non-intensified insulin therapy. Indeed, a multiple-insulin injection regimen not associated with an intensified and correct education, as well as with the application of the consecutive knowledge, may have deleterious effects on HbA_{1c} levels. On the other hand, the proper use of blood and urine glucose monitoring, insulin dose alteration, allocation of diet, etc., may lead to "intensive conventional therapy" and successful glycemic control. With such an intensive conventional therapy, a French group from Nancy (4) has obtained an HbA_{1c} level of 6.9 ± 1.4% (i.e., 123% of normal values) in type I diabetic adults, and even 6.1 ± 0.9% (i.e., 109% of normal values) in the patients perfectly applying their knowledge. Consequently, Pierre Bougnères may be reassured—my results in terms of HbA_{1c} levels are not exceptional.

In my experience, the basal-bolus regimen, with increased flexibility in daily life and dietary freedom, cannot be applied successfully before adolescence. The classic twice-daily insulin regimen is appropriate for children and adolescents until the end of secondary school. The first injection (and insulin doses alteration) is done before school and the second injection (and insulin doses alteration) after school with the help of parents, if necessary; before lunch at school, the young children may use urine monitoring. Diabetic children may eat a snack in the middle of the morning and afternoon periods with their friends. For adolescents and adults in college or working with irregular time schedules, the basal-bolus system using a pen injector is more comfortable, not ignoring that to achieve the same level of glycemic control that can be expected with two injections, the subjects on four daily injections need a significantly higher monthly frequency of home blood glucose monitoring (HBGM), 94 ± 65 vs. 67 ± 35 in our study (5). This is illustrated in Fig. 1. In the paper by Bougnères et al. (1), the mean age of the patient was not different in the two- or three-injection groups.

Second, and contrary to the affirmations of Pierre Bougnères in his reply to my letter (3), there are different ways of taking charge of the patients.

Medical and nurse involvement

I assume responsibility for medical follow-up of all my patients. Obviously, the patients included in the Bougnères' study were recruited from 10 centers and the paper is signed by 15 co-authors. Moreover, in many centers, the diabetic children and adolescents are not always followed-up by the head of the diabetology unit. In my study, there exists a significant inverse relationship between the frequency of out-patient clinic attendance (mean, 6.6 visits/year/patient) and HbA_{1c} levels. That frequency is lower in Bougnères' study because the patients were asked to be seen at the referral center four times a year, which doesn't mean that they do it.

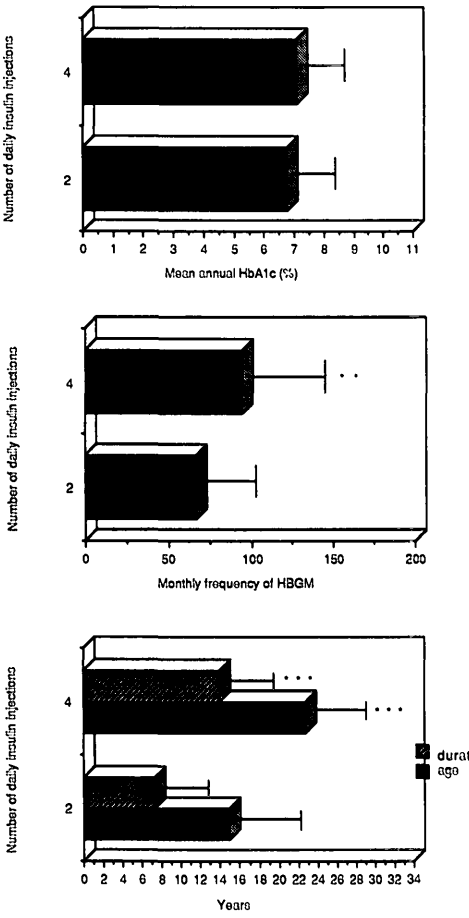

Figure 1—*Comparison between patients on two (n = 84) or four (n = 45) daily insulin injections, concerning mean annual HbA_{1c} levels, frequency of HBGM, age, and duration of diabetes (mean ± SD). **P < 0.01. ***P < 0.001.*

In addition to the education provided in the hospital, we developed visits to the children's homes and schools by specialized nurses (6).

HBGM and insulin dose adjustment

We teach the children on a twice daily injection regimen of an individualized mixture of rapid- and intermediate-acting insulins, injected 30 min before breakfast and dinner. The actions of these four insulins have to be assessed from the results of four daily measurements of blood glucose or, eventually, of urine glucose (at school or if a good HbA_{1c} level is easily reached). The midday analysis before lunch reflects the

action of rapid-acting insulin injected in the morning. The evening analysis before dinner reflects the action of intermediate-acting insulin injected in the morning. The bedtime analysis reflects the action of rapid-acting insulin injected in the evening. Morning analysis reflects the action of intermediate-acting insulin injected the previous day toward the end of the afternoon. Patients learn how to adjust their insulins every day, namely, according to retrospective glucose level measurements, and to use compensatory modifications with moderation not forgetting adjustments to physical activity (7). In my study, the mean frequency of monthly blood glucose monitoring is higher than that reported by Bougnères et al. in the conventional (65 vs. 52) and particularly in the intensive (94 vs. 59) therapy groups. I found a weak but significant inverse correlation between HbA_{1c} levels and frequency of HBGM. Moreover, I don't systematically reject urine analyses during the day as Bougnères does. The insulin dose alteration recommended by him is done only once a week according to algorithms based on a maximum of 15 blood glucose measurements each week (8). In the basal-bolus system, dose alteration of rapid-acting insulin may be guided not only by the preprandial blood glucose measurements, but also by postprandial blood glucose targets. That is the reason why it often is necessary to increase HBGM frequency if a young diabetic patient wants to benefit with greater freedom in respect to daily life and dietary habits.

Diet

The allocation of carbohydrates throughout the day is essential in the twice-daily injection regimen. The proportion of carbohydrates of the mid-morning snack must be more important than that of breakfast (9). Indeed, the peak activity of the so-called rapid-acting insulin occurs only 1.5–3.0 h after injection. If the carbohydrate content of breakfast is higher than that of the snack taken at ~ 1000, there is a risk of hyperglycemia after breakfast and of hypoglycemia at the end of the morning period. Unfortunately, this corresponds to Bougnères' recommendation of consuming 20% of the daily carbohydrate intake during breakfast and only 10% at 1000 (10).

In conclusion, the frequency of HBGM and of clinic attendance helps maintain better metabolic control, and the multiple insulin injection regimen per se doesn't necessarily improve HbA_{1c} levels. Successful glycemic control in young diabetic patients depends mainly of the quality of education and of follow-up by an experienced team in the out-patient clinic, but also by specialized nurses going to the children's homes and to their schools.

HARRY DORCHY, MD, PHD

From the Clinique de Pédiatrie Ambulatoire et de Diabétologie, Hôpital Universitaire des Enfants Reine Fabiola, Brussels, Belgium.

Address correspondence to Harry Dorchy, MD, PhD, Clinique de Pédiatrie Ambulatoire et de Diabétologie, Hôpital Universitaire des Enfants Reine Fabiola, Avenue JJ Crocq 15, B1020 Brussels, Belgium.

References

1. Bougnères PF, Landais P, Mairesse AM, Jais JP, Jos J, Peyraud J, Wielicko MC, Chavoix P, Garandeau P, Asensi D, Ythier H, Rouland V, Mazoyer T, Leturcq F, Raynaud E: Improvement of diabetic control and acceptability of a three-injection insulin regimen in diabetic adolescents. *Diabetes Care* 16:94–102, 1993
2. Dorchy H: What level of HbA_{1c} can be achieved in young diabetic patients beyond the honeymoon period? *Diabetes Care* 16:1311–1313, 1993
3. Bougnères P: Intriguing efficacity of Belgian conventional therapy? *Diabetes Care* 16:1311, 1993
4. Ziegler O, Kolopp M, Louis J, Musse JP, Patris A, Debry G, Drouin P: Self-monitoring of blood glucose and insulin dose alteration in type I diabetes mellitus. *Diabetes Res Clin Pract* 21:51–59, 1993
5. Dorchy H: Quel contrôle glycémique peut-il être obtenu chez des jeunes diabétiques sans sécrétion résiduelle d'insuline endogène? Quelle est la fréquence des complications subcliniques? *Arch Franç Pédiatr*. In press
6. Ernould C: Education. In *Diabétologie Pédiatrique*. Czernichow P, Dorchy H, Eds. Paris, Doin, 1989, p. 397–426
7. Czernichow P, Dorchy H: Traitement et insulinothérapie. In *Diabétologie Pédiatrique*. Czernichow P, Dorchy H, Eds. Paris, Doin, 1989, p. 445–496
8. Bougnères PF, Jos J: Insulinothérapie. In *Le Diabète de l'Enfant*. Bougnères PF, Jos J, Chaussain JL, Eds. Paris, Flammarion Médecine-Sciences, 1990, p. 87–102
9. Dorchy H, Loeb H: Nutrition. In *Diabétologie Pédiatrique*. Czernichow P, Dorchy H, Eds. Paris, Doin, 1989, p. 497–513
10. Jaupitre N, Merle B, Bougnères PF: Diététique du diabète insulino-dépendant. In *Le Diabète de l'Enfant*. Bougnères PF, Jos J, Chaussain JL, Eds. Paris, Flammarion Médecine-Sciences, 1990, p. 103–113

Effect of Magnesium Treatment on Glycemic Control and Metabolic Parameters in NIDDM Patients

Magnesium deficiency, defined on the basis of intracellular or extracellular magnesium levels, has been reported to be common among patients with non-insulin-dependent diabetes mellitus (NIDDM) (1). It may contribute to insulin resistance in NIDDM (2) and has been suggested to predispose patients to excess cardiovascular morbidity (1). Treatment with magnesium has been shown to be effective in diabetic patients with acute complications, such as focal