Nifedipine and Renal Function

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Dear Sir,

Diamond et al. [1] have described reversible deterioration of renal function after nifedipine administration in 4 patients with moderate chronic renal insufficiency and cardiovascular disease. These cases were identified in a retrospective manner after reviewing the clinical course of patients seen in consultation by members of the Renal Unit at the Massachusetts General Hospital during 1982–83. Other possible causes of worsening of the renal function were excluded. This effect was attributed to renal dysfunction induced by nifedipine, perhaps blocking calcium entry into renal vascular smooth-muscle cell, thereby resulting in a modified response to hormones such as norepinephrine and angiotensin II, intimately associated with glomerular filtration rate and renal blood flow regulation. It might alternatively be mediated by the influence of nifedipine in prostaglandin synthesis.

We would like to comment some aspects of this interesting clinical observation. First of all, it would be useful to know in how many patients with renal insufficiency treated with nifedipine an unmodified, or even increased, glomerular filtration rate was maintained. Secondly, it would be interesting to know if any of these patients were submitted to a prolonged administration of calcioanta-agonists, and what was the long-term effect on renal function. When we analyze the cases of Diamond et al. [1] we can see that the 1st was not hypertensive (the drug was given for angina pectoris), the 2nd and 3rd showed hypertension (the 2nd also angina and diabetes), and in the 4th it is difficult to speak of renal function deterioration.

We have been interested in the possible influence of nifedipine administration on renal function in patients with essential hypertension and normal renal function [2], or with a moderately reduced glomerular filtration rate [3]. In the first instance [2], 35 males with mild to moderate essential hypertension (diastolic values of 95–114 mm Hg) were studied. For 2 weeks they received no treatment; afterwards 30 mg/day (10 mg t.i.d.) of nifedipine were administered as the only drug. Serum creatinine levels went from 1.0 ± 0.2 to 0.8 ± 0.1 and 0.9 ± 0.2 mg/dl after 45 and 90 days of treatment, respectively, whereas values of urea declined from 38.6 ± 7.5 to 33.8 ± 6.9 mg/dl after 90 days. Both changes were statistically significant.

Our second study [3] included 22 hypertensive patients (12 men and 10 women), with a mean age of 35.4 years and a creatinine clearance between 47 and 78 ml/min, previously controlled with several antihypertensive drugs. At the beginning of the study, none of their blood pressures were over 160/95 mm Hg. Their respective treatments were changed to oral nifedipine (30–60

mg/ day, in 3 daily doses). Six weeks later creatinine clearances were once again determined. Our findings showed a significant increase of this parameter, from 60.3 ± 9.6 to 65.5 ± 11.8 ml/min (p 0.001, paired Student's test).

These findings seem to confirm certain initial observations concerning the effects of nifedipine on the kidney [4], as well as the clinical results of Corea et al. [5] and those of Yokoyama and Kaburagi [6]. They also agree with the recent report of Ambroso et al. [7], who have not observed significant reductions in creatinine clearance in

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hypertensive patients with renal insufficiency treated with combinations of antihypertensive drugs including nifedipine. It seems necessary, therefore, to emphasize that, although nifedipine administration can induce a reversible deterioration in renal function in some patients with renal insufficiency in a short term, its long term effect may be beneficial, at least in patients with essential hypertension and moderate impairment of glomerular filtration rate due to nephrosclerosis. This beneficial effect is greater than that achieved when hypertension is controlled with other vasodilators [5], creatinine clearance being slightly but significantly improved in patients treated with nifedipine.

References

- Diamond, J.R.; Cheung, J.Y.; Fang, L.S.T.: Nifedipine-induced renal dysfunction. Alterations in renal hemodynamics. *Am. J. Med.* 77:905–909(1984).
- Del Río, A.; G.-Juanatey, J.R.; Pose, A.; Cabezas, J.: Tratamiento con nifedipina en pacientes con hipertensión esencial y función renal normal: efecto sobre los valores plasmáticos de creatinina, urea, ácido úrico, glucosa y electrolitos. *An. med. Intern., Madrid* 2:274–277 (1985).
- Del Río, A.; Carrera, F.: Tratamento com nifedipina em pacientes com hipertensão arterial e moderada redução da função renal: influência sobre a filtração glomerular. *Rev. Soc. Cien. Méd., Lisboa* (in press).
- Klüttsch, V.K.; Schmid, P.; Grosswendt, J.: Der Einfluss von Bay a 1040 auf die Nierenfunktion des Hypertonikers. *Arzneimittel-Forsch.* 22:377–380(1972).
- Corea, L.; Bentivoglio, M.; Cosmi, F.; Alunni, G.; Carnovali, M.: Nifedipine versus prazosin in essential hypertension: a double-blind study. *Curr. ther. Res.* 50:708–717 (1981).
- Yokoyama, S.; Kaburagi, T.: Clinical effects of intravenous nifedipine on renal function. *J. cardiovasc. Pharmacol.* 5:67–71 (1983).
- Ambroso, G.C.; Como, G.; Scalamogna, A.; Citterio, A.; Casati, S.; Ponticelli, C.: Treatment of arterial hypertension with nifedipine in patients with chronic renal insufficiency. *Clin. Nephrol.* 23:41–45(1985).