Upsala J Med Sci 92: 75–78, 1987

Treatment of Severe Hypertension with Peroral Labetalol

Göran Frithz

Department of Medicine, Central Hospital, Eskilstuna, Sweden

ABSTRACT

22 patients with untreated, essential hypertension (diastolic blood-pressure ≥140 mmHg) and in most cases also showing neurological symptoms were given a single oral dose of 400 mg labetalol. All patients displayed a gradual decrease of the blood-pressure down to a diastolic pressure about 110 mmHg with relief of the symptoms. There were no signs of neurological deficit due to the reduction of blood-pressure.

INTRODUCTION

There is still disagreement as to when an elevated blood-pressure should be regarded as a medical emergency and acute treatment initiated. However, most clinicians would agree that a persistent diastolic blood-pressure of ≥ 140 mm Hg and/or signs of encephalopathy require acute medical intervention. On the other hand, it is well known that too vigorous treatment and rapid reduction of the blood-pressure may result in unwanted effects and even permanent signs of cerebral damage.

Labetalol, a combined α- and β-adrenoceptor-blocking agent, has been used intravenously in minibolus doses or by controlled intravenous infusion to treat very severe hypertension.

It has been shown that labetalol is rapidly absorbed and exerts its maximum pharmacological action two hours after oral administration (3). Single oral doses have been reported to cause a marked reduction of blood-pressure (2). The acute blood-pressure reduction is mainly achieved by an α-receptor-mediated reduction of the total peripheral resistance as labetalol has both α-receptor and β-receptorblocking properties. The latter property counteracts the reflex increase of heart-rate caused by the blood-pressure decrease (1).

This communication reports our experience of 5 years' use of labetalol in severe hypertension in an emergency ward.

PATIENTS AND METHODS

22 patients, 14 men and 8 women (mean age 53.4 years), were consecutively treated in the emergency ward and Intensive Care Unit. They were all admitted to the hospital with a diastolic blood-pressure of $\geq$ 140 mmHg (range 140-160) and neurological symptoms, such as headache, vertigo and dizziness, were present in most cases.

Six patients had choked optic discs (fundus hypertonicus IV). None had a history of cerebrovascular lesion, myocardial infarction or renal failure and no antihypertensive treatment had been given. A complete physical examination was performed and recorded immediately upon the patient's arrival. The pressure and heart-rate in the supine position were registered every half hour during the first few hours without any treatment.

When the blood-pressure was persistently elevated, treatment was initiated with a single oral dose of 400 mg labetalol. In 6 patients, an intravenous injection of 40-80 mg furosemide was also given owing to signs of left ventricular strain. No other medication was given at the same time.

The patients were continuously observed for 6-8 hours with repeated registrations of blood-pressure and heart-rate. The blood-pressure was measured with a mercury sphygomanometer and the diastolic pressure was registered as Korotkoff phase V.

After the initial period, the patients were transferred to an ordinary medical ward for further treatment and examinations.

In five patients there were signs of an impaired renal function with elevated serum creatinine levels (range 138-236 µmol/l. Normal upper limit <125 µmol/l). No one was found to have any endocrine disorder.

Student's t-test for paired differences was used for statistical evaluation.

RESULTS AND DISCUSSION

The effect of the treatment upon systolic and diastolic blood-pressure and heart-rate is shown in Table I. There was a highly significant reduction of the blood-pressure after one hour (systolic blood-pressure $p < 0.001$, diastolic blood-pressure $p < 0.01$). A further decrease was observed up to four hours after tablet intake (Tab I). Thereafter, the blood-pressure seemed to stabilize at about 110 mmHg diastolic. No significant changes in heart-rate were observed.

Linear regression analysis showed a significant correlation between the initial diastolic blood-pressure level and the pressure after four hours ($r = 0.52$, $p < 0.02$).

In all but one patient the neurological symptoms had vanished after 8 hours. Three patients complained of moderate nausea during the observation period. No severe side effects were registered during the acute treatment or subsequently during hospitalization. In particular, there were no signs of neurological deficit due to an impaired cerebral circulation.

Tab. I. Systolic (SBP) and diastolic (DBP) blood-pressure and heart-rate (HR) before and 1, 4 and 8 hours after oral administration of 400 mg labetalol. The significances are in relation to the initial values.

Hours	0	1	4	8
SBP mmHg	242 ± 10	210.7 ± 9 p <0.001	172.1 ± 8 p <0.001	168 ± 6 p <0.001
DBP mmHg	145 ± 7	137.8 ± 9 p <0.01	114.5 ± 6 p <0.001	112 ± 9 p <0.001
HR beat/min	72 ± 6	78 ± 4 n.s.	70 ± 5 n.s.	72 ± 4 n.s.

The findings are in accordance with earlier observations that labetalol is rapidly absorbed and its maximum effect upon isoprenaline-induced haemodynamic changes is attained after about two hours (3). The practically unchanged heart-rate in combination with the decrease of blood-pressure indicates a favourable balance between the α-receptor and β-receptor-blocking properties of labetalol. Experimental studies have shown a ratio of 1:3 between the α- and β-blocking effect after oral administration (1), which is apparently also favourable in the acute situation.

The dose of 400 mg labetalol seems to be adequate for treatment of hypertensive emergencies. The material is too small to print reliable conclusions about the additive effect of intravenous diuretics and in this study they were not used for the treatment of hypertension per se.

Several authors have warned against rapid reduction of the blood-pressure in severe hypertension and the treatment should certainly only be given upon strict indications and in hospital.

However, oral administration of labetalol produces a gradual reduction of the blood pressure. In this study, the dose used did not give an excessive fall of blood-pressure, which could lead to a disturbed cerebral circulation, with the clinical hazards this entails.

ACKNOWLEDGEMENT

Mrs Kerstin Blomberg is thanked for skillful assistance and help.

REFERENCES

1. Koch, G.:
Cardiovascular dynamics after acute and longterm adrenoreceptor blockade at rest, supine and standing and during excercise.
Br. J. Clin. Pharmac. 8 (suppl): 101-105, 1979.

2. Richard, D.A.:
Pharmacological effects of labetalol in man.
Br. J. Clin. Pharmac. 3 (suppl): 721-723, 1976.

3. Richard, D.A., Maconochie, J.G., Bland, R.E., Hopkins, R. & Martin, L.:
Relationship between plasma concentrations and pharmacological effects of labetalol.
Eur. J. Clin. Pharmac. 11:85-90, 1977.

Address for reprints:
Göran Frithz, M.D.
Department of Medicine
Central Hospital
S-631 88 Eskilstuna