Reversible Hypertension in Primary Hyperparathyroidism – Pre- and Posteroperative Blood Pressure in 75 Cases

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Summary. In 75 operatively proved cases of primary hyperparathyroidism (PH) mean systolic and diastolic blood pressure (BP) values were significantly higher pre- than postoperatively. There were 27 patients (36%) who showed hypertension before operation (systolic BP ≥ 150 mm Hg, mean 169 ± 20 mm Hg). In 20 of these the hypertension was reversible after successful treatment of PH, in seven cases elevated values persisted. The mean age of patients with persisting hypertension was significantly higher than the group with normalization of BP after operation (P < 0.01). As far as clinical presentation of PH was concerned it were those cases with hypercalcaemic syndrome and with accidentally discovered hypercalcaemia who most often showed hypertension. In cases with recurrent urolithiasis and with osteitis fibrosa as leading symptoms there was no significant increase of hypertension as compared to the whole group. Because of the relatively high incidence of hypertension in PH this possibility should be taken into consideration in each diagnostic clarification of hypertensive patients.

Key words: Primary hyperparathyroidism – Blood pressure – Reversible hypertension

Introduction

A highly significant correlation between serum calcium level and both systolic and diastolic blood pressure (BP) was demonstrated in a recently published study on 9,321 male subjects [15]. In more recent pathophysiological considerations concerning the development of hypertension, calcium plays an important role [3, 8, 18, 19]. In addition, the effect of calcium antagonists on the treatment of hypertension indicates possible relationships between calcium and BP [21, 27]. In contrast to this, results of epidemiologic and animal studies have suggested an inverse relationship between calcium intake and BP [20]. In a randomized clinical trial a calcium-supplemented group showed a significant decrease in diastolic BP [2]. Oral magnesium supplementation also was able to lower BP [9]. In primary hyperparathyroidism (PH) hypertension is a well-known symptom [12–14, 25] but little is known about incidence, reversibility and pathogenesis.

Patients and Methods

In 75 cases of PH, BP values were analysed from the preoperative hypercalcaemic stage and the postoperative normocalcaemic stage. In all cases the diagnosis was proved by the histological finding of parathyroid adenoma or hyperplasia and by the typical postoperative fall in serum calcium. Patients on antihypertensive drugs or with retention of urea and creatinine were excluded from the study. The mean age of the 52 women was 55 years (SD: ± 12), mean preoperative serum calcium 3.19 mmol/l (range: 2.65–5.50, SD: ±0.53). The mean age of the 23 men was 48 years (SD: ± 15), average preoperative serum calcium 3.20 mmol/l (range: 2.63–4.25, SD: ± 0.43). BP was measured with the method of Riva-Rocci at different days three times preoperatively and three times postoperatively. During these measurements the patients had no bed-rest. They were either in the preoperative diagnostic phase or a few days before release from hospital. A mean value was calculated from each of the three determinations.

Serum calcium was calculated from three different preoperative determinations which were performed by atomabsorption spectrophotometry. Parathyroid hormone was measured by a radioimmunoassay against the aminoterminal end of the molecule [5].

Results

The mean values and standard deviations of the systolic and diastolic BP are shown in Table 1 for
all 75 cases. There is a highly significant decrease in systolic and diastolic BP after operative correction of PH that is about the same for both sexes. The distribution of the individually determined BP levels can be seen in Figs. 1a and b. While for systolic BP (Fig. 1a) a considerable number of cases show values of 150 mm Hg and higher (up to 230 mm Hg) preoperatively, this broad spectrum narrows postoperatively to the left, i.e. to lower values. Only seven of the 75 cases have a BP of 150 mm Hg or more. In Fig. 1b a corresponding postoperative shift of values to the left can be recognized for the diastolic BP after operative correction of hyperparathyroidism. Preoperatively 48 patients (64%) are normotensive and 27 (36%) are hypertensive (systolic BP ≥150 mm Hg). The mean serum calcium for the normotensive group is $3.21 \pm 0.46$ mmol/l and for the hypertensive group $3.39 \pm 0.58$ mmol/l (p ns). For the hypertensive cases the systolic BP decreases from 169 mm Hg preoperatively to 135 mm Hg postoperatively, i.e. 34 mm Hg on average. The diastolic BP decreases on average by 13 mm Hg, from 96 preoperatively to 83 postoperatively (Fig. 2). Taken together, the 48 normotensive cases also show a significant decrease of BP. The seven cases with persisting hypertension after

<table>
<thead>
<tr>
<th>Blood pressure (mm Hg)</th>
<th>n</th>
<th>Preop. mean (±SD)</th>
<th>Postop. mean (±SD)</th>
<th>Paired t-Test t</th>
<th>p &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>75</td>
<td>145 (23)</td>
<td>128 (14)</td>
<td>7.62</td>
<td>0.0005</td>
</tr>
<tr>
<td>Diastolic</td>
<td>75</td>
<td>89 (10)</td>
<td>81 (8)</td>
<td>6.40</td>
<td>0.0005</td>
</tr>
</tbody>
</table>

Table 1. Mean values, standard deviations and results of paired t-test for the preoperative and postoperative systolic and diastolic BP in 75 patients with primary hyperparathyroidism

Fig. 1a, b. Patterns of incidence of individual systolic (a) and diastolic (b) blood pressure values in 75 patients with primary hyperparathyroidism. Postoperatively there is no narrowing and shifting to the left of the spectrum of the systolic and diastolic values.