

Pathophysiological Bases of Arterial Hypertension in Serious Obesity Studies on Obese Patients Treated with Biliopancreatic Diversion

M. Giammanco, M. Ernandes, D. Di Majo, G. Tabacchi, M. La Guardia

Istituto di Fisiologia e Nutrizione Umana. Università degli Studi di Palermo

Abstract

According to a great number of wide epidemiological studies, obesity increases the risk for hypertension. In our study, arterial pressure values have been pointed out in 10 patients (average age 34.4 years), who were morbidly obese (Body Mass Index over 40) and had already undergone a biliopancreatic diversion. All patients showed diastolic hypertension (values over 90 mmHg), whereas systolic pressure was high only in 2 patients (values over 160 mmHg). As a result of the biliopancreatic diversion, as expected, we have registered a significant reduction in weight during the following 4 months. An average 26,48% reduction of body weight (19,29% - 47,37%) was shown, with a reduction from 49.33 to 36.17 of mean Body Mass Index. Postoperatively, both systolic and diastolic blood pressure became normal again in all patients, although someone was still morbidly obese; no patient required antihypertensive drugs. This aggressive surgical operation, nevertheless, has fallen into disuse. Today bariatric surgery, prescribed only to seriously obese patients and in case of failure of other therapies, consists of reversible and more less disabling operations. The results are similar, when a careful selection of patients is preventively carried out. Mechanisms linking obesity to arterial hypertension are still unclear (hypervolemia; hyperactivity of orthosympathetic system; reduction of level of natriuretic atrial factor).

Introduction

The study of arterial hypertension in the obese has assumed increasing importance in recent years. Hypertension and obesity coexist among populations with major economic development (1), and they are primary risk factors for many serious and disabling pathological conditions. The association between hypertension and excess weight depends on age, gender and race. The effect

of biliopancreatic diversion on reducing blood pressure and body weight has been assessed in 10 patients with hypertension and morbid obesity.

Materials and Methods

Measurements of systolic and diastolic arterial pressure were obtained from the Riva-Rocci sphygmomanometer in 10 patients (average age 34.4 years) who were morbidly obese and had already undergone a biliopancreatic diversion. Nine of the 10 patients were women. None were diabetic or dyslipidaemic. Preoperatively, all patients suffered from diastolic hypertension, while only two patients had an elevated systolic blood pressure. Obesity can be defined as a condition in which, because of excess of adipose tissue, the body weight is 20% more than what is considered «ideal». For a more exact assessment of the weight increase it is appropriate to determine the Body Mass Index (BMI), which is the relationship between the body weight (expressed in kg) and the square of the height (expressed in cm) of the subject under examination. Normal values of the BMI range from 18.5 to 25. An overweight subject has a BMI ranging from 25 to 30. The term obesity is used if the BMI exceeds 30 and the term morbid obesity is used if it exceeds 40.

Results

As expected, there was a significant weight reduction in all patients after biliopancreatic diversion. After four months, the mean loss of body weight was 26.5 (19.3% -47.4) with a mean reduction of the BMI from 49.3 to 36.2. Postoperatively, both systolic and diastolic blood pressure became normal again in all patients. Discussion: Obesity is associated with numerous complications including hypertension, non-insulin-dependent diabetes mellitus, cardiovascular disease, dyslipidaemias and hyperuricaemia. In the obese and hypertensive subject, plasma volume increases pari passu with body mass and so does cardiac flow rate. Peripheral resistance increases inline with hypertension (2). Therefore, the obesity-hypertension association produces twice as much work for the cardiac muscle; cardiac imbalance remains a serious complication for the obese and hypertensive patient. Even a modest reduction in body

weight can improve and, in some cases, revert these disorders. Anyway, there is a reduction in risk factors and an improvement of clinical symptoms. The restriction of caloric intake is a way to decrease blood pressure. At least during the first few days of the diet, this effect seems to depend on increased urinary excretion of sodium and decreased sympathetic activity. There are many factors responsible for increased natriuresis: an increased urinary excretion of ketone bodylike anions, a close relationship between glucagon and insulin and reduced sympathetic tone (3). These effects, each in their own time, determine the reduction of circulating blood volume and cardiac flow (3). The low sympathetic tone explains the improvement in hypertension that is seen in many subjects who follow a hypocaloric diet. A decrease in blood pressure is not always obtained with medical, dietetic or pharmacological therapies. Radical operations include jejunioileal bypass (which has fallen into disuse) and biliopancreatic diversion (4). Their purpose is to reduce the surface area available for intestinal absorption. The weight reduction is both marked and lasting, but the side effects can be troublesome. From a pathophysiological standpoint, biliopancreatic diversion achieves the following: 1) a reduced gastric capacity, which influences food intake and provokes rapid dumping; 2) a reduction in the digestive

processes regulated by bile salts and pancreatic enzymes in the alimentary tract; 3) lack of a true blind loop. In the short segment of functioning distal ileum there is digestion and nutrients absorption. Since the proximal part of the intestinal tract does not receive pancreatic and biliary secretions, it can only absorb simple sugars and fatty acids in a limited way.

Key Words

obesity, hypertension, biliopancreatic diversion.

References

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