

Effects of progestogens on experimental atherosclerosis

Abstract

Calcification mechanisms and atherosclerosis is opening new frontiers in research. An experimental protocol was done to evaluate the repercussions of hormone therapy with progesterone in oophorectomized rabbits submitted to the atherogenic diet on the development of atherosclerotic lesions induced in animals. From these findings, we can conclude that the therapy with medroxy-progesterone acetate at doses of 5 and 10mg per day in oophorectomized New Zealand rabbits submitted to the atherogenic diet, revealed at the end of 90days: serum dosages - absence of changes in cholesterol and triglyceride levels; aorta - absence of differences in the area and height of the lesions, in the intima and middle layers; fewer aortas with calcium deposits; coronary arteries with smaller number of compromised arteries.

Keywords: experimental, atherosclerosis, steroid hormones, estrogens, progestogens, menopause

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Introduction

In view of the controversy between hormonal replacement in postmenopausal women and decreased cardiovascular morbidity and mortality, and the effects of estrogens associated with progesterones, or progesterone alone, we developed a protocol to evaluate the repercussions of hormone therapy with progesterone in oophorectomized rabbits submitted to the atherogenic diet, on the development of atherosclerotic lesions induced in animals.¹⁻⁶ The present study aims to report the effects of the addition of medroxy-progesterone acetate to the hypercholesterolemic diet, at doses of 5 and 10mg/day, given to oophorectomized New Zealand rabbits, regarding: serum cholesterol and triglycerides levels; analysis of atherosclerotic lesions of the aorta; analysis of atherosclerotic lesions in coronary arteries.

Methods

Forty New Zealand rabbits were oophorectomized and divided into three groups of ten animals, distributed as well: Group I, denomination given to animals fed a normal diet; Group II, which was fed an atherogenic diet containing 0.5% cholesterol; Group III, which received an atherogenic diet associated with progesterone at a daily dose of 5 mg/day, Group IV, which received an atherogenic diet associated with progesterone at a daily dose of 10 mg/day. The time elapsed between the administration of the diet, with or without progesterone until the end of the study was 90days. Samples were collected to analyze serum cholesterol and triglyceride levels in five times: Time 1, before oophorectomy; Time 2, at the beginning of the diet; Time 3 after 30days of diet; Time 4 after 60days of diet and finally, Time 5, on the day of animal sacrifice, i.e. after 90days, when the animals were sacrificed and the lesions that developed in the aorta and coronary arteries were evaluated.

Results

The results showed an increase in serum cholesterol in the four groups of animals. In groups II, III and IV, there was an increase of approximately fifteen times the baseline values, with no significant

differences between these groups. Regarding triglyceride levels, we found that group III showed a significant increase in values in Time 4, but this difference was not verified in Time 5.

When analyzing quantitatively the area occupied by the lesion, we found that there were no statistically significant differences between the groups submitted to the atherogenic diet. Regarding the height of the lesions, it was found that there was no significant difference in the thoracic and abdominal aorta. Regarding the percentage of coronary arteries committed to injury, there were a lower number of alterations in the groups treated with progesterone. Finally, analysis of the atherosclerotic plaque revealed that in the treated groups there was less calcium deposit in the intima layer. Calcification mechanistics have to be evaluated having specific treatment targets in mind.⁷

Conclusions

From these findings, we can conclude that

Therapy with medroxy-progesterone acetate at doses of 5 and 10mg per day in oophorectomized New Zealand rabbits submitted to the atherogenic diet, revealed at the end of 90days;

Serum dosages: absence of changes in cholesterol and triglyceride levels.

Aorta: absence of differences in the area and height of the lesions, in the intima and middle layers; and fewer aortas with calcium deposits.

Coronary arteries: smaller number of compromised arteries.

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Conflicts of interest

No conflict of interest.

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