Cardiac and endocrine features of Turner syndrome

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ABSTRACT

The present clinical trials were initiated and performed by Department of Endocrinology and Diabetes and Medical Research Laboratories, Aarhus University Hospital, Denmark.

Turner syndrome (TS) occur in phenotypic females, missing all or part of one sex chromosome and is estimated to occur in 1/2000 live female births. Most present with short stature and premature ovarian failure. An increased risk of congenital heart disease, most often bicuspid aortic valves (18-32%) and coarctation (2-12%), is also linked to the syndrome and in combination with hypertension and other risk factors is believed to increase morbidity and mortality in this patient-group. The risk of aortic dissection is greatly increased in TS.

To further elucidate the frequency of aortic dilatation a prospective observational study was initiated including 102 women with TS. Magnetic resonance imaging was used to visualize the entire length of the thoracic aorta, measure the diameter at fixed points. Aortic diameter was not significantly different in TS compared to controls, despite the smaller body size. Separating the TS group in two, depending on the morphology of the aortic valve (bicuspid or tricuspid), the aortic diameter was significantly greater in TS with bicuspid aortic valves. Multiple linear regression found blood pressure, bicuspid aortic valve and age to be main explanatory variables of aortic diameter. Hypertension was present in 54% of TS and bicuspid aortic valves in 26/102 (25%). Aortic dilatation was found in 22/95 (23%) and an aortic aneurism diagnosed in 2/95 (2%).

In part II a subgroup from the previous study (n=75) of women with TS not receiving antihypertensive treatment was selected. Hypertension was present in 60% of TS and 46% of controls. Nocturnal hypertension was predominant in TS, whilst daytime hypertension was most frequent in controls. A reduced heart rate variability was present in TS compared to controls. No differences in glucose or lipid measures was found.

Glucose metabolism has been shown to be impaired in TS in previous studies, and combined with epidemiological evidence of an increased risk of diabetes in TS, a study of insulin sensitivity and β-cell function in 13 women with TS was initiated. An impaired glucose tolerance was present in 2/13 (15%) TS (none of the controls) by oral glucose tolerance testing. Insulin sensitivity was similar between groups. A discrete reduction in first phase insulin secretion was found during an intravenous glucose tolerance test, but no difference between groups was demonstrated by β-cell stimulation.

In conclusion women with TS are at an increased risk of morbidity in several disease areas. The above studies provide important new information on risk factors regarding aortic dilatation and aneurism in TS. As regards diabetes in TS we only found discrete changes in β-cell function and no difference in insulin sensitivity. The importance of monitoring these women has been confirmed by these studies.