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Effect of prenatal cigarette smoke exposure on the architecture of the heart in juvenile Wistar rats

OG Olaiya, AH Adebiji

Abstract

This study aimed at determining the effects of cigarette smoke exposure during pregnancy on the morphology of the developing heart. Twelve adult female Wistar rats were used for the study. The animals were time mated and grouped into three: a control (A) and two treatment groups (B and C). The treatment groups were exposed to smoke from 2 sticks of cigarette (St. Moritz®) on days 8 – 14 (Group B) and days 15-21 (Group C) of the gestation. Each stick of cigarette contained an average of 0.8375 g of tobacco. The pregnant rats were allowed to litter, and at postnatal day 15, pups from all the groups were sacrificed by cervical dislocation, the chest wall was dissected and the heart was excised and either placed in 10% formal saline fixative for histological preparation using Haematoxylin and eosin staining techniques, or 0.25 M cold sucrose solution and homogenised for enzyme study on the activity of lactate dehydrogenase using the colorimetric method. The pups exposed to cigarette smoke in utero had low birth and body weights, and markedly reduced cardiac weight. Considerable disruptions of the architecture of the heart were also seen, with poorly stained and reduced sizes of cardiac myocytes. Prenatal cigarette smoke exposure impairs the normal development of the heart with subsequent possibility of postnatal suboptimal functionality.

Keywords: Gestational cigarette exposure, heart, histology, lactate dehydrogenase

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