The European Journal of Pathology

24th European Congress of Pathology

Pathology - Science for Patients

8-12 September 2012

SPOLECNOST CESKYCH PATOLOGU

European Society of Pathology

PS-18-014

Morphogenetic biomineralization aspects in the human heart valve affected by atherosclerosis

A. Romanuk , R. Moskalenko, S. Danilchenko, 0. Romanyuk, Y. Moskalenko, S. Romanyuk

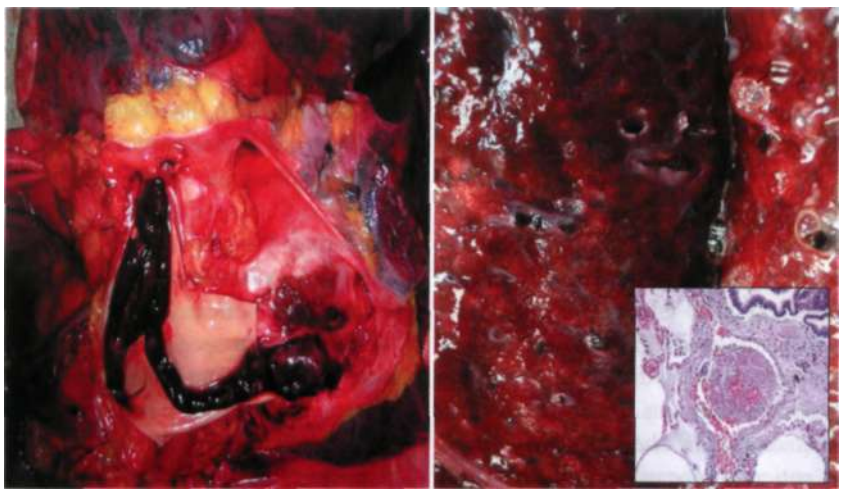
*Sumy State University, Dept. of Pathology, Ukraine

Objective: From January 2000 to December 2009 (Institute of Pathology and Legal Medicine, Paolo Giaccone - Palermo) 57 autopsies were performed on 37 males and 20 females who died of a massive PTE.

Method: Systematic autopsy.

Results: Saddle pulmonary thrombosis in 33 cases, in 24 isolated in both the main pulmonary arteries. In all cases the transverse heart diameter was 1,5-2 cm superior to the longitudinal one, the interventricular septum became rectilinear with a right ventricular dilation. The coronary artery anatomy was: critical stenosis through fibroatheromatous plaque of the dominant right coronary artery (RCA, 2), non dominant left coronary artery (LCA, 3); non critical stenosis of RCA (14), LCA (8); absence of stenosis (30). Histological ventricular examination showed hypoxic-ischaemic and/or reperfusion and overload lesions. In all cases, the lungs showed plurifocal occlusive thrombosis of intramural pulmonary arterial (IPA) vessels associated with adjacent infarctual necrosis (49); acute partially haemorrhagic basal oedema (35) and desquamative macrophagic alveolitis (28).

Conclusion: In all cases of massive PTE the thrombosis of IPA vessels associated with an adjacent infarction (86 %) is constant. This suggests that death is nearly always preceded or triggered by one or more episodes (clinically silent or with non specific symptoms) of thromboembolism of IPA vessels.



PS-18-013

Cardiac findings in routine fetal autopsies: More than it meets the eye?

E. Rios , C. Bartosch, C. Ramalho, J. Monterroso, O. Brandao

Centro Hospitalar S Joao, Pathology, Porto, Portugal

Objective: Congenital heart disease (CHD) is the most common malformation in newborns. Our aim was to evaluate the spectrum of CHD in consecutively performed fetal autopsies and to correlate prenatal and postmortem diagnoses.

Method: A retrospective study of 726 fetal autopsies was performed in a tertiary referral hospital. CHD was classified in seven categories: left ventricular outflow tract obstruction-LVOTO, right ventricular outflow tract obstruction-RVOTO, septal defects, connection anomalies, conotruncal anomalies, complex anomalies and others. Cardiac defects were also classified as isolated or associated with others anomalies.

Results: CHD was identified in 99 (13.6 %) fetuses. Most common categories were septal defects and complex anomalies. Associated anomalies were found in 67 fetuses (67.7 %). In this group, septal defects were the most common CHD, frequency being significantly higher than in the group of isolated cardiac anomalies *(p=0.0l2)*. Comparison of prenatal and postmortem diagnoses (50 cases) showed complete or partial agreement in 36 and 10 cases (72 % and 20 %, respectively) and complete disagreement in 4 cases (8 %). In the latter group, prenatal diagnosis had not been done by a pediatric cardiologist.

Conclusion: The high prevalence of CHD in lost pregnancies highlights the importance of systematic fetal autopsy performed by a specialized pediatric pathologist.

PS-18-014

Morphogenetic biomineralization aspects in the human heart valve affected by atherosclerosis

A. Romanuk , R. Moskalenko, S. Danilchenko, O. Romanyuk, J. Moskalenko, S. Romanyuk

Sumy State University, Dept. of Pathology, Ukraine

Objective: The appearance of pathological calcification, which leads to significant changes of vascular wall, which underlie the development of atherosclerotic complications, has a great importance in the morphology of atherosclerosis development. Purpose of the work is the study of pathological biomineralization in heart valves affected by atherosclerosis.

Method: The study was conducted on sectional material of mitral and aortic valves obtained during autopsy. The tissue of heart valves was studied by methods of histology, electron microscopy, X-ray diffraction, infrared spectroscopy.

Results: Macroscopically mitral and aortic valves are thickened, opaque, dull whitish, sometimes with deformity and ulceration. Histology observed the formation of atherosclerotic plaques, fibrous changes, and inflammatory infiltration. According to X-ray phase analysis biominerals in heart valves are represented by apatite crystalline phase. Sizes of crystals have distinct age dependence. The results of infrared spectroscopy revealed absorption bands of carbonate apatite replacement; in all instances they correspond to the type of substitution B (C03 2- replaces P04 3-).

Conclusion: The study of pathological mineral formations on human heart valves by the range of morphological and physicochemical methods show that they are aggregates of interacting organic and mineral components, their ratio changes with "maturation": the organic component decreases and the mineral component, represented by carbonate containing hydroxyapatite doped with chlorine grows while improving, so the process is dynamic.

PS-18-015

Relationship between myocardial injury, oxidative stress mechanism and sepsis/septic shock in infants submitted to surgery for congenital heart defects

M. Silva de Oliveira*, E. Medeiros Floriano, P. Henrique Manso, R. Nilsson Sgabieri, J. Guilherme Klamt, E. Zangiacomi Martinez, W. Vilella de Andrade Vicente, S. Gusmao Ramos

University of Sao Paulo, Dcpt. of Pathology, Ribeirao Preto, Brazil

Objective: A progressive ventricular dysfunction caused by ischemic myocardial injuries remains one of the leading causes of death during the postoperative course in congenital heart disease (CHD). The aim of this study was to investigate the role of oxidative stress in these myocardial injuries.

Method: Myocardial injuries and oxidative stress mechanisms were assessed by histopathology and immunohistochemistry and quantified by morphometrical analyses.

Results: Myocardial injury was observed in pediatric patients submitted to surgery for CHD with cardiopulmonary bypass, followed by lethal exit. Oxidative stress mechanisms were directly related to these particular types of myocardial injuries. Importantly, 4- hydroxynonenal (4-HNE), a marker of lipid peroxidation, is strongly expressed, especially in irreversible myocardial lesions. Although morphologically similar, myocardial injuries observed in patients who evolved with sepsis in the peri-operatory period exhibited a completely different set of oxidative stress mechanisms. Increased concentrations of nitrotyrosine protein adducts were observed in these patients, suggesting that peroxynitrite-mediated protein nitration may be the predominant oxidative stress mechanism found in these situations.

Conclusion: The underlying mechanisms of these lesions seem to be related to the development of ischemia or ischemia/reperfusion followed by oxidative stress mechanisms that vary depending on whether sepsis was present. While the exact mechanism is not fully understood, it has been suggested that endogenous catecholamine release could have a role in this process.

PS-18-018

Increase of ABCG2/BCRP + side population stem cells in the myocardium after ventricular unloading

J. Wohlschlaeger , B. Levkau, J. Stypmann, C. Schmid, H. Milting, K. W. Schmid, H. A. Baba

Universitatsklinik Essen, Inst, fur Pathologie, Germany

Objective: A significant decrease of the mean cardiomyocyte DNA content and increased numbers of diploid cardiomyocytes after ventricular unloading was demonstrated, suggesting a numerical increase of cardiomyocytes. The heart harbours several stem cells populations including c-kit (CD 117) + cells and side population cells (SPC), that might proliferate after unloading and generate diploid cardiomyocytes. It was tested, whether there is an increase of ABCG2+ SPC and CD117+ cells after unloading.

Method: In paired myocardial samples (before and after LVAD), the number of cells with immunoexpression of ABCG-2, c-kit/CD 117 and MEF-2 was assessed by immunohistochemisrp* and morphometrically determined.

Results: A significant increase of SPC and cells with coexpression of c-kit and MEF-2 after unloading was observed (jt7=0.001). A significant positive correlation between both SPC and cells with coexpression of c-kit and MEF-2 expression was observed (p=0.007 and 0.01). No correlation was found between the number of SPC and the mean cardiomyocyte DNA content.

Conclusion: SPC are significantly increased in the myocardium after ventricular unloading, suggesting a role of stem cell proliferation during "reverse cardiac remodelling". These cells might proliferate and commit to different cell lineages such as cardiomyocytes or endothelium, and thus ameliorate cardiac function.