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Is oxidative stress important in AAA pathogenesis?

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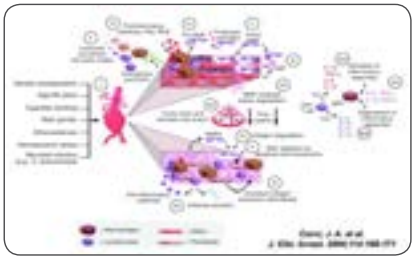
Objective: Active investigations continue to identify markers other than size that would predict a risk of AAA rupture. Circulating biomarkers could also indicate optimal intervals between the surveillance intervals. Finally, the identification of biomarkers also may identify potential pathogenic pathways, and thus may open possibilities for pharmacological inhibition of growth. In the search of novel biomarkers of AAA progression, serum and wall material proteins were analyzed by a differential proteomic approach.

Methods & Results: Same layers of AAA wall from ruptured (rAAA) and non-ruptured AAA were incubated, and the proteins released were analyzed by 2-dimensional difference in-gel electrophoresis. Proteins from serum were analyzed and correlated with AAA annual expansion rate. Several differentially expressed proteins involved in main AAA pathological mechanisms (proteolysis, oxidative stress, and thrombosis) were identified by mass spectrometry. Among the proteins identified, peroxiredoxin-2 (PRX-2) was more permanent, which was further validated by Western blot and immunohistochemistry. We demonstrated increased PRX-2 serum levels in rAAA patient wall material compared with AAA subjects and also positive correlation in serum among PRX-2 and AAA diameter and annual expansion rate. Finally, a prospective study revealed a positive correlation between PRX-2 serum levels and AAA expansion rate.

Conclusions: Several proteins associated with AAA pathogenesis have been identified by a proteomic approach. Protein profiles identified in the serum would appear to be a convenient monitoring tool that has the ability to be both sensitive and specific for AAAs. Among them, PRX-2 serum levels are increased in AAA patients and correlate with AAA size and growth rate, suggesting the potential use of PRX-2 as a biomarker for AAA evolution.



Recent Publications

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2. Martinez Pinna R, Ramos Mozo P, Madrigal Matute J, Blanco Colio L M, Lopez J A, Calvo E, et al. (2011) Identification of peroxiredoxin 1 as a novel biomarker of abdominal aortic aneurysm. Arterioscler Thromb Vasc Biol. 31(4):935 43.

3. Urbonavicius S, Lindholt J S, Delbosc S, Urbonaviciene G, Henneberg E W, Vorum H, et al. (2010) Proteins associated with the size and expansion rate of the abdominal aortic aneurysm wall as identified by proteomic analysis. Interact Cardiovasc Thorac Surg. 11(4):433 41.
4. Urbonavicius S, Lindholt J S, Vorum H, Urbonaviciene G, Henneberg E W and Honore B (2009) Proteomic identification of differentially expressed proteins in aortic wall of patients with ruptured and nonruptured abdominal aortic aneurysms. J Vasc Surg. 49(2):455-63.
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Biography

S Urbonavicius MD, PhD is a Consultant Vascular Surgeon at Regionshospitalet Viborg and clinically Associated Professor at Aarhus University in Denmark. He has many years of experience in research, teaching, and administration both in hospital and educational institutions. His passion in improving the health and wellbeing of his patients has let to many research projects with outcomes that have had impact on finding new methods of diagnosing and monitoring diseases, inhibition of disease progression, and possible new treatment methods for vascular diseases.

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