

The association of neutrophil activation markers and morphological features of aortic aneurysm

Wolf Eilenberg

Dept. of Surgery, Div. of Vascular Surgery

Medical University of Vienna

Vienna General Hospital, A-1090 Vienna, Austria



MEDICAL UNIVERSITY
OF VIENNA



Disclosure

Speaker name: WOLF EILENBERG

I have the following potential conflicts of interest to report:


- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest

Role of Neutrophils in AAA Pathogenesis

- Neutrophil depletion inhibits AAA formation (mouse)
(Eliason et al. 2005 *Circulation*)
- Elevated levels of neutrophil activation markers in plasma of AAA patients
 - **MPO**: myeloperoxidase (Vega de Ceniga et al. 2014)
 - **NGAL**: neutrophil gelatinase associated lipocalin (Ramos-Mozo et al. 2012)
 - **Elastase**: (Lindquist et al. 2018)
 - **MMP9**: matrix metalloproteinase 9 (Stather et al. 2014)

Morphometric Parameters of AAA

Characteristics	
Maximum diameter aneurysm	
Maximum diameter ILT	
Proportion circumference ILT cluster	
Craniosacral expansion AAA (H)	
Prox. aneurysmal neck (L)	
Prox. aneurysmal neck (d)	
Alpha (flow direction at A. ren. Inf.)	
Beta (flow direction aneurysm entrance)	
Neck Ratio (H/d)	
Volume thrombus	
Volume aortic segment	
Proportion thrombus/aortic segment	
Iliac arteries involved	
Aorta suprarenal involved	
Aneurysm type	

Study Design



Inclusion Criteria

- Diagnosed AAA (N=30)
- Scheduled for surgical repair



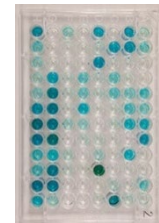
Exclusion Criteria

- Tumour (<1 year)
- Chemotherapy (<1 year)
- Haematological disease
- Transplant recipients
- Autoimmune disease



Blood Collection

- Plasma
- Serum



Marker Analysis

Plasma

- ELISA
- **MPO, NGAL and elastase**

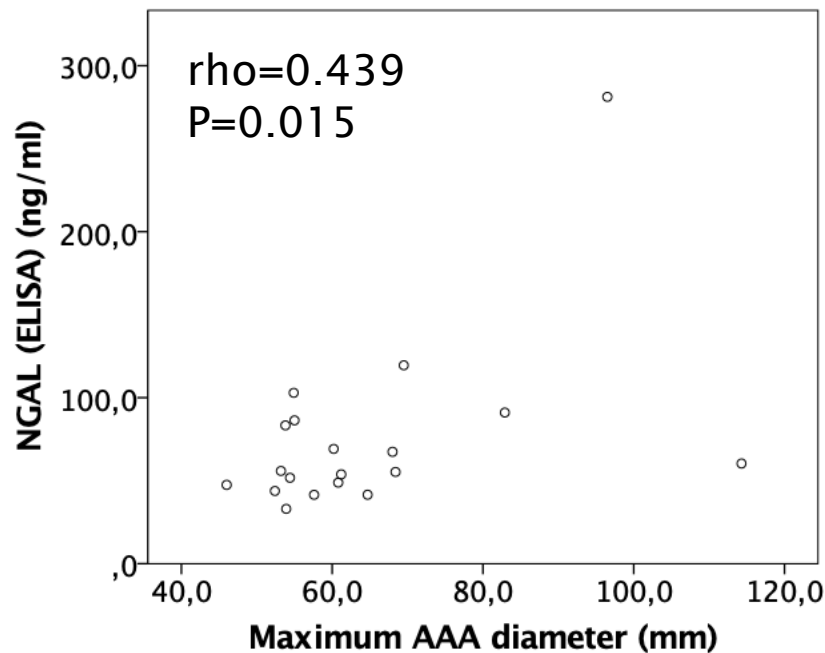


Morphometric

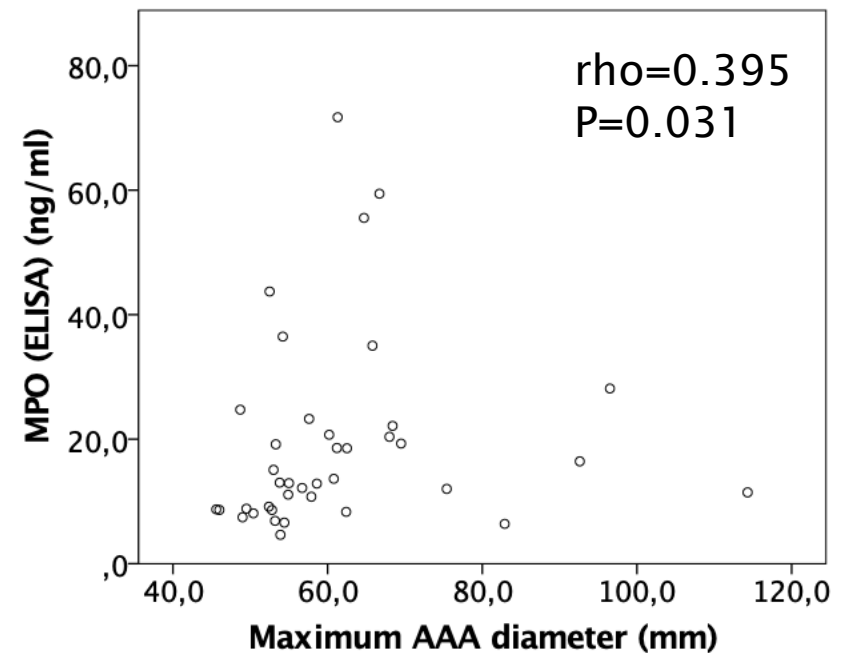
CTA analysis

Correlation of Neutrophil Activation Parameters with AAA Morphometrics

NGAL

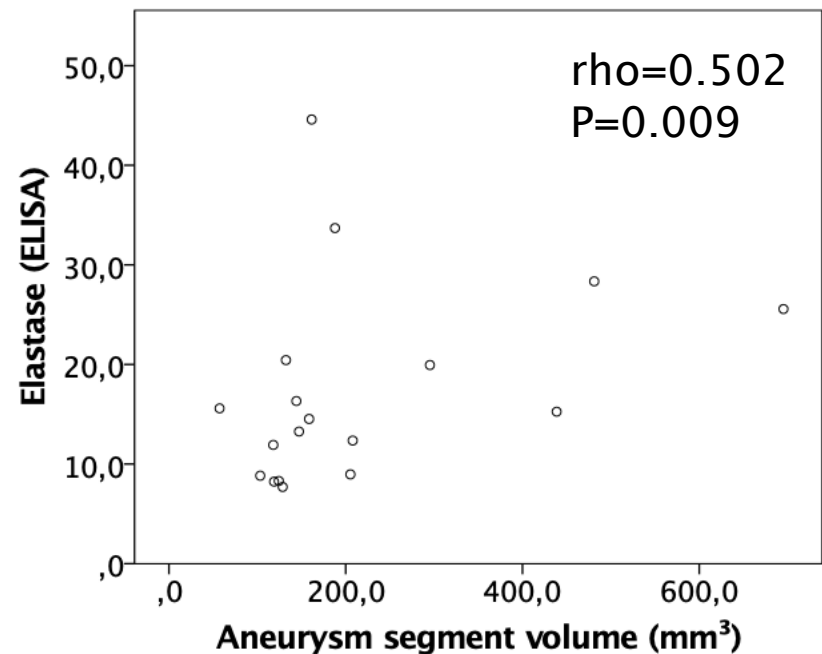
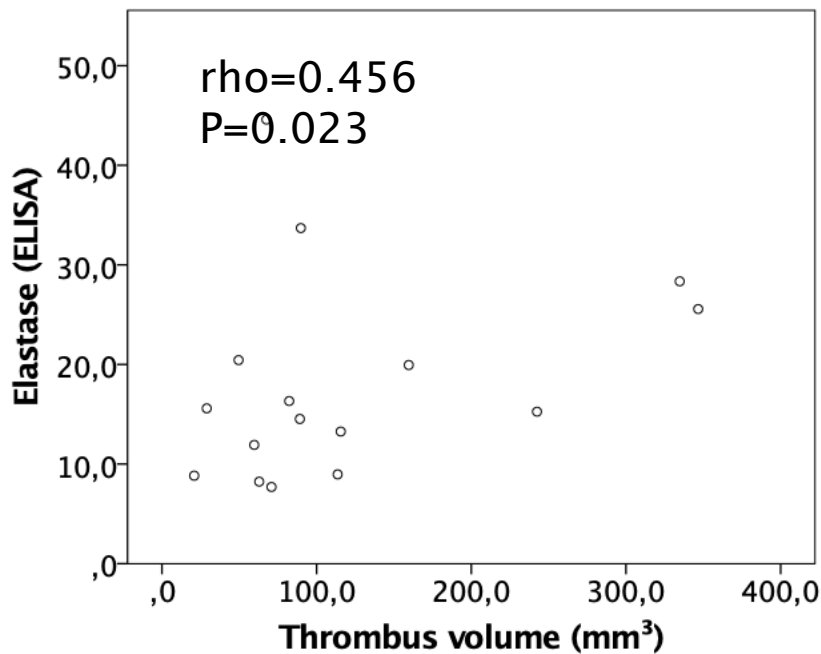


MPO



Correlation of Neutrophil Activation Parameters with AAA Morphometrics

Elastase



- aneurysm length (rho=0.411, p=0.03, n=28)
- neck ratio (rho=0.369, p=0.070, n=25).

Conclusions

- I. Neutrophil activation markers MPO and NGAL show significant associations with max. AAA diameter

- II. Neutrophil elastase correlates with multiple morphometric AAA variables such as aneurysm length, segment volume and thrombus volume
 - central role in AAA pathophysiology
 - destruction of matrix proteins
 - promoting prothrombotic reactions
(ILT as biologically active compartment)

Acknowledgements

Laboratory

Christine Brostjan
Patrick Kirchwegger
Luca Martelanz
Sonja Bleichert
Marie-Therese Grasl
Branislav Zagraban
Hubert Hayden
Renata Rajic
Sarah Hetzer
Paimann Nawrozi
Johannes Klopff
Andreas Scheuba
Peter Teubenbacher
Markus Weigl

Clinics

Christoph Neumayer
Josif Nanobachvili
Christoph Domenig
Ihor Huk
Christopher Burghuber
Markus Klinger
Bernd Gollackner
Harald Teufelsbauer

Biomedical Statistics

Georg Heinze
Alexandra Kaider

Core Facility Imaging

Sabine Rauscher
Marion Gröger

SFB Members

Ingrid Pabinger
Bernd Gilma
Irene Lang
Lisa-Marie Mauracher
Lena Hell
Thomas Hofbauer

FWF SPECIAL RESEARCH PROGRAMME SFB-54: "INTHRO"
Mediators Linking Inflammation and Thrombosis