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
Speaker name: WOLF EILENBERG

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
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☐ 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

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

\[ \rho = 0.439 \quad P = 0.015 \]

\[ \rho = 0.395 \quad P = 0.031 \]
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)
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