Progress In 18F-FDG Uptake On PET CT And Other Markers In Predicting AAA Rupture Risk

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Disclosures
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Positron Emission Tomography (PET) with 18F-Flurodeoxyglucose (FDG)

MODIFICATIONS OF THE EXTRACELLULAR MATRIX OF ANEURYSMAL ABDOMINAL AORTAS AS A FUNCTION OF THEIR SIZE

Sakalihasan et al; Eur J Vasc Endovasc Surg 1993;7:633-637
Sakalihasan et al, Eur J Vasc Surg 1999
Defawe OD,… Sakalihasan N,Clin Nucl Med 2005
Xu Y,… Sakalihasan N, Eur J Vasc Endovasc Surg 2010
Courtois A et al; JNM 2013, Nchimi A,… Sakalihasan N. Circ Cardiovasc Imaging. 2013

Vascular wall injury and Inflammatory Processes

The rupture of an AAA occurs at a hot spot characterized by an altered expression of a panel of connective tissues genes.

Site of aortic aneurysm rupture and High 18F-FDG uptake

Functional imaging and inflammatory cells

Biological evaluation of PET-CT as a predictive tool for the rupture of abdominal aortic aneurysm (AAA)

Over 90% of AAA rupture in areas away from the largest diameter

<table>
<thead>
<tr>
<th>No</th>
<th>Sex</th>
<th>Age</th>
<th>PET-Scan delay</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>70</td>
<td>6 months</td>
<td>Rapid expansion</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>60</td>
<td>6 months</td>
<td>Rapid expansion</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>64</td>
<td>6 months</td>
<td>Leaking AAA</td>
</tr>
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<td>M</td>
<td>70</td>
<td>24 months</td>
<td>Ruptured AAA</td>
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<td>M</td>
<td>77</td>
<td>36 months</td>
<td>Painful AAA</td>
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<tr>
<td>6</td>
<td>M</td>
<td>60</td>
<td>&lt; 2 months</td>
<td>Painful AAA</td>
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<tr>
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<tr>
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<td>69</td>
<td>2 days</td>
<td>Painful AAA</td>
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<tr>
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<td>M</td>
<td>84</td>
<td>60 months</td>
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</tbody>
</table>
Circulating microRNA expression signature in PET positive abdominal aortic aneurysms: new potential biomarkers

Audrey Courtois, Betty Nusgens, Roland Hustinx, Jean-Olivier Defraigne, Alain Colige, Natzi Sakalihasan

If circulating miRNAs were significantly correlated with the uptake of FDG measured by the ratio between the Standardized Uptake Value (SUV) in the aneurysmal wall and the SUV in the liver (n=41)

Hypothetical pathway of AAA Rupture

Multimodality imaging assessment of the deleterious role of the intraluminal thrombus on the growth of abdominal aortic aneurysm in a rat model

Eur Radiol. 2015 Sep 22.
Conclusions

18F-FDG uptake assessed by PET/CT in abdominal aortic aneurysms is associated with cellular and molecular alterations prefacing wall deterioration and rupture.

New factors, including CCL18, involved in the progression of AAA and, potentially, in their rupture were identified by a genome-wide analysis of PET-positive and -negative human aortic tissue samples.

PET imaging provides crucial information on the risk of AAA rupture.