Ethyl glucuronide vs fatty acid ethyl esters concentrations in hair of a dialysis patient

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Case report

- Dialysis patient
- Candidate for kidney transplantation
- Impaired liver tests
- Septal fibrosis

Ethyl glucuronide (EtG) and fatty acid ethyl esters (FAEE) in hair in order to
- Evaluate long-term alcohol consumption
- Evaluate patient’s suitability for kidney transplantation

Results

<table>
<thead>
<tr>
<th>Hair sample</th>
<th>Concentration (pg/mg)</th>
<th>Interpretation</th>
<th>EtG</th>
<th>Concentration (ng/mg)</th>
<th>FAEE</th>
<th>Patient’s self report</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd April 2014</td>
<td>2332 pg/mg</td>
<td>Chronic excessive alcohol consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd May 2014</td>
<td>2362 pg/mg</td>
<td>Chronic excessive alcohol consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd December 2014</td>
<td>2261 pg/mg</td>
<td>Chronic excessive alcohol consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th March 2015</td>
<td>1818 pg/mg</td>
<td>Chronic excessive alcohol consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

- Ethyl glucuronide (EtG) concentrations in hair
- Fatty Acid Ethyl Esters (FAEE) concentrations in hair

Should this patient receive a renal transplantation?

If patient consumes excessive amounts of alcohol, as EtG concentrations in hair indicate, septal fibrosis will progress to liver cirrhosis.

As liver condition influences the success of renal transplantation (e.g. drug metabolism), transplant failure is probable.

If patient only occasionally consumes alcohol, as FAEE concentrations in hair indicate, renal transplantation should be considered.

Further patient monitoring necessary to enable decision about renal transplantation.

Methods

- Hair samples
  - Collected on 4 occasions
  - Analyzed for the presence of EtG and FAEE
  - Results compared to self-reported alcohol consumption

- EtG
  - Decontamination
  - Pulverization
  - Extraction with ultrasonication in water
  - Solid-phase extraction with Oasis MAX cartridges
  - Pentfluoropropionic anhydride derivatization
  - Gas chromatography coupled to mass spectrometry (GC-MS)
    - In negative chemical ionization mode
    - LOD: 2.7 pg/mg

- FAEE
  - Sum of 4 esters: ethyl myristate, ethyl palmitate, ethyl oleate and ethyl stearate
  - Decontamination
  - Pulverization
  - Liquid-liquid extraction with dimethylosulphoxide and n-heptane
  - Headspace solid-phase microextraction
  - GC-MS
    - LOD: 0.027 – 0.087 ng/mg

Conclusion

False positive diagnosis of excessive alcohol consumption: serious consequences for patient

Careful interpretation of positive hair EtG concentrations in patients with kidney disease!
- Especially in cases where results do not match self-reported consumption
- Include medical records and additional markers to increase reliability

FAEE in hair as a primary biomarker in patients with kidney disease?
- Potentially useful, but further research is necessary

References


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