

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

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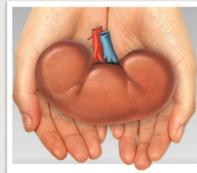


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Introduction

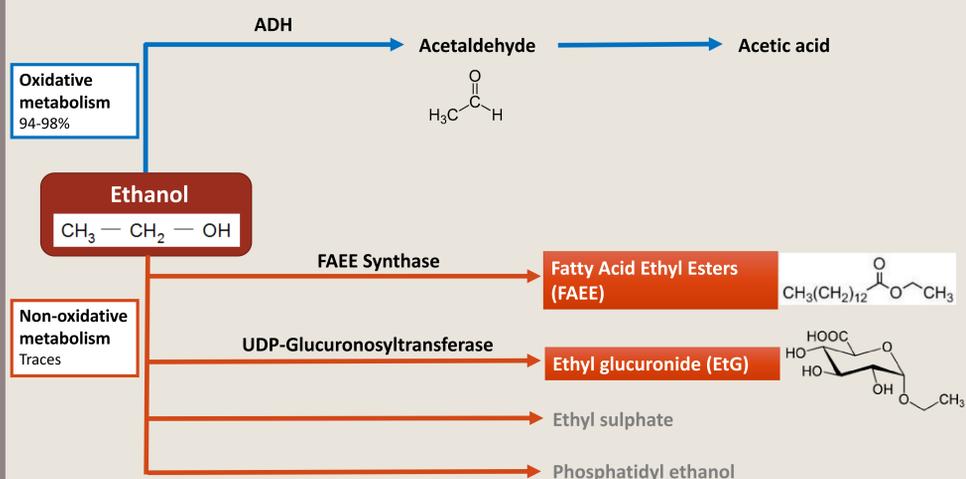
Case report

- 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

Hair sample	EtG		FAEE		Patient' self report
	Concentration	Interpretation	Concentration	Interpretation	
1 st April 2014	2332 pg/mg	Chronic excessive alcohol consumption	Not determined	/	Occasional alcohol consumption
2 nd May 2014	2362 pg/mg		Not determined	/	
3 rd December 2014	2261 pg/mg		0.81 ng/mg	Occasional alcohol consumption	
4 th March 2015	1818 pg/mg		0.65 ng/mg	Occasional alcohol consumption	Abstinence for > 1 month

Chronic excessive alcohol consumption (> 60 g ethanol/day over several months)
 • EtG ≥ 30 pg/mg
 • FAEE ≥ 1 ng/mg



Discussion

EtG concentrations in hair

= Chronic excessive alcohol consumption

Observations in earlier studies
 • Patients with decreased kidney function → delayed EtG excretion → higher blood EtG concentrations^[3]
 • Patients with decreased kidney function → higher EtG concentrations in hair^[4]

Self-reports
FAEE concentrations in hair

= Occasional alcohol consumption

Hypotheses
 • FAEE not influenced by renal condition?
 • FAEE more reliable in case of chronic renal failure?

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
- Pentafluoropropionic anhydride derivatization
- Gas chromatography coupled to mass spectrometry (GC-MS)
 - In negative chemical ionization mode
 - LOQ: 2.7 pg/mg^[1]



FAEE

- = sum of 4 esters: ethyl myristate, ethyl palmitate, ethyl oleate and ethyl stearate
- Decontamination
- Pulverization
- Liquid-liquid extraction with dimethylsulfoxide and n-heptane
- Headspace solid-phase microextraction
- GC-MS
 - LOQ: 0.027 – 0.087 ng/mg^[2]

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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