ASSESSMENT OF URINARY VOLATILE ORGANIC COMPOUNDS: A NON-INVASIVE TOOL FOR DISCRIMINATION OF TYPE 2 DIABETES MELLITUS (T2DM) AND METABOLIC DYSFUNCTION ASSOCIATED FATTY LIVER DISEASE (MAFLD)-FREE T2DM

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Urinary volatile organic compound profiling distinguished patients with MAFLD, type 2 diabetes, and both conditions, revealing unique metabolite signatures when the two diseases coexist.

KEY POINTS

- In a study of 13 patients per group (all with hyperinsulinemia >24 microU/ml), 21 urinary metabolites differed significantly between MAFLD/T2DM patients versus T2DM alone (p=0.021) or MAFLD alone (p=0.031) when extracted under alkaline conditions.
- Specific metabolites elevated in MAFLD/T2DM versus T2DM included 1-pentanol, pyridine, dimethyl sulfone, and 1-piperidine carboxaldehyde; 3-heptanone and 3-octane were lower in MAFLD/T2DM versus MAFLD alone.
- The distinct VOC signatures suggest that MAFLD and T2DM coexistence is not simply additive but involves specific pathogenetic mechanisms warranting further exploration.
- Urinary VOC profiling using headspace solid-phase microextraction coupled with gas chromatography-mass spectrometry may offer a non-invasive tool to discriminate insulin-resistant metabolic phenotypes.

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