

Bile Acid Pattern – Quantification of Unconjugated, Glycine- and Taurine-conjugated Bile Acids

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Purpose: Differentiated quantification of the five most common bile acids as well as their glycine- and taurine-conjugated derivatives can be of clinical benefit for the diagnosis of selected cholestatic disorders and other diseases affecting bile acid metabolism. Furthermore, the bile acid pattern can also be useful in experimental and clinical research.

Methods: A HPLC-(tandem) mass spectrometry method was developed for the quantification of unconjugated as well as glycine- and taurine-conjugated cholic, chenodeoxycholic, deoxycholic, ursodeoxycholic and lithocholic acid, respectively. Preliminary normal ranges were determined in 21 healthy volunteers (10 men and 11 women; mean age, 34 years) with serum cholesterol concentration < 6.2 mmol/l (mean, 4.5 mmol/l) and 84 healthy individuals from an epidemiological cohort.

Results: The following serum concentrations (range; $\mu\text{mol/l}$) of unconjugated, glycine- and taurine-conjugated bile acids were found in 21 healthy volunteers:

	unconj. bile acids ($\mu\text{mol/l}$)	glycine-conj. bile acids ($\mu\text{mol/l}$)	taurine-conj. bile acids ($\mu\text{mol/l}$)
cholic acid	0.009-0.497	0.058-0.971	n.d.a-0.433
chenodeoxycholic acid	0.028-1.258	0.142-3.421	0.022-0.620
deoxycholic acid	0.013-1.596	n.d.a-0.909	n.d.a-0.177
ursodeoxycholic acid	n.d.a-0.371	n.d.a-0.796	n.d.a-0.023
lithocholic acid	n.d.a-0.034	n.d.a-0.060	n.d.a-0.003

an.d., not detected

Conclusions: Our sensitive and selective HPLC-(tandem) mass spectrometry method allows the quantification of unconjugated and conjugated bile acids in serum samples of healthy and diseased people. This bile acid pattern can provide useful diagnostic information when incorporated in the battery of standard liver function tests and be helpful for clinical research.