Kinetic analysis of biliary lipid excretion in man and dog.

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Research Article

To understand better the mechanisms involved in biliary lipid excretion and to evaluate their role in cholesterol gallstone formation, the rates of biliary excretion of bile salts, cholesterol, and phospholipids were measured in two species, man and dog. Seven cholecystectomized patients with balloon-occludable reinfusion T-tubes were studied during intact and interrupted enterohepatic circulation and four cholecystectomized dogs were studied during interrupted enterohepatic circulation. In man and dog both cholesterol and phospholipid outputs were hyperbolically related to bile salt output by the equation $y = x/(a + bx)$. The output curves intersected the origin and showed an initial rapid rise, followed by a slower increase to a maximum, suggesting a rate-limited mechanism. The shape of the curves permitted calculation of the theoretical maximal outputs and the rates of rise to those outputs. Comparison of these values showed that in both man and dog phospholipid output was greater than cholesterol output and that cholesterol and phospholipid were excreted at different rates. These studies (a) indicate that cholesterol, phospholipids, and bile salts are not excreted in a fixed relationship and (b) demonstrate the usefulness of the derived theoretical maximal lipid output, and the rate of rise of lipid excretion to a maximum, in evaluating the kinetics of biliary lipid excretion.