Viscosity of human bile sampled from the common bile duct

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Cholestasis is a frequent gastroenterological problem, which is tackled by endoscopic procedures. Little is known about bile viscosity, a major determinant of its flow. We measured the viscosity of bile from the common bile duct during endoscopic retrograde cholangiography. Bile was aspirated immediately after cannulation of the papilla and deep-frozen. Viscosity was measured with a rotational viscometer at 37 degrees C and a broad range of shear rates (0.08-69.5 s(-1)). The majority of the 138 patients (64.5%) had bile viscosities between water (0.7 mPa.s) and the lower limit of plasma (1.1 mPa.s). In 20 patients (14.5%) it was above that of plasma (>1.4 mPa.s), and showed a non-Newtonian behaviour, i.e. the viscosity increased exponentially with decreasing shear rate. Cholecystectomized patients had a lower bile viscosity. Bile viscosities did not differ between patient groups with either choledocholithiasis, sludge, cholangitis, biliary pancreatitis, pancreatic carcinoma, or cholangiocarcinoma. We conclude that bile viscosity in the common bile duct is usually lower than that of plasma, in 15% it is higher and increases exponentially with decreasing flow rate, which may lead to a vicious cycle.

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