Ethanol-Induced Water Diuresis: One of a Spectrum of Renal Defects Resulting from Ethanol Toxicity

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Dear Sir,

A polyuric state due to ethanol has been known for several years [1] but there are conflicting reports in literature regarding its pathogenetic mechanism. Eisenhofer and Johnson [2] suggested that ethanol-induced water diuresis is due to inhibition of antidiuretic hormone release. Linkola et al. [3] reported that the diuretic effect of ethanol may occur without reduction of vasopressin levels. Since ethanol may affect prostaglandin synthesis [4], studies were undertaken to determine whether diuresis due to ethanol was mediated by enhanced renal synthesis of prostaglandin E₂ (PGE₂), a potent vasopressin antagonist.

We were very interested in the article by Zawada et al. [5]. These authors investigated urine output, urine osmolality, sodium, potassium and PGE₂ excretion in rabbits during four periods: (1) control, (2) indomethacin administration, (3) ethanol administration and (4) ethanol and indomethacin administration. Ethanol administration produced a significant increase in the urine flow rate which was not prevented by indomethacin. In addition, urinary PGE₂ excretion did not increase during ethanol administration despite the high urine flow rate is considered to be a stimulus to renal prostaglandin synthesis and excretion. On this basis, Zawada et al. [5] concluded that not only the water diuresis produced by acute ethanol administration is not mediated by enhanced renal PGE₂ production, but also demonstrated a suppressive effect of ethanol on renal prostaglandin synthesis. We report here our experience in a department of medicine where, between 1983 and 1985, we studied approximately 200 chronic alcoholics. In a previous investigation [6], we reported that in alcoholism hypocalcemia is often associated with an increased fractional urinary excretion of calcium. Three-fifths of severely dependent alcoholics and a quarter of those with mild dependence had a urine calcium to urine creatinine ratio exceeding the upper normal limit of 0.12. Furthermore, in a significant percentage of alcoholics, we observed an apparently unexplained alkaline urine pH. These findings prompted us to investigate some aspects of the tubular function in a group of alcoholics without evidence of chronic liver disease. At admission, approximately 35% of the alcoholics had a urine pH above 6.4 with an excessive urinary bicarbonate loss. In these patients, the fractional urinary excretions of sodium, potassium, chloride, calcium, phosphorus and uric acid were significantly increased while they showed a reduction of the reabsorption capacity for glucose and an impaired renal acidification capacity (acidification short test with CaCl₂). In most cases, the urine osmolality was low despite the normal levels of plasma osmolality. These findings, together with our recent reports [7, 8] demonstrate that in approximately one-third of alcoholics without chronic liver disease, ethanol abuse causes a complex renal

dysfunction involving either the proximal or the distal tubule and the collecting duct. Thus, our experience seems to confirm the conclusion of Zawada et al. [5] that the water diuresis produced by ethanol administration probably represents only one of a spectrum of renal defects which may result from ethanol toxicity.

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80

De Marchi/Cecchin

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