

Effect of Acute Ethanol Administration on the Thoracic Duct Lymph Flow in Man*

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Summary

In 17 patients the thoracic duct was cannulated and the lymph continuously collected. Thoracic duct lymph flow and the concentration of total protein in the lymph and blood serum were repeatedly measured for 6 hours. Group I (9 subjects) received 0.7 g/kg of oral ethanol in the form of 40% solution, group II (8 subjects) an intravenous infusion of 0.75 g/kg of ethanol. Oral but not intravenous administration of ethanol significantly increased the thoracic duct lymph flow. Lymph total protein significantly decreased in group I only.

There is clinical and experimental evidence that ingestion of ethanol produces profound hemodynamic changes in the splanchnic circulation (3) and influences intestinal motility (2). Little is known, however, on the effect of ethanol on the lymph flow from the splanchnic region. Vogel et al. (4) studied several alcoholic beverages as to their lymphagogue effects on the thoracic duct of rats. All of them caused a significant increase in the lymph flow. The acute administration of ethanol, either in lipid emulsions administered intraduodenally or in liquid diets given by a gastric tube, increases the flow of intestinal lymph and the output of proteins and dietary lipids into the lymph of rats. This response, maximum in the first hour, lasts for 3 hours (1). The aim of our study was to find if oral and intravenous administration of ethanol elicits a similar response in humans.

Methods

Two groups of fasting patients were studied after the acute administration of ethanol. Group I comprised 9 male patients (mean age

44.1 ± 9.5 years) with urogenital tumor (3), lymphoma (3), rheumatoid arthritis (2) and colitis (1). Ethanol was administered orally at a dose of 0.7 g/kg of body weight in the form of 40% solution. The mean level of alcohol in blood serum (Widmark's method) was 0.94 mg/100 ml 60 min after drinking. Group 2 was composed of 8 male patients (mean age 48.7 ± 6.8 years) with lymphoma (4), rheumatoid arthritis (2), colitis (1) and chyluria (1). In this group, ethanol diluted in 200 ml of saline was administered intravenously by a 30 min infusion at a dose of 0.75 g/kg of body weight. After 60 minutes, the mean level of alcohol in blood serum was 1.03 mg/100 ml. The thoracic duct was cannulated under local anaesthesia and the lymph continuously collected. Central venous pressure was monitored and maintained at the basal level by saline infusion. Thoracic duct lymph flow and the concentration of total protein (biuret) in the lymph and blood serum were measured before administration of ethanol and thereafter at intervals indicated in the figures.

Results and Comments

After oral administration of ethanol the thoracic duct lymph flow increased significantly (Fig. 1). The peak was reached at 50 min, then the lymph flow declined. The level of total protein in the lymph decreased significantly. Its values were reciprocal to those of lymph flow during the experiment. On the other hand, intravenous administration of ethanol caused no significant changes in

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Fig. 1 Thoracic duct flow \circ — \circ and lymph total protein \circ — \circ after oral administration of ethanol. Mean \pm S. D.

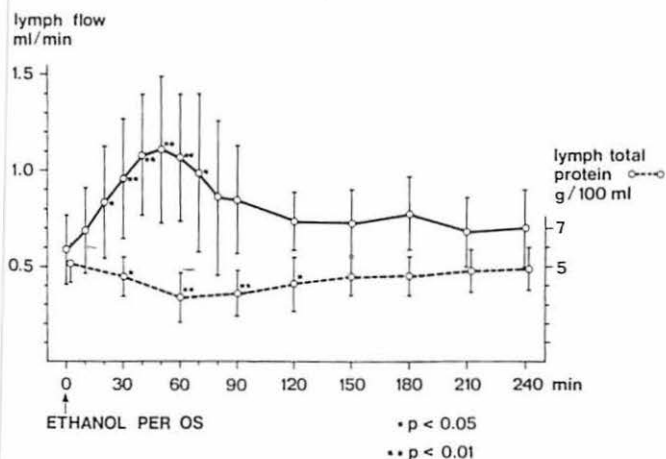
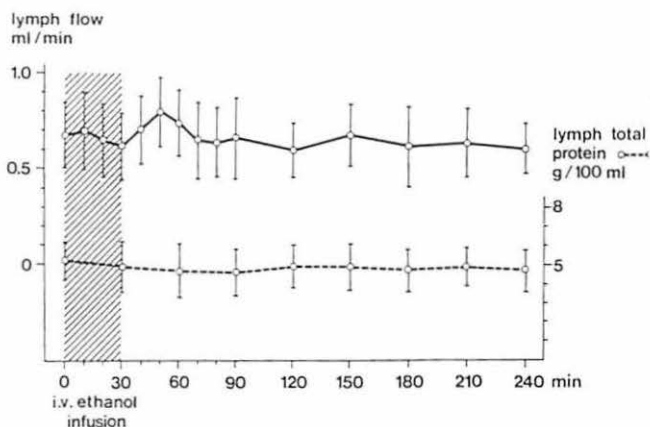


Fig. 2 Effects of intravenous administration of ethanol



lymph flow and lymph total protein (Fig. 2). Under these conditions, the lymph/serum ratio for total protein did not change significantly. It decreased, however, after oral administration of ethanol (Fig. 3). This decrease was statistically significant at 30 ($p < 0.05$), 60, 90, 120 ($p < 0.01$) and 150 min ($p < 0.05$) after drinking alcohol. It is therefore suggested that elevated lymph flow is mainly of intestinal origin.

Oral but not intravenous administration of ethanol exerts a lymphagogue effect on the thoracic duct lymph. This effect is not attribut-

able to the ingestion of fluid. The drinking of the same volume of water increased the thoracic duct lymph flow by 45% compared to 89% following alcohol. It acts topically on the gastrointestinal tract but it is not known whether its action is direct or due to stimulation of some factors or hormones. Changes in intestinal motility could be involved.

It is concluded that acute oral but not parenteral ethanol administration stimulates the thoracic duct lymph flow in man. This is caused by a local gastrointestinal effect.

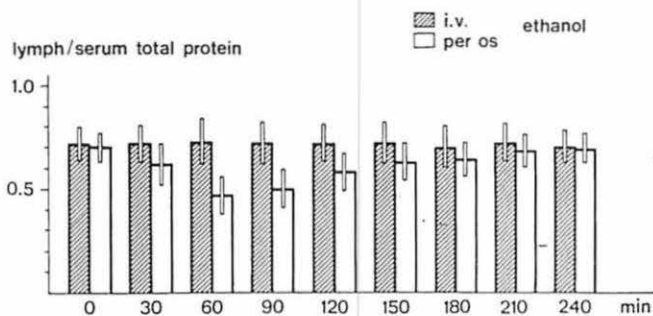


Fig. 3 Lymph/serum ratios for total protein

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