Dear Sir,

According to Brenner et al. [1], the hyperfiltration response which follows intravenous amino acid administration [2–4] or ingestion of a meat meal [5, 6] may be due to a circulating hormone or some other intermediate effector among which glucagon may be a good candidate.

We report on the absence of the hyperfiltration response to a meat meal in man after total pancreatectomy. This finding points to the role of a factor of pancreatic origin in the genesis of the renal hemodynamic response to protein load.

We studied a 45-year-old man, weighing 72 kg, who, because of severe acute pancreatitis, had undergone total pancreatectomy 4 years earlier. After surgery he had strictly adhered to an appropriate protocol of insulin administration and to a dietary regimen providing 40 g of protein and 2,000 cal/day. Protein intake was controlled before the study on 3 consecutive days by means of urea generation rates. At the time of the study, plasma creatinine was 0.99 mg/dl, creatinine clearance 84 ml/min × 1.73 m², blood urea 48 mg/dl, and fasting blood glucose 1.55 g/l. Microalbuminuria was absent.

The patient was studied before (3 clearance studies (C1–C3) and after a meat meal MM 5 clearance studies (C4–C8) at 30, 60, 90, 120 and 180 min). Each clearance lasted 30 min with the exception of C8 lasting 60 min. The meat meal provided 2 g of protein/kg body weight in the form of cooked red meat. All data measured in C1–C3

Table 1. Effects of a meat meal in a pancreatectomized man

| Amino acids, µM/l | 3600 | 3819 | 4200 | 4500 | 4906 | 6421 |

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DeSanto/Coppola/Anastasio/Coscarella/Capasso/Castellino/DeMercato/Bellini/Strazzullo/Guadagno/Pignatelli


Alvestrand A, Bergstrom J: Glomerular hyperfiltration after protein ingestion, during glucagon infusion and insulin-dependent diabetes is induced by a liver hormone: Deficient production of this hormone in hepatic failure causes hepato-renal syndrome. Lancet 1984; i: 195–197.


were averaged and the data considered as baseline values prior to 3 protein load. During the study, the patient received 1.5 U/h of regular insulin. We measured glomerular filtration rate (GFR) by inulin, renal plasma flow (RPF) by p-aminohippurate, the delivery of tubular fluid from the proximal straight tubules by lithium clearance (CLi), sodium and potassium clearance (CNa υ GFR · 100, CKe/ 5 GFR-100), hematocrit (Ht), plasma concentrations of C peptide, glucagon, renin, aldosterone, glucose, and total amino acids. We calculated the absolute rate of proximal reabsorption of isotonic fluid (GFR – CLi) by CLi derived formulae, the proximal fraction reabsorption (1-CLi/GFR), the fractional clearance of lithium (CLi/ GFR), the absolute (CLi- CNa) · PNa and fractional (CLi-CNa)/CLi distal sodium reabsorption and the renal vascular resistance (RVR) according to the formula MAP/(1-Ht) · RPF, where MAP is the 7 mean arterial blood pressure.

The results of this study are summarized in table 1 and show that: (1) GFR and RPF following a meat meal did not exceed baseline values; (2) inhibition of proximal isotonic reabsorption took place; (3) stimulation of distal sodium reabsorption occurred; (4) plasma amino acid concentration increased over time, and (5) glucagone of gastric/pancreatic origin (7) was not affected by the meat meal.

The data also indicate that after pancreatectomy no hyperfiltration response follows a meat meal in subjects on low-protein alimentation, which points to the lack of a circulating hormone/effector of pancreatic origin [8]; the initial depression of GFR and RPF which followed the meat meal is supported by data obtained in adults and children with diabetes mellitus [9,10].

References