After that time, no deaths were observed. The controls appeared to have a higher average mean weight, namely about 2%, than did the experimental animals based on the first weighing.

However, the experimental group contained 29 females and 22 males whereas the control group contained 23 females and 28 males. The apparent higher gain in body weight in the control group could be attributed to unequal sex distribution in these 2 groups. Thus the *ratio* of mean weight of the experimental animals to that of the controls was calculated and was practically constant at about 0.96. The increase in ratio from the 44th injection onward was due to pregnancy of the animals since more females were in the experimental group. It is concluded that administration of pantetheine at 0.2 g/kg did not affect growth of mice under the conditions tested.

Summary. The LD_{50} of pantetheine in mice was found to lie between 5 and 7.5 g/kg body weight. General depression, and eventual death were observed in animals after administration of high dosages of the compound. Intraperitoneal injections of pantetheine at 0.2 g/kg body weight continuously for 10 weeks did not affect growth of mice.

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Amylase Clearance and Excretion During Water Diuresis.* (23213)

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The effect of increasing urinary flow on urea clearance values(1,2) has been well established. Urea clearances rise rapidly at low urine flows up to 0.35 ml/min. but above this rate of urine flow the increase in clearance is slight. Inulin and PAH clearances in man(1,3) do not seem to be influenced by diuresis. However, data on effect of diuresis on protein excretion and clearance are lacking. In our previous study(4), amylase clearances in man with normal urine flow were determined and found to fall in the range, 1-3 ml/min. but the effect on amylase excretion and clearance of increasing urinary flow to high levels was neither determined experimentally nor could it be accurately predicted from an examination of the plot of amylase clearance *vs.* urine flow for the data available. Data on amylase clearances at high urine flows produced by water diuresis have now been obtained and are described here.

Methods. The human subjects were 10 male and 3 female medical students, ages 22-29. The subjects were instructed to drink water freely during afternoon and evening of the days prior to their individual clearance studies since the studies were carried out during a period of hot weather, July and August 1956. To produce diuresis, each subject drank 1500 ml of water in 3 equal portions at half hour intervals prior to beginning of urine collection period. At zero time, the bladders were emptied and the last 500 ml of water taken. Approximately one hour later (time accurately recorded) the bladders were again emptied and these urine specimens collected. At approximately the mid-point of the intervening hour, blood samples were drawn by venipuncture for serum amylase determinations. Both urinary and serum amylase levels were determined by Van Loon's(5) method. Clearances were calculated using the standard formula $\frac{UV}{P}$ = clearance, where U = urine concentration, P = plasma or serum concentration and V = urine flow in ml per minute. All values for urine flow, amylase clearance and amylase excretion are corrected to 1.73 square meters of body surface. The diuresis produced such dilute urine that urinary amy-

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TABLE I. Amylase Clearance during Water Diuresis in Normal Human Subjects.

Subject	Urine vol, ml/min.*	Urine amylase, units/100 ml	Amylase excreted, units/min.*	Serum amylase, units/100 ml	Clearance, ml/min.*
♂	15.6	15.5	2.42	146	1.67
	3.2	83.2	2.66	83	3.22
	15.4	12.3	1.89	55	3.43
	15.1	9.8	1.48	42	3.54
	15.3	12.8	1.96	43	4.57
	12.0	13.6	1.63	71	2.29
	3.4	17.6	.60	53	1.13
	13.3	10.0	1.33	40	3.32
	18.6	11.4	2.12	79	2.68
	11.9	13.2	1.57	73	2.17
	Mean		1.77		2.80 ± .29
♀	15.2	11.4	1.73	49	3.55
	6.4	26.3	1.68	69	2.41
	9.8	10.3	1.01	76	1.33
	Mean		1.47		2.43
	Mean for both groups		1.70		2.72 ± .28

* All values are corrected to 1.73 m^2 of body surface.

lase concentrations were too low to measure accurately in the usual 1:10 dilutions with isotonic saline. Instead, the chloride concentrations were made up to 0.16 M by addition of solid sodium chloride to the undiluted urines and these used directly in the amylase analyses. Thus the undiluted urine samples, with amylase contents of 10-20 units/100 ml, were about the equivalents of 1:10 dilutions of human serum.

Results. Comparison of amylase clearance values during the diuresis (Table I) with those(4) obtained at urine flows of 3 ml/min. or less (these clearances were 2.08 ± 0.18 ml/min. for 13 men and 1.52 ± 0.15 for 12 women) indicates that amylase clearance increases only slightly during diuresis. Comparing only the groups of men in the 2 experiments since there are only 3 women in the diuresis tests, the difference (2.80 − 2.08 = 0.72) in mean clearances is of only borderline statistical significance(6): $t = 0.72/0.346 = 2.08$. For 21 degrees of freedom, t (0.05) = 2.08.

Comparing rates of amylase excretion per minute, a mean of 1.65 units/min. was found for all subjects (1.78 for men) at low urine flows and 1.70 units/min. for all subjects (1.77 for men) during diuresis. The percentage difference in excretion rates is much less than that for the clearance values and is not statistically significant.

In one subject (M8), amylase clearance was determined in three 20 minute intervals and was constant throughout the entire hour. Successive values were 3.26, 3.34 and 3.36 ml/min. for the 3 periods at a serum amylase level of 40. In the same individual, redetermination of amylase clearance without diuresis at a urine flow of 0.93 ml/min. gave a clearance value of 3.12 ml/min. at a serum amylase level of 46. In 7 other subjects for whom clearance data at both high and low urine flows was available, the clearances were not necessarily as constant, agreeing fairly well only when the serum amylase levels were about the same in the two determinations. Mean values at high and low urine flows were 66 and 95 units/100 ml for serum amylase, 1.59 and 1.63 units/min. for amylase excretion and 2.54 and 1.93 ml/min. for amylase clearance.

Discussion. The data presented indicate that amylase clearance increases only very slightly with increasing urine flow and that amylase excretion remains constant over a wide range of urine flow. The slight increases in clearance may be due to increased glomerular filtration rates. While it might appear from the data that amylase excretion is independent of serum amylase levels within the normal range, this is not a likely possibility. The observation that a plot of urine amylase concentration *vs.* urine flow resembles a rectangular hyperbola(4) would fit this picture but other observations(7) show that excretion does increase with increasing serum levels, reaching values of 50-70 units/min. in patients with acute pancreatitis.

It was noted that 6 of the group subjected to water diuresis had sub-normal serum amylase levels at the time blood samples were drawn. The mean serum amylase level for the whole group was 68 as compared to 99 for the group with low urine flows. While it is not suggested that the diuresis was responsible for the low serum amylase levels, the fact that low levels did prevail may be the reason that clearances were higher in this group than in the one with low urine flows. Clearance values would be greater at subnormal serum levels if amylase excretion remained essentially unchanged.

The data in these experiments again seem to indicate that amylase is filtered by the glomeruli but not reabsorbed in the tubules. No indication of a threshold is seen and clearance values do not increase with increasing serum levels as would be the case if reabsorption were at all appreciable. If there is no reabsorption of amylase, one would then not expect increasing urine flow, at which time there is a decreased reabsorption of water, to influence amylase excretion or clearance.

Summary. 1. Amylase clearance increases only slightly during water diuresis. 2. Amylase excretion remains constant during water diuresis.

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A Freely Rotating Adapter for Cardiac Catheterization. (23214)

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The rotation of a cardiac catheter for the purpose of directing the tip to a desired position frequently results in marked torsion and occasional breakage of the proximal end of the catheter and, at times, spontaneous disconnection of the catheter from the stopcock. Either the deliberate separation of the catheter to release the torsion, or spontaneous disconnection, may allow air to enter the system, disrupt the continuous flow of anti-coagulant fluid, and prevent proper pressure recording.

Methods. To facilitate free and continued manipulation of the cardiac catheter without allowing separation of the infustion apparatus, a Luer-Lok adapter with a sleeve allowing free rotation in either direction has been developed. The adapter is made of nickel or chrome plated brass with a rotating Luer-Lok section connected to the catheter (Fig. 1). The external rotating ring is larger than the rest of the adapter to allow for better gripping (Fig. 2A). The adapter can be unthreaded for more efficient cleaning and also to release tension of the inner rotating ring if it becomes too stiff (Fig. 2B and Fig. 3). The opposite end of the adapter is a conventional female unit (Fig. 2C). The inner bore is .073″ diameter. The O ring is rubber† and has a temperature range of –40 to +300°F. The durometer of this ring is 70 shore "A" (±5). The O ring is the inner part of the larger rotating metal ring. Fig. 3 shows cross sectional details. The adapter and the stopcock have been also made into one unit using a standard B-D 5031 MS type 3 way stopcock with an inner bore of .073″

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† Purchased from Precision Rubber Products Corp.