

WATER INTAKE, KETONAEMIA AND RENAL FUNCTION IN SHEEP IN LATE PREGNANCY

G.J. FAICHNEY, G.A. WHITE and D. QUINLAN

Compulsive water-drinking has been reported as a disorder of late pregnancy in women (Shalev et al. 1980). However, we have observed in one experiment a substantial increase in voluntary water consumption by sheep in apparently normal late pregnancy associated with changes in plasma ketone levels and in the renal excretion of N as urea and NH_4^+ ion.

Corriedale ewes were given 804 g dry matter per day of a pelleted mixture of lucerne hay and oats (3:2) throughout pregnancy; the organic matter and N fractions of the dry matter were, respectively, 0.935 and 0.0297. The five non-pregnant ewes weighed $48.4 \pm \text{SE } 4.3$ kg. The median \pm range/2 body weights (liveweight less gravid uterus) of the two single- and three twin-pregnant ewes when killed at day 140 of pregnancy were, respectively, 49.1 ± 2.2 and 51.6 ± 2.6 kg. Medians \pm range/2 for the individual fetus weights were 4.2 ± 0.4 and 3.9 ± 0.5 kg. Drinking water was available up to a maximum of 6 L/d.

Median values for water intake, renal function and plasma ketone levels
(Number of ewes in parentheses)

Ewes	Water intake (L/d)	Plasma ketone* (mM)	Excretion of			Renal urea clearance (mL/min)	Urea	
			nitrogen (g/d)	acid† (meq/d)	urea fraction		plasma (mM)	U/P§
Non-pregnant (5)	2.66	1.3	16.6	0.90	4.0	51	15	65
(\pm range/2)	0.45	0.2	1.7	0.01	2.0	3	1	19
Pregnant 140 d:								
Single (2)	5.21	5.3	14.6	0.80	8.3	35	17	21
(\pm range/2)	0.59	0.3	0.0	0.01	2.0	1	0	7
Twin (3)	6.00	11.6	13.4	0.74	22.5	36	14	17
(\pm range/2)	-	2.5	1.4	0.04	11.4	4	1	2

* 3-OH-butyric acid; † as NH_4^+ ; § urine/plasma concentration ratio

As shown in the table, the three twin-pregnant ewes drank all the water whereas the two single-pregnant ewes drank 87% and the non-pregnant ewes 44% of the water provided. The degree of polydipsia was associated with the plasma level of 3-OH-butyrate, as was the excretion of acid as NH_4^+ ion. Urine N excretion was reduced in late pregnancy, reflecting fetal N retention. The proportion of the N excreted as urea also decreased and, as plasma urea levels did not change significantly, renal urea clearance was lower than in the non-pregnant ewes. Plasma glucose levels (median \pm range/2) for the non-pregnant, single- and twin-pregnant ewes were, respectively, 3.56 ± 0.20 , 2.76 ± 0.01 and 2.08 ± 0.39 mM. The increase in voluntary water consumption appears to be a response to the metabolic changes brought about by the demands of the fetus on the maternal system.

SHALEV, E., GOLDSTEIN, D. and ZUCKERMAN, H. (1980). Int. J. Gynaec. Obstet. 18: 465.