

**Serum Level and 24hr. Excretion Pattern of Potassium  
Following the Intake of Combined Oral Contraceptives**

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**Summary**

Serum level and 24hr urinary excretion pattern of potassium have been studied in 104 healthy women, aged 18-44 years, using combined oral contraceptives for a period of 3-48 months, and results have been compared with those obtained from 21 healthy controls of the same clinic, aged 19-40 years, using IUD. There was no significant change observed in serum potassium level, but 24hr urinary excretion pattern of potassium decreased significantly in 90% of the individuals equivalent to 2.6-78.3% of the mean control, possibly due to a retention of potassium in the cells.

**Introduction**

Previous literature mainly deals with Na retention in

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pregnancy (1-5) during luteal phase of the menstrual cycle (6) or following the administration of oestrogens (7-10), or the fact that progesterone inhibits the effect of mineralocorticoids and thus has a natriuretic effect (11-15).

Using progesterone and progestogenic compounds such as norgestrel and norethisterone for a short-term in 20 male students a natriuretic effect, together with increased aldosterone excretion rate has been observed (16). These investigators have also experienced increased urinary excretion of potassium, but using dydrogesterone they found a slight Na retention.

Considering the physiological importance of potassium in maintenance of various phenomena in the body, little attention has been directed towards the changes in body potassium following the intake of combined oral contraceptives.

#### Materials and Methods

All reagents were from Merck, deionized water was used throughout the experiments. Potassium was estimated by emission flame photometry. Blood samples were collected at 9-11 a.m. by veni puncture and sera were separated as soon as possible and tested immediately. All subjects were from the same social class, healthy individuals with no past history of severe illness.

Samples of blood serum for estimation of potassium were diluted in the ratio of 1/100 with deionized water in a graduated flask. 24hr. urine collections for estimation of potassium were diluted in the ratio of 1/1000.

#### Results

Serum levels and 24hr excretion pattern of potassium were estimated in 104 subjects, aged 18-44 years, using lyndiol (mestranol 0.075 mg and lynoestrenol 2.5mg) and

eugynon (ethynyl oestradiol 0.05 mg and norgestrel 0.5 mg), for a period of 3-48 months. These values were compared with the serum level of potassium and 24hr excretion of potassium in 21 control subjects of the same social class and clinic, aged 19-40 years who were using IUD and had never used oral contraceptives before.

Table (1) shows serum potassium levels in mEq/l and 24hr urinary excretion pattern of potassium in mEq/24hr $\pm$  standard deviation in controls and subjects who have used eugynon or lyndiol for varying length of time.

Table (ii) shows the statistical values and significance for the values observed in urinary 24hr excretion of potassium .

Fig (1) shows 24hr excretion pattern of potassium following the intake of eugynon , compared with the control. Potassium excretion decreased significantly in 90% of the individuals to a value equivalent to 2.6-74.6% of the mean control.

Fig (2) shows 24hr . excretion pattern of potassium following the intake of lyndiol, compared with control. potassium excretion decreased significantly in 90% of the subjects to a value equivalent to 5.0 - 78. 3% of the mean control.

	Serum K (mEq/l) Mean $\pm$ SD	No. of inves- tigations	Urinary K (mEq/24hr) Mean $\pm$ SD	No. of inves- tigations
<u>Control</u>	3.63 $\pm$ 0.59	21	53.00 $\pm$ 19.48	21
<u>Eugynon</u>				
3-6 months	3.70 $\pm$ 0.24	14	44.39 $\pm$ 11.41	14
6-12 "	3.50 $\pm$ 0.16	15	34.21 $\pm$ 13.84	14
12-24 "	3.73 $\pm$ 0.13	9	34.29 $\pm$ 18.85	9
24-48 "	3.46 $\pm$ 0.13	13	31.25 $\pm$ 10.7	13
<u>Lyndiol</u>				
3-6 months	3.88 $\pm$ 0.50	10	31.20 $\pm$ 5.80	10
6-12 "	4.03 $\pm$ 0.67	14	37.89 $\pm$ 12.70	14
12-24 "	3.81 $\pm$ 0.46	12	40.55 $\pm$ 17.82	12
24-48 "	3.17 $\pm$ 0.55	17	30.01 $\pm$ 8.09	17

Table (1) Serum Potassium Values in mEq/l and Urinary Excretion of Potassium in mEq/24hr in Control Group and Following the Intake of Eugynon and Lyndiol for Varying Length of Time.

	3-6 months			6-12 months			12-24 months			24-48 months		
	Mean difference	DF	t	Mean difference	DF	t	Mean difference	DF	t	Mean difference	DF	t
<u>Eugynon</u> Serum K	+ 0.07	33	0.4335	- 0.13	34	0.8260	+ 0.10	28	0.4518	- 0.17	32	1.0224
Urinary K	- 8.61	33	1.6762***	-18.80	34	3.8055*	-18.71	28	2.5602**	-21.75	32	3.6863*
<u>Lyndiol</u> Serum K	+ 0.25	29	1.1440	+ 0.40	33	1.8496	+ 0.18	31	1.7664	- 0.46	36	2.8152
Urinary K	-21.80	29	3.7180*	-15.11	33	2.7166**	-12.50	31	1.9044**	-22.99	36	5.2326*

P (Student's -t-test) \* P < 0.005 \*\* 0.01 > P > 0.005 \*\*\* P = 0.05

Table (2) Statistical Significance of Decrease Observed in 24hr Urinary Excretion of Potassium Following the Intake of Eugynon and Lyndiol.

## Discussion

The significant decrease in urinary excretion pattern of potassium, following treatment with combined oral contraceptives probably signifies that potassium is retained in the cells and is not leaking out from the cytoplasm into the extracellular fluid to be excreted. Sodium retention in the uterus tissue, during the proliferative phase of the menstrual cycle, when oestrogen secretion demonstrates a maximal peak has been observed (17). Potassium level has also shown an increase during this phase.

There was no great difference in variations observed following the use of eugynon or lyndiol.

The decrease in urinary excretion of potassium following the use of combined oral contraceptives was not dose dependent.

## Acknowledgement

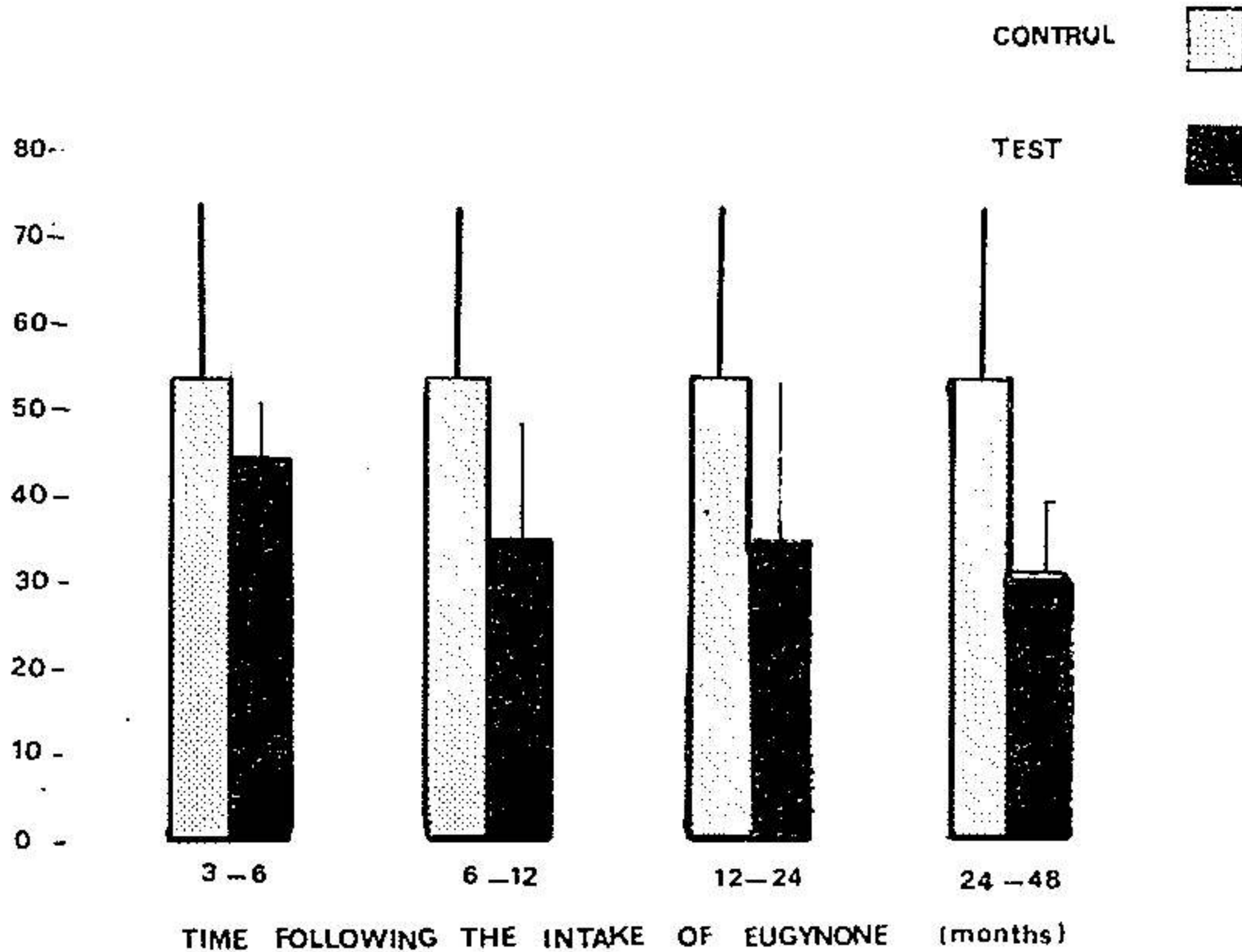
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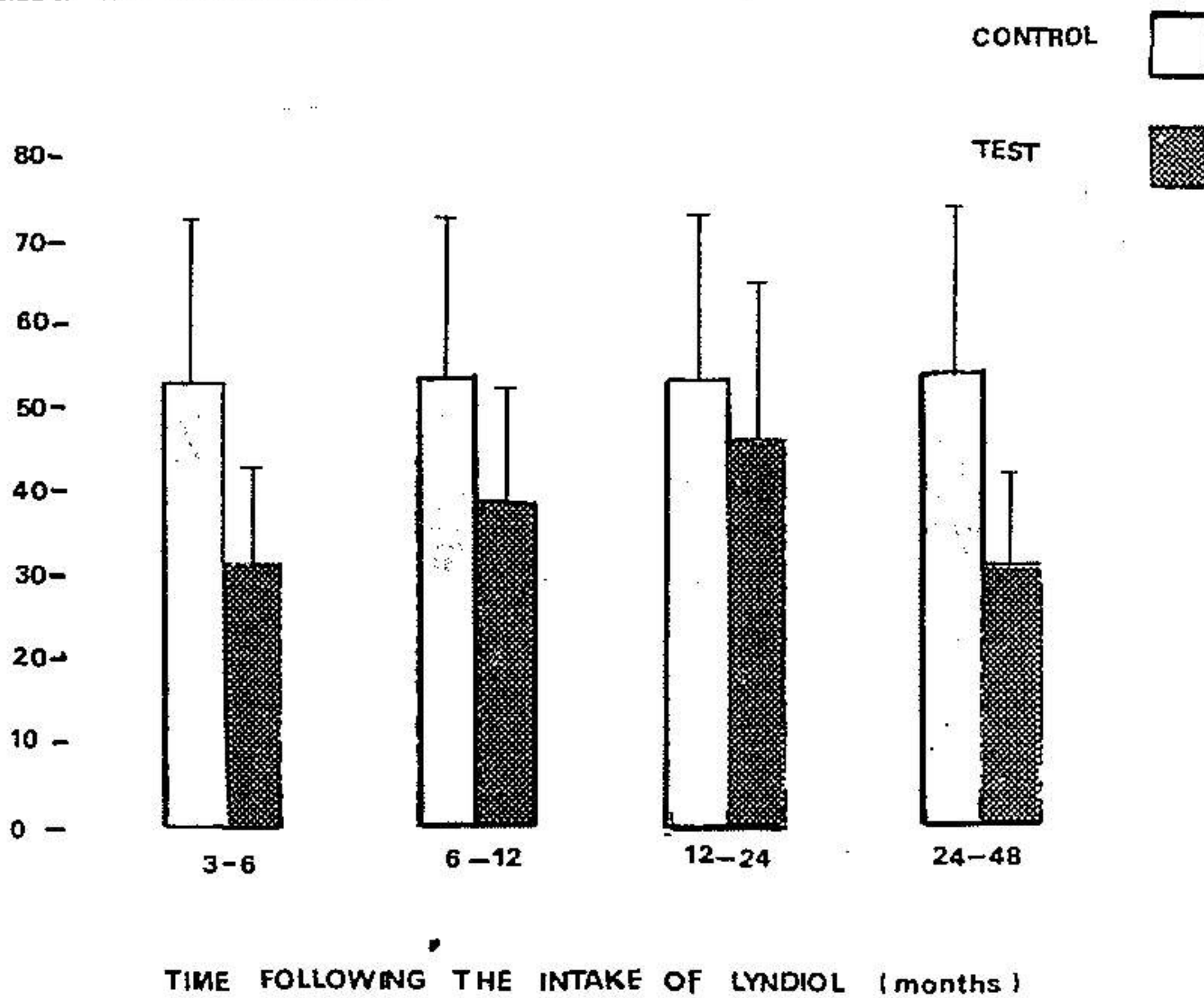
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24hr URINARY EXCRETION OF POTASSIUM (meq)



Mean Values of 24 hr Urinary Excretion of Potassium Following the Intake of Eugynone for Varying Length of Time, Compared With Control. Total Number of Subjects in Each Treated Group from Left to Right Are: 14, 15, 9, 13 and 21 Controls.

24hr URINARY EXCRETION OF POTASSIUM (meq)



Mean Values of 24hr Urinary Excretion of potassium Following the Intake of Lyndiol for Varying Length of Time, Compared with Control. Total Number of Subjects in Each Treated Group from Left to Right Are: 10, 14, 12, 17 21 Controls.