BIOCHEMICAL CHANGES IN PROLONGED LABOUR

by

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SUMMARY

Biochemical changes were studied in 75 pregnant or parturient women. The women were divided in 3 groups:

Group-I—included 25 women at term (38-41 weeks pregnant).

Group-II—included 25 women labour for 4 to 6 hours.

Group-III—included 25 women in whom Labour had lasted for 20 hours or more.

No statistically significant difference could be detected in serum sodium, blood urea, serum creatinine, urinary sodium, potassium, creatinine and urine specific grant, between control Group I and Group II.

The Group II patients in early labour showed Statistically Significant hypopotacemia ($P < .00$). A statistically significant fall in plasma bicarbonate.

The Group III patients showed a statistically significant fall in serum potassium ($P < .001$), a significant elevation in blood urea and a significant fall of plasma bicarbonate ($P < .01$).

Introduction

In many tropical and developing countries including India the facilities that exist are often quite inadequate and cases of prolonged labour due to various obstetric causes are frequent observed not only in rural areas but also in the urban areas. The result is that many come in a state of severe water and electrolyte imbalance often accompanied by severe haemorrhage in those with rupture of uterus. Patients in whom labour is progressing very slowly require the most careful supervision both by the nurse and the medical attendant. Such patients should always be transferred to a hospital, because it is difficult to predict the difficulties which may arise. The present study was carried out to provide some basis for improved care for women in prolonged labour.

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Material and Methods

Biochemical changes were studied in 75 pregnant or parturient women in Obstetrics and Gynaecology Department of

Medical College, Rohtak. The women were divided in 3 groups:

Group I—included 25 women at term (38-41 weeks pregnant).

Group II—included 25 women in normal labour for 4 to 6 hours.

Group III—included 25 women in whom labour had lasted for 20 hours or more.

All patients were in the age group of 18 and 39 years and included both primigravidas and multigravidas. 15 cc of blood was drawn from the antecubital vein of each of the woman for various serum estimations. On admission, patients were asked to collect their urine in a wide-mouth bottle one hour after evacuation. In patients of prolonged labour catheterization sample of urine was taken for the various urine estimations. Following investigations were carried out in every patient:

1. Serum sodium and potassium—Estimated by Flame Photometer.
2. Serum creatinine (Varley, 1976).
3. Plasma bicarbonate (van Slyke, 1922).
4. Blood urea by diacetyle monoxime method.
5. Urinary sodium and potassium by Flame photometer.
6. Urinary creatinine by Alkaline Picrate method.
7. Urine specific gravity by clinical refractometer.

Observations and Results

The results of the various biochemical investigations are tabulated in Tables I and II.

As seen from Table I, no statistically significant difference could be detected in serum sodium, blood urea, serum creatinine, urinary sodium, potassium, creatinine and urine specific gravity between control Group I and Group II.

The Group II patients in early labour showed statistically significant hypopotacemia ($p < .00$), a statistically significant fall was also observed in the value

TABLE I

Comparison of Data of Patients in Early Labour (Group II) With that of Control Group

	Control Group-I	Group-II	Statistical significance (p value)
1. Serum sodium (mEq/L)	127.32 ± 5.09	127.84 ± 7.9	> .05 NS
2. Serum potassium (mEq/L)	4.004 ± 0.83	3.43 ± 0.49	< .00
3. Serum creatinine (mg%)	1.57 ± 0.384	1.504 ± 0.57	> .05 NS
4. Plasma bicarbonate (mEq/L)	21.06 ± 2.42	19.16 ± 1.68	< .05
5. Blood urea (mg%)	19.96 ± 4.2	19.04 ± 4.90	> .05 NS
6. Urinary sodium (mEq/L)	88.6 ± 13.5	78.28 ± 22.4	> .05 NS
7. Urinary potassium (mEq/L)	36.4 ± 16.10	44.40 ± 21.0	> .05 NS
8. Urinary creatinine (mg%)	127.72 ± 38.2	136.12 ± 69.81	> .05 NS
9. Urine specific gravity	1019.40 ± 4.84	1019 ± 4.88	> .05 NS

TABLE II

Comparison of Data of Patients' in Prolonged Labour (Group III) With that of Control Group

	Group I	Group III	p value
1. Serum sodium (mEq/L)	127.32 ± 5.09	128.20 ± 6.80	> .05 NS
2. Serum potassium (mEq/L)	4.004 ± 0.83	3.16 ± 0.461	< .001
3. Serum creatinine (my%)	1.57 ± 0.384	1.81 ± 0.85	> .05 NS
4. Plasma bicarbonate (mEq/L)	21.96 ± 2.42	17.2 ± 3.82	< .01
5. Blood urea (mg%)	19.96 ± 4.2	27.8 ± 10.8	> .05 NS
6. Urinary sodium (mEq/L)	88.6 ± 13.5	60.32 ± 20.8	> .05 NS
7. Urinary potassium (mEq/L)	36.4 ± 16.10	49.28 ± 17.21	> .05 NS
8. Urinary creatinine (mg%)	127.72 ± 38.2	98.24 ± 35.6	> .05 NS
9. Urine specific gravity	1019.40 ± 4.84	1024.84 ± 8.67	> .05 NS

of plasma bicarbonate in Group II patients ($p < .05$). No statistical difference could be detected in serum sodium serum creatinine, urinary sodium, potassium, creatinine and urine specific gravity between control Group I and Group II.

The Group III patients showed a statistically significant fall in serum potassium ($p < .001$), a significant elevation in blood urea and a significant fall of plasma bicarbonate ($p < .01$).

Discussion

Marked biochemical changes were recorded by Hawkins and Nixon (1957) and (1958) when labour had lasted for more than 48 hours. In our series a significant fall was seen in serum potassium, a rise in blood urea and a fall in serum bicarbonate, which are in congruity with those of Hawkins and Nixon (1957). This fall of serum potassium was probably due to increased secretion of adrenocorticotrophic hormone (Kaupilla *et al* 1974) and cortisol (Adedwoh and Akinla, 1971) in labour. Corticoid hormones also cause leakage of potassium from tissues. Potassium in physiological amounts is essential for muscular contraction. So a fall in potassium may further lead to uterine inertia. In prolonged labour dehydration which resulted from the water loss in sweat and urine was reflected in the significant rise in blood urea. The rise in blood urea was also observed by Akinkugbe, *et al* (1977). They have also shown a significant fall in plasma bicarbonate which is a result of metabolic acidosis. Metabolic acidosis is a well known complication of prolonged labour. This complication often develops more rapidly than the electrolyte loss and increases maternal as well as foetal morbidity. Therefore, in clinical practice there should be more awareness that water and elecrtolyte balances change during labour. With passage of time deviation from normal becomes greater hence the fluid balance should be watched carefully in all labours, with at least correction of water

deficits at a much earlier stage of prolonged labour.

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