

Saliva aldosterone concentration in healthy infants

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SUMMARY Aldosterone and glucocorticoid (cortisol+cortisone) concentrations were measured in 106 saliva samples from healthy infants. Most aldosterone values fell within the adult range (0–0.15 nmol/l (0–5.4 µg/100 ml)), but 10 were >0.2 nmol/l (7.2 µg/100 ml). Aldosterone concentration was not related to sex, ethnic origin, time of collection, distress, or cortisol concentration but decreased with age.

Plasma aldosterone concentration has often been reported to be much higher during infancy than in older children and adults.^{1–3} Most investigators have obtained their blood samples when infants were being bled for necessary clinical investigations. These infants, therefore, may not be representative of their age range.

Saliva is a readily accessible body fluid, the collection of which raises no ethical problems even in healthy infants. In adults the concentration of aldosterone in saliva has been shown to correlate with that in plasma^{4,5} and to approximate to the concentration of the free (non-protein bound) fraction in plasma.⁶ It therefore seemed appropriate to investigate the use of saliva in the assessment of aldosterone state in healthy infants.

Methods

All the subjects of this study were apparently

healthy infants (aged 1–12 months) attending child health clinics. The study was approved by the local ethical committee, and consent was obtained from all the mothers. Saliva was aspirated using a plastic pasteur pipette while the infant was in the mother's arms. No stimulant was used to increase the rate of saliva flow. The age, sex, and ethnic origin of each infant was recorded, and they were categorised (after consultation with the mother) as 'calm' or 'agitated'. Some samples were collected at morning clinics (0930–1200h), but most were collected at afternoon clinics (1400–1600h). Most infants were white, but small numbers of Afro-Caribbean (11), Indian (nine), Japanese (five), and middle eastern infants (three), were included.

Aldosterone concentration was measured by a slight modification of our published method.⁵ The sample volume was reduced from 500 µl to 100 µl (in duplicate), and the final antibody dilution was altered to 1:1 200 000. The limit of detection (95% confidence) was 0.006 nmol/l (0.2 µg/100ml), and the within and between batch coefficients of variation were 6–8% and 10%, respectively.

Glucocorticoid concentration was measured by radioimmunoassay using an antibody raised against cortisol-3-CMO conjugated to bovine serum albumin (which cross reacts about 90% with cortisone), with [1,2,6,7-³H] cortisol as ligand and dextran-charcoal to separate free and bound fractions.

Table *Mean saliva aldosterone and glucocorticoid concentrations in 106 saliva samples from healthy infants*

	Aldosterone (nmol/l)			Glucocorticoid (nmol/l)	
	n	Mean	Range	Mean	Range
All Infants	106	0.106	<0.01–0.61	22	3–>110
Boys	57	0.092	<0.01–0.33	24	5–>110
Girls	49	0.089	0.01–0.61	20	3–59
Samples:					
Morning	15	0.086	0.01–0.25	29	8–99
Afternoon	91	0.109	<0.01–0.61	21	3–>110
Infants:					
Afro-Caribbean	11	0.074	0.01–0.23	22	3–99
Indian	9	0.167	0.015–0.47	39	10–110
White	78	0.077	<0.01–0.61	19	8–49
'Agitated'	5 17*	0.095	0.018–0.23	21	5–50

*Includes two infants from whom insufficient saliva was obtained for the aldosterone assay.

Conversion: SI to traditional units—Aldosterone: 1 nmol/l=36 µg/100ml.

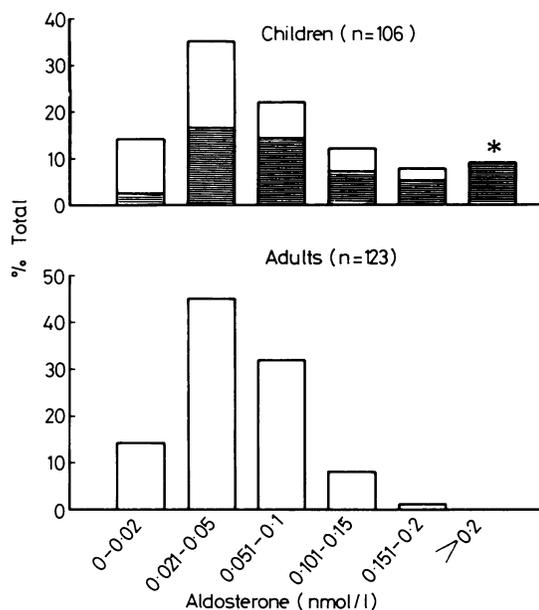


Figure Distribution of saliva aldosterone concentrations in infants and adults. Shaded areas represent children aged under 6 months.

*Mean (SD)=0.33 (0.13) nmol/l (11.9 (4.7) μ g/100 ml).

Conversion: SI to traditional units—Aldosterone: 1 nmol/l=36 μ g/100ml.

Results

The overall findings are summarised in the Table. Neither sex, time of sampling, state of arousal, nor ethnic origin were important determinants of saliva aldosterone concentration. The higher mean aldosterone for the Indian infants was due to the inclusion of two with very high values. The Figure shows that there is considerable overlap in the distribution of saliva aldosterone values in infants and adults. Infants whose aldosterone concentration is outside (above) the adult range are predominantly under 6 months of age. Aldosterone concentration did not correlate with glucocorticoid concentration either in

the group as a whole ($r=0.21$) or in the 10 infants with very high aldosterone concentrations ($r=0.19$).

Discussion

This work adds to previous investigations of aldosterone state in infants. All our infants were healthy and did not justify blood sampling and so differ from those included in the majority of previous investigations. Most of the aldosterone and glucocorticoid concentrations were compatible with our adult ranges. We did observe a downward shift in the distribution of aldosterone (but not glucocorticoid) concentrations with age and found a minority of infants had aldosterone concentrations considerably above the adult range. This latter finding is unlikely to be the non-specific effect of stress as the glucocorticoid concentrations in these infants were normal. The high aldosterone concentrations found in some infants were not associated with any of the other factors recorded.

Further work is therefore needed to explain the cause of the high saliva aldosterone concentrations found in about 10% of the infants and of the decline in aldosterone concentration during the first year of life.

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