The Retinoid Status of Kidney Transplant Recipients

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Dear Sir,

Renal function has an important influence on vitamin A (retinol) metabolism in as much as plasma retinol which is usually complexed to retinol binding protein (RBP) and transthyretin (TTR), is filterable through the glomerulus but normally is efficiently reabsorbed in the renal tubules [1, 2]. Hence, dysfunction of glomerular filtration may lead to disordered retinol metabolism. Patients with chronic renal failure and patients on long-term hemodialysis have been reported to have elevated plasma levels of both retinol and RBP [3–6]. In some of these patients, blood and liver levels of retinol were sufficiently high as to cause concern. Also, the skin of some uremic patients is reported to have high retinol levels and in these patients symptoms such as pruritis, xerosis and hair loss have been ascribed in part to hyper-vitaminosis A [5].

Given the susceptibility of long-term surviving kidney transplant recipients (KTxR) to progressive impairment of kidney function, we were interested to study the retinoid status of these patients. We studied 42 KTxR and 42 control subjects who were healthy volunteers; the two groups were matched for age and sex. The KTxR were between 4 and 15 years posttransplantation and were on maintenance immunosuppressive therapy (azathioprine and prednisone). All subjects were studied for plasma levels of vitamin A, β -carotene and α -tocopherol using high-performance reversed-phase chromatography, and RBP and TTR using immunoturbidometric technique. All subjects were tested on 2–3 occasions and a mean result determined for each subject. The statistical significance of differences between patient groups was tested by one-way analysis of variance.

KTxR, compared to the control subjects, had significantly higher plasma levels of vitamin A, TTR and RBP (table I) and the levels of these three parameters were related directly to serum creatinine levels (table II).

Table I. Plasma chemistry levels (mean $\pm$ SD) in control, healthy subjects and KTxR

Controls
KTxR
P

(n = 42)

(n=42)

Vitamin A, μM

3.4 ± 0.8

4.2 ± 1.7

0.04

β -Carotene, μM

0.9 ± 0.6

1.1 ± 1.3

> 0.05

α -Tocopherol, μM

27 ± 6

28 ± 11

> 0.05

TTR, mg/l

288 ± 48

331 ± 59

0.01

RBP, mg/l

82 ± 29

92 ± 40

0.04

Table II. Relationships in 42 control subjects and 42 KTxR between serum creatinine and other plasma chemistry levels

0.01

> 0.05

> 0.05

0.01

0.03

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Smith, F.R.; Goodman, D.S.: The effect of diseases of the liver, thyroid, and kidneys on the transport of vitamin A in human plasma. *J. clin. Invest.* 50:2426–2436 (1971).

Stewart, W.K.; Fleming, L.W.: Plasma retinol and retinol binding protein concentration in patients on maintenance haemodi-alysis with and without vitamin A supplements. *Nephron* 30: 15–21 (1982).

Vahlquist, A.; Berne, B.; Berne, C: Skin content and plasma transport of vitamin A and beta-carotene in chronic renal failure. *Eur. J. clin. Invest.* 72:63–67 (1982).

Rylance, P.B.; Brown, I.R.F.; Howells, D.W.; Nisbet, J.A.; Stone, A.N.; Eastwood, J.B.: Relationship between vitamin A and bone disease in chronic renal failure. *Nephron* 36:131–135 (1984).

Plasma levels of β -carotene and α -tocopherol were similar in the two subject groups, suggesting that differences in the retinoid status between these two groups were unlikely to be due to nutritional differences.

In conclusion, loss of renal function in long-term surviving KTxR seems likely to lead to elevated blood levels of vitamin A. In none of the patients we tested ⁵ could blood vitamin A levels be considered alarmingly high, however, as plasma vitamin A levels are considered ⁶ generally to be a poor marker of total vitamin A levels in the body, particularly in the liver, advising KTxR with prolonged renal dysfunction to avoid deliberate vitamin A supplementation of the diet would seem prudent.

References