SUMMARY & CONCLUSION

The present study was designed to detect the abnormalities of calcium and vitamin D metabolism that may occur in children with nephrotic syndrome and to assess the need of such patients for vitamin D and calcium supplementation.

Thirty children (23 males, 7 females) with nephrotic syndrome were included in this study. Their ages ranged from 2 to 12 years with a mean age of 7.7 ± 3.1 years. The control group consisted of fifteen normal children of matched age and sex.

Both patients and controls were subjected to the following:

1) Thorough history taking.
2) Complete clinical examination.
3) Laboratory investigations to confirm the diagnosis of nephrotic syndrome.
   - Urine analysis.
   - 24-hour urinary protein.
   - Total plasma proteins and serum albumin.
   - Serum cholesterol.
   - Serum creatinine.

As expected, all patients had proteinuria and hypoalbuminemia with elevated serum cholesterol levels. All had normal serum creatinine levels.

The pathology of nephrotic syndrome was obtained in 19

patients by renal biopsy. The renal lesion associated with nephrotic syndrome was minimal change glomerulopathy in three patients, focal segmental glomerulosclerosis in eleven, mesangial proliferative glomerulonephritis in two, membranous glomerulonephritis in two and membranoproliferative glomerulonephritis in one. In the remaining 11 patients, a presumptive diagnosis of minimal change glomerulopathy was based on clinical criteria.

Serum levels of total calcium, phosphorus, parathyroid hormone (PTH) and $1,25(OH)_2D$ were measured in all patients and controls.

Statistical analysis of the data revealed the following results:

- Total serum calcium concentration was significantly lower in the nephrotic patients than in the controls.
- Serum phosphorus levels in the nephrotic patients were not significantly different from the levels measured in the control group.
- Serum PTH level was significantly higher in the nephrotic patients than in the control group.
- Serum level of $1,25(OH)_2D$ in the nephrotic patients was significantly lower than in the controls.
- Total serum calcium showed a direct and significant correlation with serum albumin and an inverse but insignificant correlation with proteinuria.

- Total serum calcium was correlated directly with serum level of $1,25(OH)_2D$ and inversely with both serum phosphorus and serum PTH level.
- Serum level of $1,25(OH)_2D$ showed a direct and significant correlation with serum albumin and an inverse and significant correlation with proteinuria.
- Serum level of $1,25(OH)_2D$ was correlated inversely with both serum phosphorus and serum PTH level.
- As regards the effects of renal pathology, no statistically significant differences were noted in serum calcium, phosphorus, PTH and $1,25(OH)_2D$ between patients with MCNS (n = 14) and patients with other renal lesions (n = 16).

From this study, it can be concluded that there are distinct abnormalities of calcium and vitamin D metabolism in the form of hypocalcemia, secondary hyperparathyroidism and low serum levels of $1,25(OH)_2D$ in patients with nephrotic syndrome. Thus, nephrotic children, particularly those with a protracted or frequently relapsing course, may be at risk for developing metabolic bone disease.

As a result, our study suggests that vitamin D and/or calcium supplementation should be given to children with protracted nephrotic syndrome.

We recommend another study of calcium and vitamin D metabolism in larger number of children with nephrotic syndrome during periods of relapse and remission. Also, bone histology should be studied in patients with nephrotic syndrome.