**Palmer M, Adami HO, Bergstrom R, et al.** Survival and renal function in persons with untreated hypercalcemia. Population-based cohort study with 14 years of follow-up. Lancet 1987; **1**:59.

**Rao DS, Wilson RJ, Kleerekoper M, et al.** Lack of biochemical progression or continuation of accelerated bone loss in mild asymptomatic primary hyperparathyroidism: evidence for biphasic disease course. J Clin Endocrinol 1988; **109**:959.

**Scholz DA, Purnell DC.** Asymptomatic primary hyperparathyroidism. Ten-year prospective study. Mayo Clin Proc 1981; **56**:473.

## TREATING SLE NEPHRITIS: SOME GUIDELINES

While data concerning the use of total lymphoid radiation and cyclosporine show promise in the treatment of lupus nephritis, evidence is still anecdotal. A conservative approach that combines vigorous early treatment with long-term low-dose therapy is still the preferred method of treatment. The following points outline the basic tenets of this approach:

- Ideally, early treatment of lupus nephritis should start when the patient has diffuse proliferative lupus glomerulonephritis and a serum creatinine ≤1.2.
- An accurate renal biopsy will help avoid overtreatment. Patients with mild involvement will respond well to a relatively modest therapeutic regimen.
- Short-term oral cyclophosphamide has proven to be as efficacious as other immunosuppressive regimens that have been added to prednisone.
- Intravenous cyclophosphamide should be used instead of oral cyclophosphamide if there is a possibility of poor patient compliance.
- Early treatment (for the first 4 to 8 weeks) should be as vigorous as possible, followed by a judicious tapering of prednisone with a long-term goal of alternate-day steroid therapy.
- The induction of a remission of glomerulonephritis, with a serum creatinine ≤ 1.4 mg/dL and a 24-hour urine protein ≤ 300 mg, is an important determinant of long-term prognosis.
- Prednisone may be required indefinitely for patients who have had severe lupus nephritis. Such patients should be followed closely, both systemically and nephrologically, since they are susceptible to recurrence.
- Systemic arterial hypertension and drug-associated renal damage and dysfunction are as much a concern among these patients as in any population with chronic renal disease.

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SUGGESTED READING

**Lewis EJ, Hunsicker LG, et al.** Collaborative Study Group. A controlled trial of plasmapheresis therapy in severe lupus nephritis. N Engl J Med 1992; **326**:1373–1379.

**Schwartz MM, Bernstein J, Hill G, et al.** Predictive value of renal pathology in diffuse proliferative lupus nephritis. Kidney Int 1989; **36**:891–896.

**Schwartz MM, Lan SP, Bonsib SM, Gephart GN, Sharma HM.** Clinical outcome of three distinct histologic patterns of injury in severe lupus glomerulonephritis. Kidney Int 1989; **36**:891–896.

## HEMODIALYSIS-INDUCED HYPOTENSION: THE SEARCH FOR A CAUSE

Often during the course of dialysis, episodes of hypotension occur that can be severe enough to require interruption of dialysis and treatment with saline infusion. Among the proposed etiologic factors in dialysis-induced hypotension are (1) excessive fluid removal: (2) venodilation with venous sequestration of blood volume; (3) autonomic neural dysfunction, with the inability to counterbalance cardiovascular instability induced by fluid removal; and (4) autonomic disequilibrium with predominant vagal stimulation induced by the reduction of left ventricular volume.

Autonomic dysfunction in hemodialysis has been extensively studied as a cause of dialysis-induced hypotension; however, evidence suggests that the pathogenesis is more related to hemodynamic and volume factors. Studies at the Cleveland Clinic have shown that although the efferent parasympathetic pathway was abnormal in hemodialysis patients, adrenergic responses were generally normal. These findings could not be linked to the occurrence of dialysis-induced hypotension and, in fact, there were no differences between dialysis patients with and without hemodialysis-related hypotension.

Echocardiographic studies of dialysis patients at the Cleveland Clinic point out the importance of

intravascular volume redistribution between the central and peripheral segments of the circulation. Since these studies have demonstrated that unloading of the cardiopulmonary receptors is associated with a normal response of heart rate and diastolic blood pressure, we concluded that this redistribution of blood volume may provoke hypotension by mechanisms unrelated to any abnormality in the cardiopulmonary afferent reflex pathway.

Studies done at The Cleveland Clinic Foundation in collaboration with Southwestern University of Dallas, Texas, have shown that the hypotension was linked to acute paradoxical withdrawal of sympathetic vasoconstrictor drive, producing vasodepressor syncope. The stimulus leading to this response can be presumed to be the central hemodynamic unloading produced by venodilation. Venodilation during dialysis has been previously suggested by the finding of a reduction in cardiac output in association with improvement of indices of cardiac performance.

Dialysis-induced hypotension is an important clinical problem, the cause of which is under investigation. At present, its pathophysiology seems more related to hemodynamic factors and volume changes than to chronic adrenergic neural hypofunction.

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## SUGGESTED READING

**Chaignon M, Chen WT, Tarazi RC, Bravo EL, Nakamoto S.** Effect of hemodialysis on blood volume distribution and cardiac output. Hypertension 1981; **3(3):**327–332.

**Converse RL, Jacobsen TN, Toto RD, Jost CMT, Cosentino F, Fouad-Tarazi FM.** Sympathetic overactivity in patients with chronic renal failure. N Engl J Med 1992; **327:**1912–1918.

**Nakashima Y, Fouad FM, Nakamoto S, Textor SC, Bravo EL, Tarazi RC.** Localization of autonomic nervous system dysfunction in dialysis patients. Am J Nephrol 1987; **7(5):**375–381.