

## REFERENCES

1. 1981 End-stage renal disease, annual report to congress. Washington, D.C.: Health Care Financing Administration, 1981:108.
2. Krakauer H, Grauman JS, McMullan MR, Creede CC. The recent U.S. experience in the treatment of end-stage renal disease by dialysis and transplantation. *N Engl J Med* 1983; 308:1558-63.
3. Braunwald E. Effects of coronary-artery bypass grafting on survival: implications of the randomized coronary-artery surgery study. *N Engl J Med* 1983; 309:1181-4.
4. Reisman AS. The new medical-industrial complex. *N Engl J Med* 1980; 303:963-70.
5. *Idem*. The future of medical practice. *Health Affairs (Project Hope)* 1983; 2:5-19.

## CORRESPONDENCE

Letters to the Editor are considered for publication (subject to editing and abridgment), provided that they are submitted in duplicate, signed by all authors, typewritten in double spacing, and do not exceed 1½ pages of text (excluding references). They should not duplicate similar material being submitted or published elsewhere, and they should not contain abbreviations. Letters referring to a recent *Journal* article should be received within six weeks of the article's publication. We are unable to provide pre-publication proofs, and unpublished material will not be returned to authors unless a stamped, self-addressed envelope is enclosed.

## HAZARD OF MICROWAVE OVENS TO TRANSDERMAL DELIVERY SYSTEM

*To the Editor:* Medical hazards reported to be associated with microwave ovens include pacemaker dysfunction, burns, cataract formation, and neurologic injury.<sup>1,2</sup> I describe a case involving another type of injury.

A 51-year-old man with angina pectoris presented with a burn in the area of his Transderm Nitro-10 patch, which had occurred a week previously. He had worn the patches for several months before the burn and has subsequently worn them in other locations without difficulty. On questioning, the patient stated that he was sitting near his mother's microwave oven when she turned it on. He began to experience warmth in the area of the patch, which progressed rapidly, and by the time he was able to pull it off, a burn had occurred. He related that the oven had recently been serviced.

Physical examination revealed a healing second-degree burn on the left side of the chest in the size and configuration of a Transderm Nitro-10 patch.

He was advised to have the oven checked for a microwave leak, and at a return visit, he indicated that one had been found and repaired.

The Transderm Nitro-10 patch is provided with an adhesive strip of aluminized plastic. It is assumed that the metallic element of the patch was heated by microwave radiation, resulting in this patient's injury. Other dermal delivery systems with metallic elements would present a similar hazard.

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1. Osepchuk JM. Sources and basic characteristics of microwave/rf radiation. *Bull NY Acad Med* 1979; 55:976-98.
2. Brent RL. X-ray, microwave, and ultrasound: the real and unreal hazards. *Pediatr Ann* 1980; 9:469-73.

## KIDNEY STONES AND DRINKING WATER

*To the Editor:* The high incidence of nephrolithiasis in Israel is a serious public-health problem. Many patients present with calcium stones in conjunction with hypercalciuria. There is a general aware-

ness that higher water intake may help reduce the risk of renal colic. Furthermore, the major health-insurance agencies conduct radio and television campaigns to encourage higher water intake. One important point, however, has been underestimated: the content of calcium in the drinking water, which in some areas may be as high as 10 mg per deciliter. We describe three patients in whom nephrolithiasis and hypercalciuria were related to an intake of water with a high calcium concentration and were corrected by replacing tap water with boiled water, the calcium content of which is reduced as a result of precipitation of calcium carbonate.

Patient 1 was a 45-year-old man who presented with a history of recurrent kidney stones. A radiopaque stone was visualized in the left ureter by intravenous urography. Creatinine clearance was 91 ml per minute, and urinary calcium excretion was 560 mg per 24 hours (7 mg per kilogram of body weight per 24 hours). The serum concentration of calcium, phosphate, uric acid, and parathyroid hormone were normal. The patient consumed a regular diet, with water intake ranging between 7000 and 11,000 ml per 24 hours and containing 630 to 1000 mg of calcium. As a substitute for tap water, an equal volume of water boiled for 10 minutes and containing 140 to 220 mg of calcium reduced the urinary calcium level to 250 mg per 24 hours (3 mg per kilogram per 24 hours). For the past three years no renal colic has been recorded.

Patient 2, a 39-year-old man, had a history of recurrent renal colic since the age of 13 years. At 22 years three stones were removed from the right kidney. Creatinine clearance was 85 ml per minute, and urinary excretion of calcium was 500 mg per 24 hours (6.8 mg per kilogram per 24 hours). Serum calcium phosphate, uric acid, and parathyroid hormone concentrations were normal. The patient consumed a regular diet, with a water intake ranging between 2000 and 6500 ml per 24 hours and containing 180 to 600 mg of calcium. Substitution of boiled water for tap water reduced the urinary calcium level to 130 mg per 24 hours (1.8 mg per kilogram per 24 hours). No recurrence of renal colic has been reported over the past two years.

Patient 3 was a 25-year-old man with a history of nephrolithiasis since age 20. At age 23 a calcium oxalate stone was removed from the left kidney. Creatinine clearance was 110 ml per minute. Serum calcium, phosphate, uric acid, and parathyroid hormone concentrations were normal. Urinary excretion of calcium ranged from 600 to 800 mg per 24 hours (7.6 to 10.2 mg per kilogram per 24 hours). The water intake, which averaged 4000 ml per 24 hours, contained 360 mg of calcium. Substitution of an equal volume of boiled water for tap water reduced the calcium content to 80 mg; the urinary calcium level then ranged between 200 and 230 mg per 24 hours (2.5 to 2.9 mg per kilogram per 24 hours). No recurrence of renal colic has been recorded over the past two years.

These observations emphasize the importance of the quality of drinking water in patients with hypercalciuria and caution against a recommendation to increase the intake of water, without first estimating its calcium content.

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## DANAZOL AND MIGRAINE

*To the Editor:* The article by Ahn et al. on the use of danazol and Gelfand's accompanying editorial (June 9 issue)<sup>1,2</sup> prompted our interest in employing this drug for the treatment of migraine. Migraine may be regarded as an endocrine-associated disorder, since approximately 60 per cent of women with this disorder have attacks at the time of their menstrual period.<sup>3</sup> These attacks are normally preceded by fluid retention, which is not always relieved by diuretics.<sup>4</sup> Although the relation between water retention and sex-hormone change is not understood, it is well documented.<sup>3</sup> Danazol has been shown to suppress the enzymatic synthesis of sex steroids, as well as to bind competitively to sex-steroid receptors.<sup>5,6</sup> We hypoth-