steroids. To date it has not been possible to determine the overall period of time necessary for patients to remain on steroid maintenance doses. As yet the effect of steroids on the disease process remains unknown.

Because of the potentially dangerous side effects resulting from long-term high doses of corticosteroids, this mode of therapy should be used only when the classical treatment with anticholinesterase agents or thymectomy or both have failed to control the symptoms of the disease.

N. VIJAYAN, MD
P. M. DREYFUS, MD

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Dantrolene Sodium (Dantrium®-Eaton) for Relief of Spasticity

WITHIN THE last three years, extensive evaluation of dantrolene sodium (Dantrium®), a unique chemical agent for relief of severe spasticity, has been done. This medication appears to act directly on the contractile mechanism of skeletal muscle rather than as a central suppressant of spinal cord or higher brain stem reflexes concerned with the spastic state. It is believed that the drug interferes with the release of calcium from the sarcoplasm and thus interferes in the excitation-contraction sequence of muscle. Results of experimental studies have shown diminution of the Achilles reflex and resting tone; while in some reports, volutional contraction of the muscle as measured by transducers or as monitored by electromyography was little affected. The drug offers the potential of decreasing spasms in patients with cerebral palsy, spinal injuries or multiple sclerosis. Findings of recent clinical studies indicate an approximate 50 percent improvement in most patient groups, although with considerable variability from one report to the next.

Side effects include pronounced diarrhea, occasional vertigo and rare hepatic dysfunction. General malaise, light-headedness and some confusion also may occur. Many patients have as a side effect such increased weakness that use of the drug must be discontinued. The drug's effect usually is short-lived and the dose must be increased gradually from 25 mg twice a day to as much as 100 mg four times a day. The drug apparently is not effective for painful muscular contraction in various rheumatic states.

It appears that the dantrolene sodium may be worth trying in patients whose progress in recovery from illnesses with spasticity has not been complete, but at the risk of inducing some simultaneous decrease in motor strength. Landau has recently attacked the theoretical concepts in the use of such agents since he believes that suppression of motor unit activity in symptomatic hyperactive reflexes usually would have to interfere with purposeful movement as well. He points out that previous trials of curare for the relief of reflex spasm are effective but exaggerate weakness.

Despite the theoretical controversies about the new drug, it deserves further study. The dose must be carefully determined for each patient and further data concerning long-term toxicity are needed before its proper place in the armamentarium of relaxant drugs is assigned.

JAMES R. NELSON, MD

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Brain-stem Audiometry

IT IS NOW possible to record in humans the electrical activity generated along the auditory pathway in its course from the cochlea to the cortex using surface electrodes (Jewett). The principle employed is that of "far-field" recording and entails using a small computer to average the potentials generated—at a distance out of the background electrical noise. Approximately 1,000 to 2,000 click trials presented at 10 per second are necessary to resolve the brain-stem components.

With this technique, it is possible to define a series of seven deflections in the first ten milliseconds following click signals. Their amplitudes are in the nanovolt range. Both the latency and amplitude of the components vary in an orderly manner with signal intensity and can be detected to click signals close to threshold intensity. The generators of these potentials have been shown by experiments in animals (Jewett) and in humans (Starr and Achor) to originate in particular areas of the auditory pathway. For instance, Wave I,

which occurs at the shortest latency (1.5 milliseconds), appears to be generated by VIII nerve activity. Whereas, Wave V which appears at latency of about 5.5 milliseconds, appears to be generated in the region of the inferior colliculus. Factors of attention, arousal or expectation do not affect the amplitude or latencies of the response (Picton).

The ability to record the activity of the auditory pathway from a surface electrode in human subjects affords the physician a new tool for evaluating (1) the presence or absence of hearing by objective means, (2) some idea as to the extent of hearing impairment by changes in latency or amplitude of the responses and (3) a measure of the functioning of the central auditory pathway in various neurological diseases.

ARNOLD STARR, MD

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Diet in Multiple Sclerosis

CONSIDERATION OF nutritional factors has always been prominent in the search for the cause and proper treatment of multiple sclerosis (MS). Deficiencies of vitamins and minerals, food allergies and fat intake have been suggested as possible etiologic factors but have never been confirmed as significant. Treatment with vitamin B-12 (and with niacin), as with numerous drugs, was initially thought promising but has faded from use (popularity). Swank's success with a low fat diet has been neither confirmed nor contradicted. Similar but less physiological dietary regimes, based only on anecdotal reports, have recently been popularized in the lay press. The unpalatable nature of these diets makes it unlikely that many patients will stay on them long enough to build up a pool of scientifically significant statistics.

Findings from epidemiological studies related to nutrition have shown significant correlation only with total fat intake and with the percent of calories of animal origin. These are in accord with the geographic findings of high risk areas in countries where the use of dairy products (animal fats) is high.

At present it does not seem that nutritional factors play an important part in either the cause or the treatment of MS, although one double-blind study suggested that a supplement of linoleate (sunflower seed oil was the source) decreased the severity, duration and perhaps the frequency of exacerbations. Even though it is not certain that a high fat diet may have an unfavorable effect on MS, it still seems reasonable to advise MS patients to eat a low fat diet, and to avoid dietary extremes and indiscretions.

GUY M. HUNT, MD

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Guanidine Hydrochloride Therapy in Neuromuscular Disorders

GUANIDINE HYDROCHLORIDE facilitates acetylcholine release at the neuromuscular junction. The drug was first used in treating patients with myasthenia gravis in the late 1930's but was found to be ineffective. In some patients treated, weakness increased. However, in most patients with the myasthenic syndrome (Eaton-Lambert), guanidine decreases weakness and repairs the electrophysiologically demonstrable defect of neuromuscular transmission. The drug also has proven beneficial in some patients with botulinum intoxication. Evidence is far from convincing that guanidine significantly alleviates symptoms in patients with amyotrophic lateral sclerosis even temporarily, and the natural course of the disease is not altered by this therapy.

Adverse reactions to guanidine hydrochloride are common and may be serious. Side effects range from paresthesias, tremors, ataxia, nystagmus, slurred speech, vertigo, increased weakness, increased emotionality, anorexia, nausea, diarrhea, various skin eruptions, anemia, leukopenia, thrombocytopenia or aplastic anemia. Monthly blood counts on patients treated with guanidine appear to be sufficiently sensitive to detect the slowly developing bone marrow depression.