THE USE OF CURARE IN THE TREATMENT OF
SPASTIC PARALYSIS

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The purpose of this report is to direct attention to the usefulness of curare in the management of patients suffering with spastic paralysis, and to describe and discuss an heretofore unreported technique of administration of curare in the treatment of this condition.

At the present time the use of curare, while not actually in disrepute, is approached by many with trepidation. This is due not only to the sinister history of the "South American arrow-tip poison" but also to the general impression that the drug does not lend itself to standardization and is a source of danger by reason of its variable, unpredictable, and at times catastrophic effect. Standard works on pharmacology make such statements as:

"the possibility of its therapeutic use depends largely upon whether an adequate degree of muscular relaxation can be obtained without arrest of respiration, and therapeutic experiments have been hampered by difficulty in obtaining reliable preparations of curare or of its active principles. . . . It is not impossible . . . that if the active principles can be obtained and the dosage accurately determined, curare may yet find a place in therapeutics for the treatment of conditions of spasm and rigidity of voluntary muscles."  
"Curare and its alkaloids have no valid, well-established clinical uses."  

Objection against the clinical use of curare on the basis of its variability was valid until the past few years. Despite this, the interest of many clinical investigators has been drawn to the possibility of its usefulness from the time of Joussset who first utilized it therapeutically through the years. The return of the Gill-Merrill expedition to the United States in 1938 with large quantities of curare made possible research on its standardization.

The expansion of knowledge concerning curare is resulting in its widespread employment in anaesthesiology and in the prevention of the...
traumatic effects of metrazol convulsions.\textsuperscript{1,16} The successful utilization of curare in alleviating convulsions of tetanus has been reported.\textsuperscript{5,17} Finally, the employment of curare in spastic states has been described.\textsuperscript{2,3,7,12}

**OBSERVATIONS ON THE USE OF CURARE**

A preparation of curare has been employed in this hospital in the treatment of spasms of the lower extremities of 12 patients suffering with paraplegia secondary to transverse myelitis incurred as the result of wounds. Justification for the alleviation of spasticity is covered in the discussion and case reports of 5 patients most intensively treated. All the patients whose treatment with curare is described herein are young men with traumatic paraplegia in whom spastic and spasmodically contracting muscles of the lower extremities and trunk posed a threat against the possibility of either partial or complete usefulness. A total of 453 injections was given to these 5 patients up to 8 July 1945.

**Dosage.**

1. The drug was administered intramuscularly.

2. All of the 5 patients described in the appendix were given initial doses of between 0.020 and 0.100 grams, repeated not oftener than 72 hours.

3. In these same cases the amount of curare was increased by increments of (at first) 0.010 grams and (later) 0.020 grams until doses of 0.140 grams were reached.

4. Patients whose treatment we have initiated more recently have received “trial” doses of 0.060 grams, which were later modified to fit their needs.

5. The revised schedules stipulated doses varying from 0.050 to 0.070 grams, given at six-hour intervals.

**Toxicity.**

1. Mild toxic reactions were seen frequently. These were consistently seen when doses exceeding 0.080 to 0.100 grams were employed. When smaller but therapeutically effective doses were used, mild toxic reactions were observed in approximately 50 per cent of the cases. Severe toxic reactions were not noted. For a period of at least 60 minutes following the administration of curare, prostigmine and facilities for artificial respiration were kept in readiness for immediate use. This precaution has never been found to be necessary and after 3 weeks’ experience with the drug, facilities for artificial respiration were not alerted. At no time was a change in pulse, blood pressure, respiratory rate or force observed.

2. The mild toxic reactions noted consisted of weakness in ocular convergence, droopiness of the lids and at times generalized muscular weakness. These were noticeably accentuated when the patient attempted vigorous physical exercise.

3. No cumulative effect was noted when the drug was administered 4, and in one case 5 times daily over a period of more than a month.

4. Diminution of the gag reflex or other cranial nerve weaknesses aside from the above were not observed.

**Time of Appearance and Duration of Effect.**

1. The drug effect became