A PRELIMINARY STUDY ON THE USE OF FLAXEDIL*

(Gallamine Triethiodide) (Tri-(diethylaminoethoxy) benzene triethyliodide)

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Twelve years have elapsed since electric convulsive therapy was introduced in this country at the Pennsylvania Hospital. At the present time, it is a widely used, accepted procedure and the prevention of complications in its application is of great importance.

In a preliminary study using “Flaxedil,” a new muscle-relaxing agent in electric shock therapy, a series of 13 patients with varying disabilities was chosen. These patients would ordinarily have received curare (d-tubocurarine, the active alkaloid of curare).

The most frequent complication of electric convulsive therapy is a fracture in the skeletal system, caused primarily by sudden contraction of muscles and deficiency in bone structure, as well as by faulty technique in application. In epilepsy, the tonic phase is much longer than in artificially induced convulsions, and this may explain why fractures are less frequent in epileptics.

Various measures have been introduced to minimize fractures. Von Braunmuhl treated patients in the embryo-like position, with little significant result. Some observers doubt whether the position of the patient plays an important role. Other attempts to reduce fractures included the use of magnesium sulfate, quinine metachloride, sodium amytal, glucose, dilantin, bromides, and calcium. Electric convulsive therapy with glissando attachment should theoretically reduce fractures because of less sudden onset of the tonic stage, but the experience of the writers during the past two years of using the glissando, does not substantiate this theory.

In 1940, Bennett reported on the use of curare, which has, at this time, become the accepted method for the prevention of fractures in electric convulsive therapy. This drug has been extremely useful in treating patients with bony deformities, recent fractures and cardiac deficiencies. Curare blocks the transmission of impulses across the myoneural junction in voluntary muscles, thus inhibiting the intensity of muscular contraction. In electric con-

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vulsive therapy, the dosage is regulated so as not to paralyze all the muscles completely, but rather to decrease the strength of the contractions. Curare has been accepted as an excellent muscle-relaxing agent but, at the same time, many psychiatrists have reported unfavorable side effects and fatalities that are primarily due to the drug. In reviewing the earlier material of Rockland (N. Y.) State Hospital, there were two recorded fatalities in curare-treated, electric convulsive therapy patients. The side effects, which usually are not serious but rather unpleasant, were: (1) respiratory embarrassment, requiring oxygen as a routine procedure; (2) a feeling of being paralyzed, accompanied by anxiety and resentment on the part of the patient after treatment; and (3) thrombosis of veins, an important complication in patients with poor veins.

In an effort to find a suitable substitute with effective muscular relaxation but without these complications, the authors are now using a new substance, “Flaxedil (Gallamine triethiodide),” which was synthesized in France by Rhône-Poulenc-Spécia. Patients who were to receive flaxedil were given the routine pre-electric-convulsive-therapy work-up, including thorough physical examination, dorsal spine x-rays, EKG and any other elective tests. A test dose of 1 cc. of flaxedil was given intravenously, over a period of one minute, the cubital vein having been used routinely. The patients were told they were receiving a muscle-relaxing drug which would have a short period of action, following which they would receive a second injection to neutralize the first, after which they would be put to sleep. After a period of three to four minutes, during which pulse, respiration and subjective symptoms were noted, an injection of 1 cc. of prostigmin was given by hypodermic. On the second day, a dose of 1½ to 2½ ccs. of flaxedil was given. According to the investigators, the theoretical initial dose of flaxedil tends to be 1 mgm. per kilogram of body weight. The fatal dose is 5.5 mgm. per kilogram of body weight. One cubic centimeter of flaxedil contains 20 mgms.; therefore about 3 to 4 ccs. should be given to an average person—but in the experience of the writers, a reduced grand mal seizure was obtained from dosages of 1.5 to 2.5 ccs. of flaxedil. Flaxedil is injected at a uniform rate of 1 cc. a minute.

The procedure just outlined, with tests for relaxation, such as asking a patient to raise and lower his head, open and close his