

-----The use of Curare in General Anesthesia -----

Abdominal Operations 72

Greatly impressed by the success of Dr. Harold R. Griffith, of Montreal, in using curare for relaxation in general anesthesia, we began using curare intravenously, in 1943, in order to obtain better muscular relaxation during the course of surgical operations.

Up to the present, we used curare in a series of 75 cases. We have not used curare routinely, but only when special indications presented themselves.

A few years ago, to obtain a better relaxation with cyclopropane, we used nembutal but no morphine and no atropine as premedication. The morphine was added at the end of the operation. Since seven years, we use pentothal combined with cyclopropane in most of our abdominal operations. As pentothal causes the bowels to contract, and generally produces good muscular relaxation we use curare only in the most difficult cases, obese, hepatic etc.

The list of our operations in which curare (Intocostrin Squibb) was used is as follows:-

Cyclopropane	43
Pentothal + CO_2H_6 N_2O	27
Ether	5

Intocostein used 75
 Abdominal operations 72
 Gall-Bladder 46
 Stomach
 Laparotomy 16
 Hysterectomy 10
 Bronchoscopy 1
 Trismus 1
 Nodules on cords 1

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 Pentothal + C_2H_6 27
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What are the result obtained?

We observed that the results are the same as demonstrated by both Doctors Griffith and Cullen, i.e. neither the pulse nor the blood pressure was modified, but muscular relaxation and respiratory depression varied according to the quantity injected.

Seventeen patients suffered temporary intercostal paralysis which necessitated manual compressions on the breathing bag. Nevertheless, a one-year-old child who had received no preliminary medication, and who had been superficially put to sleep with ether for bronchoscopy suffered a complete respiratory paralysis for ten minutes after having received an intravenous 7 mgms curare injection. After five minutes of intra-pulmonary artificial respiration, with the help of an endotracheal tube, the diaphragm began to contract. The intercostal activity began ten minutes later. During this period the child presented myosis as opposed to mydriasis as observed in remote therapeutic intoxications. The child's pulse remained good; saliva flowed freely—such was recorded in Cullen's observations on dogs.

Two facts, worthy of mention, could explain this very definite reaction produced by the curare.

Firstly, the child had received no preliminary medication.

Secondly, he had been put to sleep with ether. These facts are in absolute accord with Cullen's observation in a similar case, ~~but not in accord with Dr. Griffith's observations.~~

The child returned home one hour later; he was seen to during the following days; had no temperature and gave no sign of intoxication whatever. A patient, having two nodules on her vocal cords and anesthetized with pentothal, received 2c.c. of curare, the surgeon easily removed the nodules from the cords which remained gaping for a few

minutes without reacting to the stimulus.

A second patient suffering maxillary osteitis and who had been under trismus for three weeks, was anesthetized with pentothal. As the trismus could not yield to the influence of this anesthetic, we gave her an intravenous 2c.c. injection of curare and the maxillary muscles relaxed lightly for a few minutes; the dentist curetted the bone and extracted an inserted tooth.

A third patient, weight 260, was given endotracheal cyclopropane for an acute cholecystitis operation. While we were controlling the respiration, he was injected 5c.c. of curare in a single dose. We, naturally, continued to control the respiration, but the pulse and blood pressure were not modified. The relaxation was perfect. We gave oxygen to the patient for two hours after the operation because cyanosis was more emphasized than before the operation. The post-operative course was normal.

A seriously injured man, suffering rupture of the liver and the spleen, received 5c.c. of intocostrin in a single dose. Cyclopropane was the anesthetic. The operation was then easy to perform; the surgeon sutured the wounds and sponged out the blood. The post-operative course was normal.

We very seldom inject 5c.c. of curare in a single dose. We inject curare before or after the incision of the peritoneum when the muscles do not relax. In 25 cases we repeated the injection before closing the abdominal wound. In some cases we injected intocostrin only for the closure of the wound. The first dose injected is about 3c.c. The second is given in smaller quantity. When the anesthetic is ether, 2c.c. is sufficient.

How did our patients get along during the post-operative course? All of them were kept under close observation during the

post-operative course up to their release from the hospital. No modifications seem to have occurred.

Six patients affected by icterus were given intocostrin. Five of them suffering icterus by gall-stones of the common-duct got through very well. One of them was affected by cardiac lesion. The bile of common duct returned ^R to its yellowish color in just as short a time as in any other cases. One died of cancer.

One patient who had been suffering acute cholecystitis with temperature for three weeks completely recovered.

A patient operated for peritonitis two days after perforation of the gall-bladder healed without any further intoxication.

A patient, suffering diabetes mellitus, was operated for cholecystectomy under cyclopropane anesthesia. She received 4c.c. of intocostrin. Her condition did not worsen during the post-operative course and she received the same quantity of insulin?

Three patients died during the post-operative course. The first, who had been affected by icterus caused by cancer in the biliary ducts for four months, died three weeks after a laparotomy.

The two others died of peritonitis.

As regards these deaths, we are of the opinion that intocostrin had no influence in the evolution of sickness.

To sum up, from the standpoint of clinic no signs of intoxication, temperature, muscular weakness, twitching due to purified curare were disclosed.

It is known that the risks of an operation increase when the patient ^{STRAINS} during the course of operation. This state of rigidity renders the operation more difficult to perform, the tissues more liable to tearing, the tractions upon the bowels and peritoneum more intense. The heart is subject to greater fatigue. The post-operative

illness is more serious; the patient is more subject to shock, adhesions, hernia and to many other complications.

Between a series of patients who remain under muscular tension during operation and a similar series of patients whose muscular relaxation is complete after having been injected with curare. We firmly believe that we shall obtain better results with the later.

After having used curare in obese, short neck, hepatic cases, we came to the conclusion that ~~we~~ prefer muscular relaxation obtained with cyclopropane and curare than that obtained with cyclopropane and nembutal, or pentothal, or ether, in the above mentioned cases.

Intocostrin is not a thing to be used indiscriminately by inexperienced anesthetists.

After further studies of its action on the organs, we shall be in a better position to determine its value.

As curare may be a light toxic, I personally think it advisable that it should not be combined with another anesthetic acting on liver. We are more and more inclined to use it only with cyclopropane. It does not seem toxicant by itself, when added to other poisons, it may become dangerous.

I wish to express a word of gratitude to Dr. H. Griffith for having provided surgery and anesthesia with such a precious means.

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