

# Curare in Anesthesia

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Good muscular relaxation is one of the requirements for efficient abdominal surgery, and in order to obtain <sup>this</sup> relaxation surgeons and anesthetists have ~~sometimes~~ <sup>sometimes</sup> used anesthetic drugs and methods ~~of administration~~ which are ~~sometimes~~ <sup>more</sup> toxic or hazardous. The introduction of curare into <sup>clinical medicine</sup> ~~anesthesia~~ has made it possible for us to obtain complete muscular relaxation at any time during anesthesia with non-toxic controllable anesthetic agents. After more than two years of careful clinical observation I personally have come to the conclusion that curare is a ~~perfectly~~ safe drug to use in combination with certain ~~general~~ anesthetic agents, provided it is administered under properly controlled conditions.

Copy Page 1 - "The story of the transformer - -  
to Page 3 - ..... Dr. L.H. Wright, of New York, we began using it in patients under cyclopropane anesthesia at the ~~Operating room~~ Homoeopathic Hospital of Montreal in January, 1942. The results obtained were dramatically successful, but we proceeded cautiously until we became fairly

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sure that there were no post-operative effects to worry about, and it seemed advisable to publish a preliminary report and to seek confirmation of our results by other workers. The reports which have been published and which have been communicated to me personally by many anesthetists are ~~unanimous~~ unanimous that Curare has a useful place in anesthesia, and that its use appears to be safe. The most convincing and valuable work which has been done is that of Dr. S. C. Bullen of the <sup>State</sup> University of Iowa, who has been using Curare routinely in abdominal surgery <sup>since 1942</sup> and who has now reported over 1000 <sup>successful</sup> administrations.

Personally, I have administered Curare ~~to~~ only 200 ~~times~~ <sup>times</sup>, because ~~as~~ I ~~will~~ have preferred to give it only to those patients who need extra relaxation, and as I will show in my statistics, that is in a comparatively small proportion of our total cases.

I do not propose in this clinical <sup>and pharmacological</sup> report to ~~enter~~ ~~into a discussion~~ ~~as to~~ the physiological action of Curare. ~~It is now established~~ It is sufficient to state that it acts on the neuro-muscular synapse probably by neutralization of the acetylcholine reaction. It effectively blocks synaptic transmission between preganglionic and postganglionic fibres of the sympathetic division of the autonomic nervous system. Curare is eliminated very rapidly, partly by destruction in the liver and partly by excretion unchanged by the kidneys.

Copy Page 3 "No evidence of any ---  
Page 4 to --- never been necessary to use it."

Most of the patients to whom I have administered Curare have been undergoing abdominal operations under Cyclopropane anesthesia. For years I have ~~advocated~~ found cyclopropane unmixed with ether to be generally satisfactory for abdominal surgery, and I have used it in a much larger proportion of cases than ~~the average~~ <sup>do many</sup> other anesthetists. I have personally administered cyclopropane ~~to~~ over 10,000 times, ~~patients~~ and have been lucky enough to have all these patients leave the operating room alive, but I must admit that there are times when it is difficult to secure complete muscular relaxation with cyclopropane alone. Since we have had Curare we do not try to push a resistant patient into deep anesthesia with cyclopropane but at the first evidence of inadequate relaxation we make an intravenous injection of Curare. This takes effect within a few seconds, and is usually sufficient when combined with cyclopropane to maintain relaxation throughout the operation as long as it is required during the operation. The <sup>duration of the</sup> effect of a single dose of Curare when not combined with cyclopropane or other anesthetic agent is not more than fifteen or twenty minutes. The following table shows the incidence of our use of Curare in 1000 consecutive operations:  
(Copy table to end of page 5.)

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The <sup>proper</sup> ~~dose~~ of curare to be used in ~~connection with~~  
patients under anesthesia is a matter of

There have been some differences of opinion  
between various workers as to the proper dose of  
Curare to be used in patients under anesthesia.  
All are agreed that it is best given intravenously,  
altho intramuscular injections are used for the treatment  
of patients with spastic disease, and "Dantocostin"  
is not irritating to the subcutaneous tissues. The  
intravenous route <sup>secures the</sup> most ~~the~~ rapid and controllable  
effect for our purpose. Cullen, and more recently,  
Baird and Adams of the Mayo Clinic, recommend an  
~~average~~ injection of 2.3 cc of "Dantocostin" after the skin incision  
is made, to be repeated if muscular relaxation is  
not satisfactory. My routine has been somewhat  
different. Copy Page 6. "To the average adult patient ---  
to --- firmness and asthenia in the aged."

Whether Curare may safely be used with babies  
and quite small children remains to be determined  
by those ~~who~~ work ~~in~~ in that field. I have not  
used it in any case of cesarean section or obstetrical  
delivery.

Copy Page 7 "As I have said ----- whole investigation"

Much more clinical and laboratory <sup>experience</sup> ~~experience~~  
will be needed before we can come to any ~~final~~  
conclusion as to the ~~place~~ permanent place of  
Curare in Anesthesiology. However, in view

Of our experience so far I venture to predict<sup>5</sup>  
that it will have some effect in reducing the  
incidence of spinal anesthesia since the  
<sup>indication</sup> ~~indication~~ ~~reason~~ for many spinal anesthetics is in order to  
obtain abdominal muscular relaxation; and  
also that Curare will increase the use of pure  
Cyclopropane or Pentothal anesthesia for abdominal  
surgery ~~and thus reduce postoperative~~ without  
the addition of ether, and thus reduce postoperative  
complications. May I close with an urgent  
word of caution — Curare is still a poison, and  
like every other poison it should be handled intelligently  
and <sup>only</sup> by experienced physicians.