Brevital Sodium for Basal Anesthesia in Pediatrics

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In operative procedures for adults, intravenous anesthetics are used mainly to shorten anesthetic induction time, to eliminate the ever-dangerous period of second-stage anesthesia, and to insure a pleasant and non-stimulating induction for the patient. The same results can be attained in children by using basal anesthesia with a rectal agent.

Although there are several agents that can be used rectally for basal narcosis, this paper will be concerned specifically with Brevital Sodium. Brevital has several advantages: it is a parasympatholytic agent which dilates the bronchi; it is rarely associated with laryngospasm; it effects sedation within three to five minutes and recovery is also rapid; it rarely produces vomiting and is less toxic to the liver and kidneys than some other agents. Brevital, then, has of itself qualities which recommend it for use with children.

The majority of children between the ages of one to six years find the period of hospitalization terrifying. They may even undergo experiences that leave permanent impressions in their memories. The anesthetist now has an opportunity for eliminating fear and apprehension.

Rectally administered agents have the great advantage of involving neither mask nor needle. Most children under five or six years of age do not object to the passage of a rectal tube. As soon as the solution is given, the child falls into a deep sleep without any excitement or struggling. Children between the ages of one to three years may be considered the most excitable and the least approachable group. These, in particular, need a calm induction.

Smith states, “Induction by rectally administered agents is undoubtedly the most reliable method by which to gain an even, calm induction.” A rectally administered agent is likewise suited for mentally retarded children who often react poorly to oral or parenteral sedatives.

Tribromethanol (Avertin) dwindled in popularity over the past years and the rectal thiobarbiturates took its place. Following administration of these agents, the patient would usually be awake in one to three hours but most often would fall asleep again. If recovery is delayed, more space must be provided, as well as sufficiently trained personnel to insure the well-being of the patient, and a safe, satisfactory recovery period. Lipoid and nervous tissues absorb Avertin rapidly and contain it after disappearance from blood.

Thiobarbiturates are not truly ultrashort acting agents as there is a

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delayed awakening time. Fatty deposits in the body rapidly absorb these agents and subsequently slowly release them as metabolism proceeds. This transformation is a slow process and consequently the thiobarbiturates only seem ultrashort acting because of rapid localization in fat. Eventually these substances are returned to the circulation as this mechanism is only temporary in nature.\(^4\)

Many hospitals without a post-anesthetic recovery room completely disregard basal anesthesia as being practical due to the lack of constant supervision in the immediate postoperative period. Thus, we are able to see the definite need for a truly ultrashort acting rectal agent.

Methohexital Sodium (Brevital Sodium) was first put into use as an intravenous agent. Brevital Sodium is an oxybarbiturate, differing chemically from other barbiturate anesthetics in that it contains no sulfur in the molecule and has two positions of unsaturation in the fifth position radicals.\(^2\)

In comparing Brevital Sodium with other agents it is interesting to note the following table:

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<th>Avertin</th>
<th>Pentothal Surital</th>
<th>Brevital</th>
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<tbody>
<tr>
<td>1. Sympathomimetic action bronchodilating, no laryngospasm</td>
<td>1. Parasympathomimetic, bronchoconstricting, with tendency for laryngospasm</td>
<td>1. Parasympatholytic, bronchodilating, rare laryngospasm</td>
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<tr>
<td>2. Fairly safe after eating, no vomiting</td>
<td>2. Contraindicated after eating. Increased tendency to severe laryngospasm</td>
<td>2. Rare vomiting</td>
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<td>3. Anesthesia 7-10 min.</td>
<td>3. 10-20 min.</td>
<td>3. 3-5 min.</td>
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<td>5. Toxicity established in ill patients</td>
<td>5. Less toxic to liver and kidneys</td>
<td>5. Less toxic to liver and kidneys</td>
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Parasympatholytic agents dilate the bronchi; Brevital Sodium falls into this classification of drugs, making it beneficial for use in asthmatic patients. If open drop ether is to be used for anesthesia, Brevital is preferable to thiopental because the bronchoconstricting effect of the latter delays the uptake of the anesthetic and prolongs induction. Since Brevital Sodium is less likely to be associated with laryngospasm it may be used prior to bronchoscopic procedures.

At present, Brevital Sodium for rectal use is prepared from the solution for intravenous use. Warm tap water is used in preparing a 10% solution; average dose is 10 mg. per pound. Atropine sulfate should be given before arrival in the operating room; if this is not possible, as soon as the patient is asleep from the Brevital Sodium.

According to Stetson,\(^6\) some children at times will mention abdominal discomfort after the injection, but nothing marked, and the distress may be due to having a rectal nozzle in place. There are no aftereffects on the rectum. Outpatients may leave in two hours after rectal Brevital Sodium, if the operative procedure and
anesthetic are not too extensive. Rectal Brevital Sodium is quite handy to sedate a child before procedures under local anesthesia when the child has food in the stomach, as in an emergency. Stetson also says that muscle twitching is rarely seen at a dose of 8-10 mg. per pound. With a dose of 20 mg. per pound, like the intravenous administration, Brevital Sodium "knocks them cold in a couple of minutes, depresses respirations, and muscle twitchings."

Clinical observations of rectal Brevital Sodium were made on 100 unselected cases at St. Francis School of Anesthesia in La Crosse, Wisconsin. Pre-anesthetic medication consisted only of atropine or scopolamine in a sufficient amount for the age and size of the child. Basal anesthesia was accomplished by using a 10% solution of Brevital Sodium with 10 mg. per pound as a guide for dosage. Occasionally, the amount given was decreased according to the physical constitution of the child. The average onset of action using this guide occurred in three to five minutes. All of the children were sleeping soundly upon arrival in the operating room, approximately 15-20 minutes following administration of rectal Brevital Sodium.

Induction and maintenance of anesthesia was carried out with open drop Vinethene and ether or nitrous oxide, oxygen, and Fluothane, using the semi-closed system. Anesthesia induction in all patients was notably devoid of struggling. The average length of the surgical procedures was forty minutes. A few procedures required up to one hour of anesthesia time. In those cases, the level of anesthesia required deepening as the rectal Brevital Sodium wore off. Rectal Brevital Sodium was administered to children only; the youngest was nineteen months and the oldest five years. The one hundred operations studied were distributed as follows: tonsillectomy and adenoidectomy, 31; herniorrhaphy, 20; eye, 27; neck, 6; orthopedic, 11; cystoscopy, 5.

The children had a quiet awakening which was rapid and without excitement following the termination of anesthesia. Average length of time in the recovery room was fifteen minutes with one isolated case requiring two hours. It was encouraging to see the children wave goodbye to the recovery room nurses in such a short time. Our early morning cases were usually alert and awake enough to eat the noon meal. Nausea and vomiting were at a minimum.

CASE REPORTS

Case 1. Marie, a two year old child, was brought to surgery for excision of a thyroglossal cyst. On physical examination all findings were within normal limits. Marie weighed twenty-six pounds and appeared to be a healthy child. Pre-operative medication was scopolamine gr. 1/300 administered forty-five minutes before the scheduled surgery. Brevital Sodium 250 mgm. was given rectally twenty minutes before the child was brought to the operating room. The onset of action was rapid, even within five minutes. Upon arrival in the surgical suite she was sleeping soundly.

Induction was with open drop Vinethene and ether, intubation performed; maintenance was with nitrous oxide, oxygen, ether, using a non-rebreathing system. The surgical procedure required sixty-five minutes. Following extubation, Marie was taken to the recovery room where she
responded in fifteen minutes. She was alert the rest of the day, slept at intervals, but was easily aroused. Both noon and evening meals were eaten heartily with no subsequent nausea or vomiting.

Case 2. Four year old Danny was admitted to the hospital for a cystoscopy with retrograde pyelograms. He was premedicated with scopolamine gr. 1/300. His weight was thirty-four pounds so Brevital Sodium 300 mgm. was administered per rectum. Danny was sleeping in three minutes. Upon arrival in the operating room twenty-five minutes later he was still sleeping but reacted to external stimuli by opening his eyes, yet remaining quiet.

Fluothane, nitrous oxide and oxygen with a semi-closed technique were used for induction and maintenance of anesthesia. Twenty-five minutes were required for the cystoscopy and another thirty minutes for the retrograde pyelograms. Danny was maintained on nitrous oxide and oxygen while the x-rays were being taken. At the conclusion of the x-rays, he was in a very light plane of anesthesia and had started to respond before he arrived in the recovery room. Danny seemed quite alert and active the rest of the day, playing in his room.

SUMMARY
Brevital Sodium (methohexital sodium) is an ultrashort acting oxygen barbiturate which is not deposited in the fatty tissues. Until recently it has been used only as an intravenous agent. It is now being used as a rectal agent for basal narcosis in children.