dopsin in a micellar species, which results in a modified conformation.

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Key words: rhodopsin, detergent removal, regeneration.

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Retrolbulbar injection of bupivacaine (Marcaine) for anesthesia and akinesia. R. Brian Smith and Jay C. Linn, Jr.

Bupivacaine (Marcaine), 1-n-butyl-DL-piperidine-2-carboxylic acid-2, 6-dimethylamidine hydrochloride, is a new long-acting anilide local anesthetic introduced into clinical practice in the United States in 1973. It was synthesized in 1937 by AF Ekenstam, Egner, and Peterson.1 Bupivacaine is closely related structurally to mepivacaine (Carbocaine). It differs from mepivacaine in that a butyl group was substituted for a methyl group. The drug has been extensively used in other countries for pain relief, epidural, and regional anesthesia.2-5.

Because of its unique long action, retrolbulbar blocks were performed using bupivacaine for various ophthalmologic procedures on seven patients. Bupivacaine is available in concentrations of 0.25 percent, 0.5 percent, and 0.75 percent with and without epinephrine 1:200,000. A concentration of 0.75 percent is recommended for motor block. Patients were premedicated with hydroxyzine, 50 mg. intramuscularly, 45 minutes preoperatively. In the operating room 2.5 mg. increments of intravenous diazepam were administered to a total ranging from 5 to 10 mg. A 30 ml. 0.75 percent solution of bupivacaine was mixed with 150 international units of hyaluronidase (Wydase). Two milliliters of this solution was used for retrolbulbar block. A facial nerve block using a modified Van Lint technique was performed using between 5 and 7 ml. of solution. Tetracaine (Pontocaine) 0.5 percent was applied topically to the cornea in all cases prior to the retrolbulbar block. In two patients tetracaine was repeated once during the procedure.

The results are shown in Table I. Onset of akinesia was between 10 and 15 minutes. In Patient 1, the retrolbulbar block was repeated because of incomplete akinesia. Patients 1 and 2 were observed for return of eye movement. The first detectable movements were 130 and 135 minutes and complete movements returned in 240 and 285 minutes, respectively.

Patient 6 was a 35-year-old female who was 11 weeks pregnant. Local anesthesia was chosen because of pregnancy.
Table I. Results

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age</th>
<th>Procedure</th>
<th>Onset akinesia (min.)</th>
<th>Duration of procedure (min.)</th>
<th>Partial kinesia (min.)</th>
<th>Complete kinesia (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>Cataract extraction</td>
<td>12</td>
<td>50</td>
<td>130</td>
<td>240</td>
</tr>
<tr>
<td>2</td>
<td>70</td>
<td>Cataract extraction</td>
<td>15</td>
<td>65</td>
<td>135</td>
<td>255</td>
</tr>
<tr>
<td>3</td>
<td>65</td>
<td>Corneal transplant</td>
<td>10</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>78</td>
<td>Corneal transplant</td>
<td>—</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>40</td>
<td>Trabeculectomy</td>
<td>12</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>Detached retina</td>
<td>11</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>68</td>
<td>Detached retina</td>
<td>15</td>
<td>130</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All patients recovered uneventfully from surgery and anesthesia. There were no complications.

A comparative study of anesthetic agents used for retrobulbar block was made by Russell and Guyton. The duration of near maximum akinesia of extraocular muscles using procaine and lidocaine in a solution containing epinephrine 1:20,000 is as follows: Procaine 4 per cent—40 minutes, Procaine 4 per cent Wydase (10 to 20 U. per cubic centimeter)—30 minutes, Lidocaine 4 per cent—90 minutes, and Lidocaine 4 per cent Wydase (10 to 20 U. per cubic centimeter)—60 minutes.

Everett, Vey, and Finlay studied the duration of akinesia in monkeys following retrobulbar block with procaine, monocaïne, lidocaine, tetraïne, and carbocaine. The longest duration of akinesia was with carbocaine 2 per cent, the average duration being 55 minutes.

These observations show that bupivacaine 0.75 per cent with hyaluronidase may be successfully used for ophthalmic surgery of more than two hours duration. This may significantly affect the choice of procedures to be performed under local anesthesia. If needed, the duration of retrobulbar block produced by bupivacaine could be prolonged omitting hyaluronidase and adding epinephrine 1:200,000 if so desired.

Thus the majority of ophthalmologic surgical procedures can now be performed, when indicated, under local anesthesia.

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Key words: retrobulbar block, bupivacaine (Marcaine), cataract, retinal detachment, corneal transplant, trabeculectomy.

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