POSTOPERATIVE MUSCLE PAINS*

BY

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Muscle pains have been reported as occurring after the administration of suxamethonium chloride. Bourne et al. (1952) made passing mention of this, but not until 1954 did Churchill-Davidson fully describe these pains and determine their incidence — primarily in the ambulant patient. His series was small, covering 68 patients. In view of considerable speculation on the frequency and importance of these pains it was decided to make a more detailed survey of their incidence and to this end two concurrent series of patients were submitted to a careful postoperative follow-up. Two consecutive groups of unselected patients were observed during and following (plastic, oral, traumatic, and a few who had had abdominal) surgery. Both groups underwent comparable surgical procedures which were mainly plastic and oral, and all had a minimum of 24 hours bed rest postoperatively. Ages ranged from 4 to 83 years. Children under 4 years were excluded as unreliable witnesses, and the majority of patients were between 16 and 50 years of age. The first group consisted of a series of patients who received suxamethonium chloride during anaesthesia, and the second group, acting as a control, was composed of those patients who did not receive suxamethonium chloride but gallamine triethiodide, decamethonium iodide or other relaxant.

METHOD

The pre- and postoperative medication and type of anaesthesia did not vary in the two groups, and was as follows:

Premedication

Adults under 65 years of age: papaveretum $\frac{1}{2}$ grain (20 mg); scopolamine 1/150 grain (0.4 mg).

Adults over 65 years of age: papaveretum $\frac{1}{8}$ grain (10 mg); atropine 1/100 grain (0.6 mg).

Children under 56 lb (25 kg) in weight: quinalbarbitone $\frac{1}{2}$ grain to 3 grains (30-180 mg) according to weight and atropine 1/100 grain (0.6 mg).

Postoperatively

Adults: pethidine 100 mg, or papaveretum $\frac{1}{3}$ grain (20 mg), or butobarbitone 3 grain (180 mg) on evening after operation.

Children: Nepenthe intramuscularly according to age and weight.

Anaesthesia

Induction in all adults and in most children was with thiopentone sodium 200 to 500 mg; a few children were induced with nitrous oxide or cyclopropane.

Maintenance of anaesthesia was by nitrous oxide and oxygen with the addition, where necessary, of pethidine, thiopentone, or cyclopropane.
**Relaxant**

The only difference between the two series investigated was that one received suxamethonium chloride, the other did not.

**Group 1:** 149 patients received suxamethonium chloride; 86 received suxamethonium chloride as the sole relaxant, and 63 received suxamethonium chloride combined with a simultaneous injection of decamethonium iodide, by which means more prolonged muscle paralysis of rapid onset was achieved.

When given alone, the initial dose was suxamethonium chloride 50–75 mg and the average total dose was 150 mg; in the other cases a single dose of 50 mg suxamethonium chloride, and 4 mg decamethonium usually sufficed.

**Group 2:** None of these patients received suxamethonium chloride. Where relaxation was necessary it was achieved by gallamine triethiodide, decamethonium, or ether. This group numbered 96 patients.

**RESULT OF FOLLOW-UP**

264 patients were followed up postoperatively; of these, 168 had received suxamethonium chloride while under anaesthesia, but for reasons given (table I) it was necessary to exclude 19 cases—reducing group 1 to 149 patients. The remaining 96 patients comprise group 2—the “control” series.

Table II shows the division of patients into their respective groups.

All the following tables (III, IV, V and VI) are related to the 149 patients in group 1.

Table III shows the subdivision of group 1 into (a) those receiving suxamethonium chloride as sole muscle relaxant during anaesthesia (86 patients), and (b) those receiving suxamethonium chloride and decamethonium iodide (63 patients).

Table IV shows the incidence of pains. Twenty per cent of these patients were found to develop pains or stiffness following administration of suxamethonium chloride. No patient in group 2 complained of pain or aches of this type.

Table V shows the distribution of pains. Some patients complained of pain and aches, or of stiffness, and these pains were most common in the neck, abdominal muscles, and subcostal region, or they...
TABLE IV
Incidence of pains

<table>
<thead>
<tr>
<th>Group</th>
<th>No. of patients</th>
<th>Total in series</th>
<th>Type of pain</th>
<th>Total for group</th>
<th>% for whole Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
<tr>
<td>1.</td>
<td>Suxamethonium chloride, alone</td>
<td>86</td>
<td></td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Suxamethonium chloride and decamethonium iodide</td>
<td>63</td>
<td></td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Other means of relaxation</td>
<td>96</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total for group 149 | 30 | 20.1 |

TABLE V
Sites of pain and stiffness

<table>
<thead>
<tr>
<th>Sites of pain and stiffness</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized pains</td>
<td>9</td>
</tr>
<tr>
<td>Chest subcostal or retrosternal</td>
<td>4</td>
</tr>
<tr>
<td>Neck stiffness only</td>
<td>4</td>
</tr>
<tr>
<td>Neck and subcostal region</td>
<td>3</td>
</tr>
<tr>
<td>Abdominal and chest muscles</td>
<td>2</td>
</tr>
<tr>
<td>Abdominal and neck muscles</td>
<td>3</td>
</tr>
<tr>
<td>Abdominal muscles only</td>
<td>1</td>
</tr>
<tr>
<td>Neck and legs</td>
<td>3</td>
</tr>
<tr>
<td>Interscapular</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Table VI shows an interesting variation in sex incidence.

TABLE VI
Shows the sex incidence of these pains

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number of cases</th>
<th>Those with pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females in Group 1</td>
<td>82</td>
<td>25</td>
</tr>
<tr>
<td>Males in Group 1</td>
<td>67</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>149</td>
<td>30</td>
</tr>
</tbody>
</table>

DISCUSSION

The muscle fasciculations which precede onset of paralysis by suxamethonium commonly in neck, or subcostal region. Did not last into second postoperative day if the patient remained in bed.

(b) Moderate. Pains were in two or more sites. Commonly abdominal and neck, or abdominal and chest muscles. Duration of discomfort varied but patients were usually free from symptoms on the third postoperative day.

(c) Severe. Pains were generalized and so disabling that the patient was immobilized. The usual duration was 72 hours. All these patients were confined to bed till symptom free. Analgesics were necessary. Acetylsalicylic acid 20 grains (1.2 g) t.i.d. was used with fairly good results. Pethidine 50 mg gave only temporary relief. Codein in small doses was not effective.
chloride were believed to bear some relation to the postoperative sequels. Bourne et al. (1952) state that where fasciculations are vigorous postoperative stiffness is more likely. The amount of fasciculation and the degree of subsequent relaxation depend on the dose and rate of injection of the suxamethonium chloride (Mayrhoffer, 1952). Rapid injection of even a small dose of suxamethonium chloride causes marked muscle twitching followed by profound relaxation which is very transient, but more slowly given injection causes barely perceptible fasciculation and is followed by a less complete paralysis (Tewfik, 1953). For these reasons it is logical to inject the initial depolarizing dose very slowly. However, the twitch-pain relationship is not constant. Five patients in the series who exhibited violent muscle twitching on injection of the drug did not suffer any postoperative discomfort.

Fasciculations are usually less marked in children and old people, and within the limits of this series postoperative pains in these patients appeared less common. As mentioned previously, most patients in the group under investigation fell between the ages of 16 and 50 years of age.

Churchill-Davidson (1954) first described these pains and estimated that the incidence was far higher in ambulant outpatients (66 per cent) than in those confined to bed (13.9–5.6 per cent).

CONCLUSIONS

From this survey the following facts emerge:

That suxamethonium chloride may be followed by postoperative pains and stiffness in 20 to 25 per cent of patients. Combining a second depolarizing muscle relaxant with suxamethonium chloride does not increase the incidence of pain, and may decrease it.

Suxamethonium chloride has the advantage of providing profound relaxation with rapid reversal, but a neuromuscular blocking agent which acts for five minutes and whose unpleasant sequelae may stretch into the third postoperative day, is not "short acting" in any true sense. Furthermore, the postoperative immobility which it may impose might favour the development of unpleasant or dangerous postoperative complications. Some patients who, from a surgical aspect, were fit for discharge from hospital, performed remained in bed a further 48 hours to recover from the effects of suxamethonium chloride.

It would appear that the routine use of suxamethonium chloride should be restricted to those cases where its advantages outweigh the risk of its unpleasant sequelae.

SUMMARY

Investigation of a series of 149 patients in hospital who received suxamethonium chloride showed that 20 per cent developed postoperative muscle pains.

In a concurrent series where relaxation was obtained by other means there was complete absence of these pains.

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REFERENCES