EFFECT OF INDOMETHACIN ON PAIN RELIEF AFTER THORACOTOMY

T. PAVY, C. MEDLEY AND D. F. MURPHY

SUMMARY

The effect of indomethacin on postoperative pain was studied in 60 adult patients undergoing thoracotomy in a prospective, randomized, double-blind manner. Patients receiving indomethacin required significantly less opioid after operation and had significantly lower pain scores compared with the control group. Pain on movement and on coughing were reduced also. No major adverse effects were encountered.

KEY WORDS

Many techniques have been used for management of pain after major thoracic surgery, with varying degrees of success. The conventional use of intermittent i.m. injections of opioids is known to be less than ideal in most circumstances. I.v. infusions of opioids provide less fluctuation in the quality of analgesia, but they require the use of more sophisticated infusion devices and experienced personnel for optimal use. Cryoanalgesia is effective in decreasing opioid requirements, but is time consuming, supplies insufficient analgesia when utilized alone and may cause prolonged anaesthesia or dysaesthesia after surgery [1, 2]. Continuous paravertebral block [3, 4] and extradural analgesia using local anaesthetic or opioid may be used, but may be associated with hypotension and delayed respiratory depression [5–7]. Moreover, not all pain after thoracotomy is dermatomal in distribution and therefore may not be relieved by regional analgesia alone [8]. Interpleural local anaesthesia has been reported as being variably effective after thoracotomy [9, 10].

In recent years several studies have reported the successful use of non-steroidal anti-inflammatory agents in the treatment of postoperative pain and in the reduction in opioid requirement when used in combination with these drugs [11–13]. As such drugs might be useful in the management of pain after thoracic surgery, the use of indomethacin suppositories to augment the effects of i.v. opioid analgesia was evaluated in a prospective randomized double-blind trial.

PATIENTS AND METHODS

We studied 60 adult patients undergoing thoracotomy, after obtaining informed consent and following ethics approval by the Committee for Human Rights. Patients with a previous history of peptic ulceration were excluded from study.

Premedication comprised oral temazepam 20–30 mg 1 h before operation. Anaesthesia was induced with thiopentone and maintained with halothane or enflurane, supplemented with morphine 0.1–0.2 mg kg⁻¹. Neuromuscular block was produced with vecuronium or pancuronium, and endobronchial intubation and one-lung ventilation were undertaken when appropriate. When the patient recovered from anaesthesia, continuous i.v. infusion of papaveretum was commenced and the rate of infusion adjusted to attain adequate analgesia as determined by each individual patient. The patients were discharged from the recovery room when clinically stable and when pain was controlled satisfactorily.

The patients were allocated by random sequence to one of two study groups. One group received indomethacin suppositories after operation: two (200 mg) on termination of surgery and
one (100 mg) twice daily for 3 days. The other group received identical placebo suppositories in a similar manner. Neither the patient nor the investigator, attending nurses and physiotherapist were aware of which drug was administered. In addition, all patients were maintained on i.v. papaveretum titrated by the attending nurse to maintain adequate postoperative pain relief as determined by the patient. The attending nurses administered bolus doses of i.v. papaveretum as required and altered the rate of infusion, increasing the rate to attain control of pain and decreasing it in the case of excessive drowsiness in the presence of adequate pain relief. The dose of bolus injections, time of administration and time and change in infusion rate were documented for all patients. All patients were nursed in the same ward by the same team of senior nurses who were experienced in administration of i.v. analgesia.

Measurements undertaken included evaluation of total requirement for papaveretum at 2, 4, 6, 12, 18, 24, 30, 36, 42 and 48 h from return to the ward and patient evaluation of pain using a 10-cm visual analogue scale [14] before and after chest physiotherapy, which was undertaken three times daily by the same physiotherapist. Chest physiotherapy involved deep breathing exercises, coughing, percussion, postural drainage and mobilization.

Statistical evaluation of papaveretum requirement was by a one-tailed t test. Comparison of pain scores was performed using the Mann–Whitney test.

RESULTS

Sixty patients were included in the study; 29 received indomethacin suppositories and 31 received placebo. Four patients receiving indomethacin suppositories were lost from study because they required transfer to the intensive care unit for surgical reasons. Two patients in the placebo groups were lost for similar reasons. Two patients were withdrawn from the study early because of suspected gastrointestinal disturbance caused by the drug. One of these patients was found to have received placebo and the other indomethacin. Patient data and the type of operation performed for the remaining patients are shown in table I.

Patients receiving indomethacin suppositories required less papaveretum at all times compared with patients receiving placebo (figs 1, 2) (P < 0.05 from 12 h until completion of the study period at 48 h).

Pain scores on the first day after surgery, before and after chest physiotherapy, are shown in figure 3. Pain scores on the second day after operation followed a similar pattern.

Patients receiving indomethacin had significantly lower pain scores at all times compared with those who received placebo (P < 0.01). Pain scores before and after chest physiotherapy were not significantly different within each group.

<table>
<thead>
<tr>
<th>Table I. Patient data</th>
<th>Indomethacin group</th>
<th>Placebo group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr) (mean (SD))</td>
<td>60.9 (9.0)</td>
<td>63.7 (12.0)</td>
</tr>
<tr>
<td>Weight (kg) (mean (SD))</td>
<td>69.1 (12.4)</td>
<td>71.9 (12.8)</td>
</tr>
<tr>
<td>Sex (M/F)</td>
<td>19/5</td>
<td>15/13</td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonectomy</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Open lung biopsy</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Surgical pleurodesia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Excision carcinoid/hamartoma</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Excision mediastinal mass</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Thoracoplasty</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

FIG. 1. Cumulative papaveretum requirement (SEM) for indomethacin (▲) and placebo (●) groups over 48 h after operation.
FIG. 2. Papaveretum requirements (SEM) for indomethacin (■) and placebo (□) groups in 6-h time periods for 48 h after operation.

FIG. 3. Pain scores (VAS) (SD) on the first day after operation for indomethacin (■) and placebo (□) groups.

With the exception of the two patients mentioned above who were withdrawn from the study early, no other adverse effects were encountered. Indomethacin was discontinued after the third day after operation and adverse effects from its chronic use were therefore not encountered.

DISCUSSION

Non-steroidal anti-inflammatory drugs are used predominantly for mild to moderate pain. Used alone, they are usually insufficient to control pain after major surgery, but may have a significant opioid sparing effect in the immediate postoperative period. Gillies and colleagues [11] found that patients receiving ketorolac by continuous infusion required significantly less morphine than the control group after upper abdominal surgery.

Similar results have been found with ibuprofen [12] and diclofenac [15].

In the present study, indomethacin significantly reduced papaveretum requirements. This may be advantageous in patients with chronic pulmonary disease at significant risk of worsening pulmonary function as a result of pulmonary resection and postoperative pulmonary atelectasis. Our results are similar to those of Reasbeck, Reasbeck and Rice [16], who studied the effect of indomethacin in patients recovering from major abdominal surgery. Keenan and colleagues [17], comparing rectal indomethacin and cryoanalgesia as adjuvants to opioid analgesia after thoracotomy, found indomethacin to be better than cryoanalgesia in reducing pain on movement. Patients receiving indomethacin alone or in combination with cryoanalgesia also required less opioid supplementation than those receiving opioid alone or opioid with cryoanalgesia.

We conclude that pain relief after thoracotomy may be improved by the administration of indomethacin, as shown by reduced pain scores and requirements for papaveretum.

REFERENCES


