

If this is so we may expect an increase in incidence of this malignancy in the future in women with renal transplants who become pregnant.

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Intravenous indomethacin or oxycodone in prevention of post-operative pain

It is an indictment of modern medicine that prevention of post-operative pain has been neglected.¹ Pain seems to be generally accepted as an essential part of the postoperative phase, and patients may suffer intolerable pain despite the plethora of effective analgesics available. Opiates are still the most popular potent analgesics, but they are usually not administered frequently enough or are not administered until the patient complains. Increased interest has recently been shown in continuous intravenous or on demand administration of opiates.²⁻⁴ We compared the efficacy of continuously administered intravenous indomethacin and intravenous oxycodone in preventing postoperative pain.

Patients, methods, and results

Altogether 168 patients (124 women, 44 men) received a single dose of 0.5% bupivacaine as an epidural anaesthetic before operation for varicose veins or orthopaedic disorders. Immediately after the operation 148 patients

were given 25 mg indomethacin (Confortid IV, A/S Dumex, Denmark) and 20 were given 5 mg oxycodone (Oxanest, Leiras, Finland) intravenously over 10 minutes. Thereafter indomethacin (5 mg/h) and oxycodone (2 mg/h) were given as continuous injections by means of an automatic syringe pump (Hostec R-50, Finland) throughout the night after the operation. Supplementary doses of 10 mg indomethacin or 2 mg oxycodone were administered intravenously to patients who complained of pain. A five degree scale of pain (none, mild, moderate, severe, or intolerable) on a time schedule was used to record pain and its duration. Possible side effects were recorded. Patients were questioned about their pain on the morning after the operation.

The table shows the incidence and relative duration of pain with each drug. The mean dose of indomethacin was 123 mg and of oxycodone 38.1 mg. Forty one (27.7%) of the patients given indomethacin and eight (40%) given oxycodone received supplementary doses of their respective drugs. The incidence of no pain was significantly higher ($p < 0.01$) and the incidence of severe pain significantly lower in patients given indomethacin ($p < 0.01$).

Side effects comprised mild nausea (17 patients (11.5%) given indomethacin *v* four (20%) given oxycodone), vomiting (three (2%) *v* three (15%)), and mild dizziness (seven (4.7%) *v* seven (35%)). Patient acceptance of the treatment was high: 143 patients (97%) given indomethacin and 19 (95%) given oxycodone found it acceptable.

Comment

The lower incidence of postoperative pain and the longer periods without pain ($p < 0.01$ and $p < 0.05$, respectively) in patients given indomethacin show that indomethacin prevented postoperative pain more effectively than oxycodone. The mean dose of indomethacin was only 123 mg whereas that of oxycodone was 38.1 mg, which is almost the maximum daily dose.

Because of its mechanism of action and other properties it seems logical to administer indomethacin prophylactically and then to maintain a preventive concentration by continuous intravenous injection. An initial intravenous dose of 25 mg and a maintenance dose of 5 mg/h are low enough to permit additional doses when necessary. This regimen resulted in a peak serum concentration of about 2 mg/l and a steady state concentration of about 0.7 mg/l. Indomethacin has the added advantage of being non-addictive.

The type of surgery that these patients had undergone was theoretically suitable for comparing analgesia obtained with an anti-inflammatory agent and with oxycodone. In more severe and deeper pain intravenous indomethacin may be administered together with intravenous opiates because of their advantageous synergism.⁵

¹ Anonymous. Postoperative pain [Editorial]. *Br Med J* 1976;**i**:1491.

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Incidence and duration of post-operative pain in patients given intravenous indomethacin or oxycodone

Degree of pain*	No (%) of patients given:		P†	Duration of pain as % of total duration of treatment		P†
	Indomethacin	Oxycodone		Indomethacin	Oxycodone	
None	103 (69.6)	8 (40)	< 0.01	97.1	90.0	< 0.05
Mild	18 (12.2)	6 (30)	< 0.05	1.6	5.0	NS
Moderate	22 (14.9)	3 (15)	NS	1.1	2.5	NS
Severe	4 (2.7)	3 (15)	< 0.01	0.2	2.5	NS
Intolerable	1 (0.6)		NS	0.04		NS
Total	148 (100)	20 (100)		100	100	

* Incidence of pain was registered according to hardest pain.

† χ^2 test.