

East African Medical Journal Vol. 77 No. 6 June 2000

POST-OPERATIVE MANAGEMENT OF PAIN FOLLOWING MAJOR ABDOMINAL AND THORACIC OPERATIONS.

E. F. Ocitti MBBS (KRT), MMed(Surg) Nbi, General Surgeon, P.O. Box 21274 and J. A. Adwok, MBBS (KRT), MMed(Surg), Nbi, FRCS Ed., Associate Professor, Department of Surgery, College of Health Sciences, University of Nairobi, P.O. Box 19676, Nairobi, Kenya.

Request for reprints to: Professor J. A. Adwok, P.O. Box 21274, Nairobi, Kenya.

## POST-OPERATIVE MANAGEMENT OF PAIN FOLLOWING MAJOR ABDOMINAL AND THORACIC OPERATIONS

E. F. OCITTI and J. A. ADWOK

### ABSTRACT

**Objective:** To study the common methods of analgesia and their effectiveness in post-operative patients and to assess the occurrence of common post-operative complications related to pain.

**Design:** A prospective descriptive study.

**Settings:** Three general surgical wards and one cardiothoracic ward at the Kenyatta National Hospital, Nairobi, between 1st September 1996 and 30th November 1996.

**Patients:** One hundred and six adult patients admitted in the hospital for thoracotomy and/or laparotomy over a period of three months.

**Results:** Overall, 60% of the patients did not achieve adequate pain relief during the first 72 hours after surgery. Age, sex, weight, drug and type of operation did not influence pain score significantly. All but two patients were not prepared psychologically about expectations after surgery. Over ninety seven per cent received pethidine while 2.8% had morphine. The drugs were prescribed and administered with too little attention to the patient's response and too much concern about adverse effects and narcotic addiction.

**Conclusion:** The results suggest that the standard of post-operative pain relief is poor. Patients need to be told more about what to expect (and demand). The medical and nursing staff need further education in how to prescribe and administer analgesia with reference to individual drug response. Other more effective methods of pain control should be introduced.

### INTRODUCTION

The treatment of post-operative pain had been described by a non medical man subjected to surgery as "a grave defect in public hospital treatment which ..... is cruel and a callous disgrace"(1). This subjective account of surgery stimulated an editorial on "tight-fisted analgesia"(2) in which the attitude of the medical profession towards post-operative pain was castigated. Another editorial commented on the subjective view of a professor of obstetrics in which he had stated that his pain (after heart surgery), defies description(3). The inadequacy of post-operative pain relief at night has been an object of another devastating account by a medical man who had undergone upper abdominal surgery and had been prescribed "on demand" post-operative analgesia. He described post-operative pain as "a chilling euphemistic indictment of the neglect which patients suffer after operation"(3).

There are numerous reviews, editorials and letters in the medical literature, nearly all have stressed the inadequacy of the present approach in post-operative pain management(2,3). Medical and nursing staff are unduly concerned about the adverse effects of narcotics. This reflects an educational process in which the emphasis has been on dangerous side effects, such as respiratory depression and addiction rather than effective pain relief. It has been suggested that upto 80% of surgical patients

have moderate to severe pain for most of the first 72 hours after surgery(4,5).

Immobility induced by fear that any movement may cause pain increases the liability of deep vein thrombosis and thus, thromboembolism(6). Immobility also increases the risks of pressure sores and promotes muscle atrophy, particularly in the frail and elderly(7). Other psychological consequences of pain following surgery include nausea that potentiates post-operative ileus; tachycardia and hypertension which increase cardiac ischaemia in susceptible patients. Inadequate pain relief also increases the catabolic stress response to surgery(7). All these effects can be minimised by appropriate analgesia. Pain control is therefore fundamental to a rapid post-operative recovery and good quality care of a surgical patient.

Kenyatta National Hospital is a major referral centre in the east African region. This prospective study was undertaken to assess common methods of analgesia and their effectiveness in post-operative patients. The occurrence of common post-operative complications related to post-operative pain were also studied.

### MATERIALS AND METHODS

This was a prospective study on post-operative pain relief conducted on in-patients who had been admitted and operated in the abdomen or thorax on the surgical wards at Kenyatta National Hospital (KNH) over a period of three months.

All adult patients admitted for laparotomy and/or thoracotomy on the surgical wards who were cooperative and with good communication skills formed the study group. The aim of the study was explained to the patient and an informed consent was obtained from the patient, parents or guardian. The post-operative treatment sheet of the patient and the operation notes were reviewed and analysed for the prescription of analgesia and operation done respectively.

A questionnaire was designed to record hospital number, age, sex, weight, diagnosis, type of anaesthesia, surgical procedure, assessment of degree of analgesia and other variables concerning postoperative complications related to the operation and updated for each patient on a daily basis. Assessment of the degree of analgesia was scored using verbal response scale (VRS).

Statistical data was analysed by using student's t-test and Mann-Whitney U-test; correlation coefficients were calculated to evaluate the effect of age on scores of pain. The scores of pain were analysed in respect to the operation and sex with t-test. A significance level of  $p > 0.01$  was used where applicable.

The results were presented in the form of tables and bar-charts. The final results were discussed and compared with the findings of other researchers in the literature. Conclusions and recommendations were drawn from the results.

Patients with a history of drug abuse, major psychiatric disorder, allergy to an analgesic, chronic pulmonary disease or inability to cooperate were excluded from the study. Minor abdominal operations like simple appendicectomy which do not involve extensive laparotomy were excluded.

## RESULTS

A total of 120 patients who had operations of thoracotomy and laparotomy were approached. One hundred and six patients were finally enrolled in this study. Fourteen patients were excluded for various reasons. Eight were not able to communicate post-operatively for two consecutive days, two patients were admitted to the intensive care unit (ICU); four patients refused to participate in the study and two patients discharged themselves to private hospitals soon after surgery. The remaining 106 patients fulfilled the inclusion criteria for the study.

Figure 1 shows the route of admission to hospital. The mean age was 39 years ( $SD \pm 14$ ). Minimum age was 15 years and maximum age 81 years (Figure 2). The male:female ratio was 4:1.

There was a wide weight range with a mean weight of 64 kg ( $SD \pm 8.9$ ). No statistical significance was noted when age, sex and weight were computed for inter-relationship with pain perception and treatment in the various age groups ( $p = 0.38$ ).

All patients received the standard premedication of atropine 0.6 mg and pethidine 50 mg given intramuscularly or intravenously before operation. The doses of the premedication did not differ significantly.

All the 106 patients were anaesthetised in a standard manner. Induction of anaesthesia was attained using sodium thiopental (STP) and suxamethonium (Scoline) and anaesthesia was maintained after intubation with nitrous oxide in oxygen and/or halothane. Pancuronium was used for muscle relaxation and artificial ventilation maintained for delivery of the gases.

Figure 1

Routes of admission to hospital

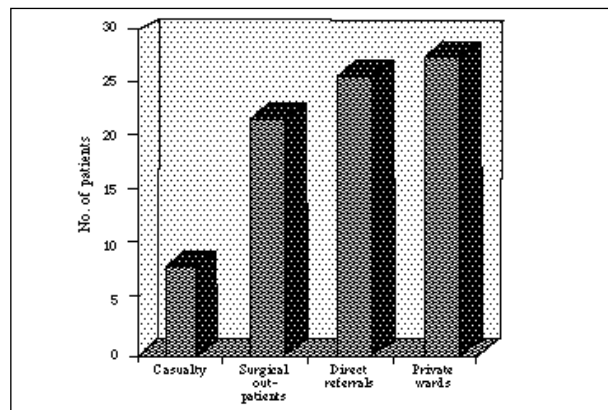
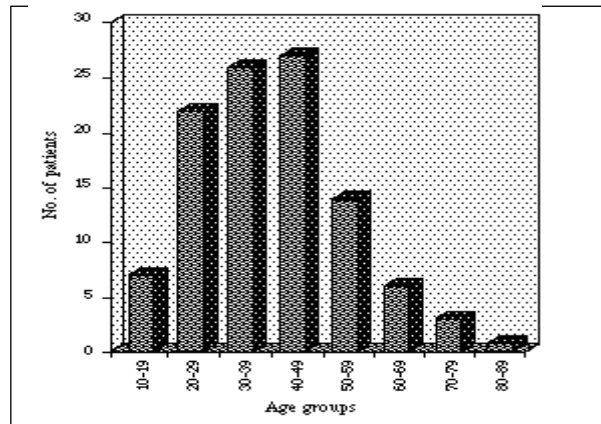


Figure 2

Age distribution



The indications for surgery in both the thoracotomy and laparotomy patients are shown in Tables 1 and Table 2, respectively.

Table 1

Indications for thoracotomy

Diagnosis	No. of patients
Ca. bronchus	2
Ca oesophagus	5
Achalasia	4
Mitral stenosis	2
Emphysema	1
Empyema thoracis	1
Haemothorax	1
Total	6

Post-operatively, all patients were prescribed opioid analgesics in the first 72 hours. One hundred and three patients (97.2%) were prescribed pethidine and three patients (2.8%) received morphine. Table 3 shows the route of administration of the drugs. The frequency of administration of drugs is shown in Table 4. Fifty three patients (50%) were prescribed pethidine at a dose of 50mg. Out of these, 34 patients received their medications

eight hourly; thirteen patients six hourly and only two patients four hourly.

**Table 2***Indications for laparotomy*

Diagnosis	No. of patients
Abdominal trauma	25
Gastric pathology	12
Small intestinal obstruction	21
Obstructive jaundice	7
Peritonitis	7
Healthy kidney donors	3
Colonic pathology	5
Miscellaneous abdominal pathology	9
Abdominal aortic aneurysm	1
Total	90

**Table 3***Routes of administration of analgesics*

Route	%
Intramuscular	78.3
Intramuscular and intravenous	20.8
Intravenous	0.9
Total	100

**Table 4***Frequency of analgesic administration*

Hours	No. of patients	%
4	7	6.6
6	24	22.6
8	61	57.5
12	14	13.2
Total	106	100

Thirty six patients were given pethidine at a strength of 100 mg. Twenty three patients received this eight hourly; seven patients six hourly and no patients received this dose at four hourly intervals. Table 5 gives an overview of the doses and drugs administered at various intervals.

**Table 5***Distribution of analgesics per strength per interval*

Drug	Dose (mg)	Interval				No. of patients
		4 hourly	6 hourly	8 hourly	12 hourly	
Pethidine	50	2	13	34	4	53
Pethidine	75	3	3	5	3	14
Pethidine	100	-	7	23	6	36
Morphine	5	1	-	-	-	1
Morphine	10	1	-	-	-	1
Morphine	25	-	1	-	-	1
Total						106

**Table 6***Distribution of pain score in 106 patients (per cent)*

Pain	Day 1	Day 2	Day 3
None	9.4	10.4	21.7
Mild	34.4	35.8	30.3
Moderate	42	42.5	45
Severe	14.2	11.3	3

Seven patients were not scored for pain as their analgesics were stopped in less than 72 hours. Table 6 shows the distribution of pain score in the three days of narcotic analgesic medication. The data were combined and analysed on a daily basis to derive an average of daily score for pain in the whole study population.

## DISCUSSION

Post-operative pain relief in patients recovering from major abdominal and thoracic operations was studied prospectively over a three-month period at the Kenyatta National Hospital.

While various methods are available for controlling pain, effective post-operative analgesia is still a luxury that is withheld from too many patients. Failure to treat patients in severe pain with adequate doses of narcotic analgesics has been described as another form of drug abuse, this time by the physician for withholding narcotic analgesics from those who really need them(8).

The analysis of scales used in scoring pain severity was complicated by variation in the doses given and the number of scales completed. There was also no statistical significance when age, sex and weight were computed for inter-relationships with pain perception and treatment in the various groups ( $p = 0.38$ )

A number of studies have found that 40% - 80% of patients receiving conventional intermittent intramuscular narcotics for post-operative pain classify their pain as "very unpleasant indeed" (4,5,8-10). These reports are in keeping with the findings of this study where 60% of patients assessed had their pain scored as moderate to severe.

The management of post-operative pain should ideally commence at the time the patient is seen and the decision for an operation made. This primary aspect which is the psychological component is very important(11,12). It has been noted that a clear explanation of the effects of proposed operation, especially in terms of severity and duration of post-operative pain, reduce the amounts of opioids required in the post-operative period(13). Only about two per cent of patients in this study were offered "some" information concerning pain after surgery despite several days spent on the wards pre-operatively, on average.

The physiological component of pain and its management is the mainstay of successful treatment of a patient with acute pain. The most commonly used narcotic at Kenyatta Hospital is pethidine, which is slightly inferior

to morphine and shorter acting. Properly used, however, all opioids can be very effective in controlling pain (14)

There has been a unanimous criticism of intermittent intramuscular administration of opioids in the literature in the last two decades(15,16). The main contention with this method is the unpredictable absorption of the drug particularly after surgery, when peripheral perfusion may be reduced and uptake prolonged giving an uneven level of analgesia. In 78% of the patients in this study, the route of administration of opioid was entirely by the "time honoured" intermittent intramuscular injection. Given the practical reality in the hospital, the prediction is that the method is bound to remain a common practice for some time. There is however, some justification in the intramuscular injection of analgesics in our set up due to the ease of administration, low cost and less demand on staffing. Nevertheless much can still be done to improve on this feasible and available method if more awareness is created in the understanding of how to achieve effective analgesia and its importance to the patient post-operatively.

There seems to be a persistent widespread ignorance about the pharmacodynamics of the most prescribed drug, pethidine(10,14). Fifty seven per cent of the patients were prescribed the drug on eight hourly basis, 22.6% on six hourly basis, regardless of the strength while others received it only twice daily. This is too far away from the consideration that the duration of action of pethidine is about four hours(10).

More often than not, physicians prescribe analgesics with the fear that it might cause sedation, respiratory suppression and addiction(18). This irrational approach to prescribing narcotic drugs leads to the use of less than adequate doses. The inability to predict accurately the individual analgesics requirement has led to the suggestion that self administration systems may be the most efficient means of achieving good analgesic effect. This method is widely used in hospitals in developed countries(19,20), but has, so far, not been available or introduced at the Kenyatta National Hospital.

Local analgesia can eliminate pain whereas systemic analgesia alleviates it(9). Some researchers reported complete analgesia in over 90% of patients treated by this method(6,12,16,21). Epidural or intercostal block are the main modalities in use for local analgesia.

Non-steroidal anti-inflammatory drugs (NSAIDs) play an important role in the management of acute pain after 48 hours(22,23). They act by blocking the enzyme cyclo-oxygenase which is an important enzyme in the pathway of prostaglandin synthesis. Opioids combined with NSAIDs can reduce the analgesic requirement of the former by 30%. NSAIDs have the advantage of availability for use through the oral, parenteral and rectal routes.

Untreated post-operative pain has many deleterious effects on respiration, circulation, autonomic activity, renal function and gastrointestinal activity.

The most common and serious complications are pulmonary. Sixty to eight per cent of patients develop these complications(4,24-26). Adequate analgesia provides

improvement in pulmonary function and reduces the incidence of post-operative pulmonary complications(5,27).

In conclusion, it is important to observe that patients need adequate preoperative counselling as far as post-operative pain is concerned and what to expect. Prescription of opioids should be in adequate doses and should not be withheld unnecessarily because of fear of respiratory depression or addiction. Other effective, simple and cheap methods of pain control should also be utilised. It might not be easy to free every patient from the last vestige of his pain, but some flexibility in the prescription pattern could go a long way in alleviating their agony.

#### REFERENCES

1. Nac Innes, C. Cancer ward. *New Society*. 1976; **36**:232-5.
2. Editorial Tight-fisted analgesia. *Lancet*. 1979; **1**:1338.
3. Editorial. The other end of the knife. *Brit. Med. J.* 1976; **1**:1491.
4. Alfred, J.D. Postoperative analgesia. Essential surgical practice, 2 edn. A. Cuscheiri, G.R. Gile, A.R. Moosa. Butterworth Heinemann, Ltd. 1988.
5. Cusheiri, R.J., Morran, E.G., Howie, J.C. and McArdle, C.S. Postoperative pain and pulmonary complications: Comparison of three analgesic regimens. *Brit. J. Surg.* 1985; **723**:495-8.
6. Marc, L., Edagar, D. and Elganzouri, A. Continuous epidural infusion for analgesia after major abdominal operations. *Surgery*. 1985; **98**:718-728.
7. Ann, C. Postoperative pain control. *Surgery*. 1995; **31**:201-4.
8. Richard, L.B., Randy, L.B. and Brack, A.B. Patients controlled analgesia: a new concept of postoperation pain relief. *Ann. Surg.* 1981; **195**:700-5.
9. Ulting, J.E. and Smith, J.M. Postoperative analgesia. *Anaesthesia*. 1979; **34**:320-332.
10. Edwards D.J., Svensson, C.K., visco, J.P. and Lalka, D. Clinical pharmacokinetic of pethidine. *Clin. pharmacokinetic*. 1982; **7**:421-433.
11. Vanche, E. Inadequate treatment of pain in hospitalised patients. *N. Engl. J. Med.* 1982; **307**:55.
12. Keats, A.S. Postoperative pain: research and treatment. *J. Clin. Dis.* 1968; **4**:72-83.
13. Phillip, H.S. Studies in pain with the analgesic - demand system. *Anaesth. Analg.* 1971; **50**:1-10.
14. Jackson, J. Acute pain: Its physiology and the pharmacology of analgesia. *Nurs. Times*. 1995; **91**:27-8.
15. Austin, P. Multiple intramuscular injections: a major source of variability in analgesics response to morphine. *Pain*. 1980; **8**:47-62.
16. Asantila, R. Comparison of different methods of postoperative analgesia after thoracotomy. *Acta. Anaesthesiol. Scand.* 1986; **30**:421-5.
17. Bollis, S. J. Efficacy of Patients controlled analgesia versus conventional analgesia for postoperative pain. *Clin. Pharm.* 1985; **4**:48-52.
18. Porter, J. and Jick, H. Addiction rare in patients treated with narcotics. *N. Engl. J. Med.* 1980; **302**:123.
19. William, A. C. Results are better when patients control their own analgesia. *J. Amer. Med. Ass.* 1982; **247**:945-7.
20. Koh, P. and Thomas, V.J. Patient-controlled analgesia (PCA): does time saved by PCA improve patient satisfaction with nursing care? *J. Adv. Nurs.* 1994; **20**:61-70.
21. Sabanatham, S., Bickford Smith, P. J. and Pradhan, G.N.A. Continuous intercostal nerve block for pain relief after thoracotomy. *Ann. Thorac. Surg.* 1988; **46**:425-6.
22. Smallman, B.J. Postoperative management of pain, nausea and vomiting. *Surgery*. 1992; **18**:179-182.
23. Phillips, P. J., Lema, L.E.K. and Camiero, P.M.R. Comparison of Diclofenac sodium and pethidine as postoperative analgesia in major elective surgical procedures. *East Afr. Med. J.* 1985; **62**:666-671.
24. Hanse, G., Drablos, P.A. and Steinert R. Pulmonary complications, ventilation and blood gases after upper abdominal surgery. *Acta. Anaesthesiol. Scand.* 1977; **21**:211-5.
25. Pasteur, W. Active lobar collapse of the lung after abdominal operations: a contribution to the study of postoperative lung complications. *Lancet*. 1910; **2**:1080-3.
26. Laszlo, G., Archer, G.G., Darrel, J.H., Dawson, J.M. and Fletcher, C.M. The diagnosis and prophylaxis of pulmonary complications surgical operations. *Brit. J. Surg.* 1973; **60**:129-134.
27. Parsonnet, V. Postoperative pain. *Brit. Med. J.* 1976; **230**:664-9.