Orthopaedic patients' reporting of pain management

Advances in pain management have occurred in recent years through the development of patient-controlled and epidural analgesia, while the conventional regime of intramuscular analgesia has also continued to be used. This article describes a study comparing orthopaedic patients' experiences of postoperative pain using the three methods of analgesia.

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Throughout medical institutions there has been a rapid growth in pain clinics and pain relief services in the past 30 years. Despite this rise in the awareness of pain and the analgesics used, the control of postoperative pain has in the past been poor. Studies which have looked specifically at patients' satisfaction with their postoperative pain relief include Church (1979) and, more recently, Kuhn et al (1990), who suggested that the management of pain relief was far from satisfactory and is a continuing problem.

Progress in pain management has occurred in recent years with the development of patient-controlled analgesia (PCA) and epidural infusions, alongside the conventional regime of intramuscular (IM) analgesia.

Research into the effectiveness of such pain relief has often concluded that patients have suffered severe pain postoperatively (Koh and Thomas 1994, Smythe et al 1994). Several studies have investigated the factors which affect pain relief and patients' quote experiences in the postoperative period. One example, which incorporated three techniques of postoperative analgesia, is Kilbride et al (1992), a prospective study comparing IM analgesia, PCA and epidural analgesia. The resulting recommendation was that epidurals were the optimal method in achieving pain control following abdominal surgery.

THE AIM OF THE STUDY

The aim of the pain survey was to identify the current pain management situation at the Royal Surrey County Hospital in one area of orthopaedics, and to highlight any specific issues or problems in the practice. The importance of such research was illustrated by Mackintosh (1994), who said that: 'Areas of inadequacy need careful identification and evaluation – so changes can be targeted at causes of concern.'

With greater awareness of the importance of empowering patients and their need for self-advocacy, research focusing more directly on individual views was needed, to ensure that patients' interests continued to be well served.

LITERATURE REVIEW

Peck and Wallace (1980) suggested that 'pain' describes a number of experiences which differ in 'intensity, quality, duration and meaning' (Peck and Wallace 1980), and can only be studied indirectly by recognising another's pain behaviour or by acknowledging his or her self-report. Carrying out preoperative assessment of patients' pain expectations allows a baseline assessment to be made; staff may then be enabled to prepare patients for a certain degree of pain.

Hayward (1979) proposed that one of the main aspects of measuring pain was the use of verbal reports. He recognised the difficulties of using words which may limit a person's interpretation of what he or she is feeling. Researchers have acknowledged this in devising a number of scales to try accurately to measure pain:

- Simple descriptive scales
- Graphic rating scales
- Numerical rating scales
- Visual analogue scales
- Face rating scales
- Colour scales
- Questionnaires, such as the McGill Pain Questionnaire (Melzack 1975).

A patient undergoing surgery of any kind is likely to fear two things – intolerable pain and the unknown. A review of research by Hayward (1975) into anxiety and its effect on pain clearly showed a relationship. Fear of the unknown resulting from a lack of information will cause tension and increased pain. This relationship can develop into a cycle of events, with an increase in pain in turn causing further uncertainty and anxiety. Minimising a patient's anxiety, for example by providing information, can, therefore, help to reduce the amount of pain experienced postoperatively.
PAIN MANAGEMENT

The significant postoperative recovery time in terms of venous (IV) administration, while IM injections vary of achieving postoperative pain relief. Coyle (1985) of anxiety and panic. This is one of the advantages feel out of control, this may lead to the development fears of staff concerning addiction. However, the risk amount of body fat, which affects absorption rates. Avery divided analgesics into three groups (Box 1).

Speed of onset is a factor to consider with opioids. Most start to take effect about 20-30 minutes after oral administration (Twycross and McQuay 1985). A very rapid onset can be achieved with the use of intravenous (IV) administration, while IM injections vary according to the vascularity of the muscle and the amount of body fat, which affects absorption rates. Reports on opiate medication frequently mention the fears of staff concerning addiction. However, the risk of addiction with opiates is negligible when the drugs are only used for a few days to manage acute pain (Carr 1989).

Traditionally, postoperative analgesia is given via the IM route, four-hourly as required, and patients must often experience pain before asking for a pain killer (Warwick 1992). Relief from pain is provided only for a limited amount of time, and is subject to peaks and troughs. In recent years, new methods and routes of administration, including PCA and epidural analgesia, are increasingly being used. The provision of opiates using these modalities often has the advantage of providing sustained analgesia, which is obtained at a lower peak plasma concentration of the drug, with minimised side-effects (Tempest 1992). The advantage of administering opiates by means of an epidural is that much smaller doses are required in comparison with other methods, including the IV route (Shenton 1993).

Research into the specific area of orthopaedic procedures and pain management can be seen in Scalley et al's 1988 study, in which the design set out to compare PCA with IM therapy. The conclusions were that PCA provided similar results to those seen in the studies of Wermeling et al (1992) and Notcutt and Morgan (1990), with PCA providing a superior method of post-operative analgesia.

Lange et al (1988) compared these two methods of analgesic administration using a prospective, randomised study design. The noted advantages of PCA over the IM regime were that less analgesia was used, and that it appeared to be of benefit to the patients to assume control of their own well-being. Less medication was used by the PCA group, and this compares to the research carried out by Scalley et al (1988).

The requirement for adequate pain relief is obviously very important, yet research continues to highlight failures in postoperative pain management. Areas of inadequacy need careful identification and evaluation (Mackintosh 1994), and the key to effective pain control involves monitoring patients' pain experiences using methods of assessment. Harrison (1991) suggests that evaluating the treatments prescribed will lead to improvements in postoperative pain management.

**POSTOPERATIVE PAIN MEDICATION**

The significant postoperative recovery time in terms of pain is the first 48 hours (St Marie 1991). There are a number of analgesic drugs currently used as a means of achieving postoperative pain relief. Coyle (1985) divided analgesics into three groups (Box 1).

**METHODOLOGY OF THE STUDY**

The purpose of the study was to investigate orthopaedic patients' reporting and appraisal of pain control with IM analgesia, PCA and epidural infusion following surgery.

The hypothesis tested was that patients receiving IM analgesia will report higher pain scores than patients receiving PCA or epidural analgesia. The design of the study contained elements of Carr's research (1990), which utilised pre- and post-operative pain assessment charts and a questionnaire exploring patients' experiences and acknowledging contributing factors. The reliability of the research design was not tested by a test-retest process, although it was developed around Carr's 1990 study.

Before use, the simple descriptive scales and questionnaire were presented to the pain sister and a consultant anaesthetist, who verified the relevance of the questions. Validity was also considered while carrying out the pilot study.

**Sample population** Time constraints on the study determined that the sample was to be drawn in a non-random manner. The patients for this study were to be selected from six orthopaedic and general surgical wards. Each was to undergo an orthopaedic procedure predominantly requiring the administration of opiate analgesia for at least 36 hours:

- □ Total hip replacement (THR)


**Box 1. The three groups of analgesics**

**NON-NARCOTIC ANALGESIA**

- Acts principally on the central nervous system to relieve moderate to severe pain of either somatic or visceral origin

**NARCOTIC ANALGESIA**

- Acts peripherally, to relieve mild to moderate pain of somatic origin

**ADJUVANT OR CO-ANALGESICS**

- Can be used alone or in combination with narcotic drugs to increase the analgesic effect
□ Total knee replacement (TKR)
□ Fractured neck of femur repair – where the operative procedure resulted in either a dynamic hip screw or THR.

The sample population therefore consisted of patients assigned to the IM, PCA and epidural regimes of postoperative pain management, gathered during the five week data collection period. Exclusion criteria included patients with terminal illness, multiple injuries, for example road traffic accidents, or head injuries and those unable to read or understand the Simple Descriptive Scale (SDS) or pain chart.

Ethical consent was sought and gained from participating patients, and also from the medical and nursing staff.

Data collection Data collection was carried out with the use of SDS pain charts. The SDS contains a list of three to five adjectives describing pain intensity, and the patient is asked to point out their level of pain by selecting a word. The pain score is then reached by putting a value beside each adjective. Each patient was requested pre-operatively to complete two pain charts, the first enquired after their current pain, and the second asked them to consider the level of pain expected following their operation. At approximately 48 hours postoperatively, each patient was presented with the third pain chart, which they were to report the pain experienced in the past 24 hours.

Completion of the questionnaire, consisting mainly of closed-answer questions, allowed each patient to report on and appraise their pain management. The third pain chart and questionnaires were given to each patient in a coded, sealed, envelope, to be collected the following day, thereby ensuring anonymity.

In addition to the information obtained from the patients themselves, a profile was kept on each patient recording several factors such as the surgeon, anaesthetist, ward of care, past medical history, main analgesic prescribed and other medications being taken during the patient's admission. These were acquired from the medical and nursing notes, in order for an assessment to be made of their level of influence on the pain experienced.

Pilot study Over a period of one week, nine patient's results were correlated and analysed for any difficulties in the completion of the forms. It became evident that, for those patients who were experiencing problems with the analgesia, the staff needed to be informed. It was therefore necessary to explain to patients that they should pass on any problems in their pain management to a member of the ward staff. It was also decided that the names of any patients experiencing extreme problems or poor pain control were to be passed on to the pain sister. The pilot was useful in identifying necessary changes to the research, as some of the patients did not understand the phraseology of the questions, and patients with visual disturbances were unable to take part in the study.

The pilot also provided evidence of the individuality of the pain experience. For example, one individual in the pilot study presented with Brown-Séquard syndrome causing complications in his pain reception. Here the brain messages are confused and pain on the left side of the body is transmitted in the brain to the right side.

Analysis Descriptive and inferential statistics were to be applied to the quantitative data. The Chi-square test was used for analysing differences between the analgesic groups, and the Spearman's correlation coefficient for observing relationships between the pain scores and individual analgesics. The Social Science Statistics computer package was selected to aid the analysis.

PRACTICAL ASPECTS

Statistical analysis The data obtained from this research consisted mainly of subjective information from individuals undergoing orthopaedic surgery.

For a majority of the analysis, the Chi-square test was utilised – as this could be applied to data in the form of frequencies, looking for the significance of differences between the groups used. In order to assess for any relationships existing between variables where the expected value was less than five, the Spearman's rank correlation coefficient was used = 0.05 (5 per cent significance level). The Mann-Whitney U test, suitable for comparing two independent population groups in order to see if they are the same, was applied to the three types of analgesia. The Wilcoxon test was applied in cases where there were related samples, such as preoperative and postoperative pain scores, as a means of comparing the two related variables.

Data collected During the data collection period, the admission of 50 orthopaedic patients undergoing THR, TKR and repair of fractured neck of femurs was acknowledged. Twenty-one of these admissions were fractured neck of femur patients, and a total of 15 were not assessed because:

□ Four refused to participate
□ One could not be included, as the fracture was the result of a road traffic accident
□ One was the result of a pathological fracture
□ Two people were confused
□ One person was inarticulate
□ One had already been administered a premedication before being seen
□ Five were missed, having gone directly to theatre.

Of the fractured neck of femur patients admitted therefore, six were included in the study. There were also 17 THR patients and eight TKR patients, giving a total of 31 patients participating in the study, 27 of
who were female and four male.

RESULTS
The aim of this research was to check the hypothesis that patients receiving IM analgesia postoperatively will report higher pain scores than those receiving PCA or epidural analgesia. In particular, significant evidence would be found in:
- The analysis of postoperative experience of pain
- The time taken for the analgesia to take effect
- The effect of pain medication at rest and on movement.

However, because of the limited sample size, the statistical analysis cannot be applied to the general population and, therefore, the hypothesis is unable to be accepted.

When considering the results of this study, it must be recognised that all of the patients within the sample were being asked to recall their experiences with the pain medication. The research is, therefore, composed of retrospective data, and is at risk of being biased by patients not correctly remembering their experiences. It is hoped that questioning the patients at the 48-hour time point was early enough to minimise such recall bias.

The data analysis incorporated Chi-square and Spearman's correlation coefficient. The levels of significance in the Chi-square results cannot be directly accepted, however, due to the occurrence of more than one expected value being less than five in each of the tests. Statistical significance may be better achieved using a larger population sample.

The Mann-Whitney and Wilcoxon statistical tests were also applied, but no statistical results were obtained from these tests as there was insufficient data for processing. This was largely due to the spread of data across four or five categories, for example in the number of patients experiencing either no pain, mild pain, moderate pain, severe pain or very severe pain, and also in the appraisal of pain medication as very good, reasonably good, moderate or poor. It was therefore decided that these groups were to be combined for analysis, allowing differences between the groups to be established.

The sample population consisted of an uneven distribution of patients within the types of operation, and in the three groups of analgesia. This was difficult to avoid when gathering a sample in the time scale of five weeks.

In designing the research, it was essential to reduce the occurrence of random errors. Consequently, the sample population was to be obtained from only one ward, thus reducing the variability of care which might exist between wards. However, it was necessary to use two orthopaedic wards in order to collect a sufficient sample size. Despite this plan, because of a shortage of beds, a number of patients were admitted to outlying wards, and it became apparent that these patients would have to be included in the study to obtain a sufficient sample. The differences in care between the six wards utilised is, therefore, an unknown factor, which may have influenced the experiences of pain for these patients.

Preoperative pain and expectations Pain charts asking about current pain levels showed that most patients, before surgery, were experiencing either moderate or severe pain. The levels of pain expectation were very varied. All those who received IM analgesia expected moderate to severe pain, and the PCA and epidural groups expected a range of either no pain to very severe pain. Further exploration into patients' previous experiences with pain and operative procedures would be required, however, in order to make valid inferences from their preoperative expectations.

Postoperative pain Postoperative pain charts showed that all IM patients reported moderate to severe pain, whereas the PCA and epidural groups contained a number of patients experiencing no pain or mild pain.

It would appear significant, although not statistically proven, that 100 per cent of the IM group did not report any periods of being pain-free or encountering mild pain.

This suggests that they had a higher pain experience than the PCA and epidural groups. The implication for practice would therefore be to implement routine assessment of pain on the wards in order to reduce the amount of pain experienced.

Information The importance of providing preoperative information has been acknowledged for several years. For instance, Hayward (1975) and Jones (1988) stated that by providing information, and thus minimising anxiety, a reduction in the amount of pain experienced postoperatively can be seen. The provision of information to the IM group appeared to be lower in comparison to the other two types of analgesia, although not to a significant extent. This conceivably has an influence on the pain experienced by the IM group postoperatively.

Time to take effect Particular interest within this study was aimed at discovering how long it took for patients to receive their analgesia. Although there was no significant correlation between the pain experienced and the time taken for analgesia to take effect, it was interesting to note that, for the IM patients, the time range was from ten minutes to more than an hour, whereas the PCA group noted that the pain medication took effect immediately or in 0-10 minutes. For the epidural patients, the time range for effect was from immediate to one hour, which highlights the individuality of pain perception. It is important for staff to acknowledge that intramuscular analgesia takes longer to have an analgesic effect.
Appraisal of analgesia

The appraisal of the pain medication showed some interesting results. At rest, the appraisal of medication for the three groups of analgesia was better than on movement. Also it can be seen that the level of satisfaction with IM medication in comparison to the PCA and epidural groups was lower. For example, only 25 per cent of IM patients stated that on rest their pain relief was very good, compared to 70 per cent of the PCA and epidural groups. Similarly, on movement, 25 per cent of the IM patients stated they had poor pain relief, whereas none of the other patients complained of poor pain relief.

Carr (1989) and Lander (1990) noted several complications which can arise from reduced movement, and which may inhibit a patient's recovery. Post-operative assessment of pain, therefore, should encourage patients to report an increase in the pain if it is restricting the amount of movement they are willing to carry out. The implications are summarised in Box 2.

CONCLUSION

There are numerous factors affecting patient experiences, including gender, culture, environment and past medical histories. However, the individuality of the pain experience (East 1992) suggests that research into pain should acknowledge the variety of patient experience which exists in the average population. This would ensure that results obtained can be generalised to the population as a whole.

Box 2. Implications for practice

- Patients do not always report their pain straight away and the pain medication, in the case of IM analgesia, must be requested if not administered periodically.
- The results suggest that IM analgesia takes longer to have an effect. This must therefore be recognised as nurses plan the administration of medication.
- At rest, the appraisal of medication for the three groups of analgesia was better than on movement. Complications can arise due to reduced movement, and these may inhibit a patient's recovery.
- Eighteen patients experienced sleep disturbance during the day and 27 patients during the night. Pain levels elevate due to sleep deprivation, so ward staff need to ensure that patients' sleep is facilitated wherever possible.
- Patients receiving IM analgesia reported a greater number of moderate to severe pain scores than those receiving PCA or epidural analgesia. Because of the variation in pain perception and methods of analgesia used, individual patient pain assessment is recommended.

REFERENCES