Pain following day case oral surgery – an investigation into post-operative analgesia

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Abstract

Aim: To investigate the post-operative pain experience of patients undergoing oral surgery under day case general anaesthesia.

Methods: All ASA I and II patients, aged 16 years and over requiring oral surgery procedures under day case general anaesthetic over a 3 month period were included. Patients were asked to assess their own level of pain using a numerical rating scale at 6 and 24 hours following surgery. The type of surgery performed, type of analgesics prescribed, additional non-prescribed analgesics taken, satisfaction with analgesia provided and pain relief were also recorded.

Results: The data of 80 patients was obtained. Patients received post-operatively ibuprofen 600mg or paracetamol 1g or codeine/paracetamol combination (30/500) or both ibuprofen and a codeine/paracetamol combination. At 6 hours, 42.6% of patients experienced moderate to severe pain, whereas at 24 hours there was a minor reduction to 38.8%. Thirteen patients required additional non-prescribed analgesics, of these 10 patients belonged to the group who received ibuprofen 600mg alone. Eighty-nine percent of patients were satisfied with their pain relief when questioned. Overall, 70% of patients rated their pain relief as excellent.

Conclusion: Post-operative pain following oral surgery under day case general anaesthesia remains a clinical problem. Patients' reported satisfaction levels of pain relief were high despite a high proportion of patients experiencing moderate to severe pain. A more robust management strategy is required to improve the post-operative pain experience.

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Keywords: Post-operative pain; Third molar; Day case.

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Introduction

Oral surgery procedures may be performed on an inpatient or outpatient (day case) basis depending on a patient's medical status and the nature and complexity of the surgery. The provision of day case type surgery is on the increase. In a recent survey, it was found that 65% of elective surgery was performed on a day case basis in the UK and approximately 70% in the US [1]. Day case patients are selected based on a satisfactory pre-operative assessment of their medical status (ASA I or II) and Body Mass Index (BMI typically up to 35). Principal drivers for more day case surgery are the reduced waiting time and cost compared to inpatient care [2].

The provision of day case surgery is considered an ideal method of utilising health service resources to their maximum potential [3] and day case surgery is expected to increase in the UK National Health Service to three quarters of all operations carried out by 2010 [4]. However, there are concerns about the effects that this rapid growth has had on the pain experienced by patients having day case surgery [5–9].

Post-operative pain control for inpatients may be more easily managed with the selection of analgesics available, including opiates. Complications and side effects are more common following administration of a more potent analgesic especially opiates, as they can cause nausea, vomiting and even respiratory depression and hypotension at high dose. Observation and management of any complications is possible as an inpatient but not as an outpatient. Patients treated on a day case basis are reliant on self management and the care of family members or friends that may not have the expertise to manage complications that may arise [3]. Post-operative pain control for these patients is usually managed by over the counter analgesic prescriptions. According to an audit carried out by Mackintosh and Bowles over a 2 year period at a general hospital in the north of England about post-operative pain following day case surgery, it was found that 17-20% of patients experienced unacceptable levels of pain [10]. In a study to assess the intensity, duration and pain following day case surgery, 89 subjects were given a self administered questionnaire before leaving hospital and up to 7 days after discharge. It was found that 40% of the subjects experienced moderate to severe pain during the first 24 hours after hospital discharge. The authors concluded that the severity and duration of pain following day case surgery should not be underestimated and they recommended aggressive analgesic treatment whilst in hospital as well as a robust take home analgesic protocol [8].

Despite advances in anaesthesia and developments in the knowledge of pain control, it is well established that pain following day case surgery is still common and has been highlighted in several studies [6, 7, 11-13]. Several strategies have been recommended to improve the post-operative pain experience of day case patients including the provision of better patient information and communication about the surgical procedure, aggressive and more robust protocols for take home medication, pre-emptive analgesia, protective analgesia, and better analgesic self administration instructions [14-16]. In our own surgical practice we have developed the use of an analgesic protocol based on the best research evidence using paracetamol, ibuprofen and codeine/paracetamol combination.

Ibuprofen is commonly prescribed following oral surgery procedures due to its anti-inflammatory properties. Other analgesics frequently

prescribed include dihydrocodeine and paracetamol [17]. A systematic review was conducted by Barden and colleagues comparing the relative efficacy of analgesics following third molar extraction. For each of the eligible randomised controlled trials in this review, the number of patients with at least 50% maximum total pain relief (max TOTPAR), number needed to treat (NNT) and number needed to harm (NNH) were calculated. NNT is an estimate of how many people need to receive the treatment before one person experiences benefit. Lower value of NNT means better efficacy. NNH in this review refers to the number of adverse events. Among the different ibuprofen doses, 400mg ibuprofen had the lowest NNT value of 2.2 in the group compared to 200mg (NNT 2.7) and 600mg ibuprofen (NNT 2.8). Valdecoxib 40mg and diclofenac 100mg had a NNT value of 1.6, whereas for paracetamol 1g, NNT was 3.7. Among the worst analgesic for post-operative pain following third molar removal was dihydrocodeine [18].

Paracetamol is an effective analgesic for treatment of mild to moderate pain with minimal adverse effects. Its effectiveness is improved by the addition of codeine. In another systematic review, the authors assessed the analgesic efficacy and adverse effects of a single dose of oral paracetamol alone and in combination with codeine for moderate to severe post-operative pain. In this review, paracetamol 1g for post-operative pain had an NNT of 4.6 for at least 50% pain relief when compared with placebo, and paracetamol 600/650 mg had an NNT of 5.3. When paracetamol 600/650 mg was combined with codeine 60mg, the NNT was reduced to 3.6. The authors concluded that the addition of codeine 60mg to paracetamol produces additional pain relief but is accompanied by an increase in drowsiness and dizziness [19].

When a lower dose of codeine (30mg) is used, the incidence of side effects is reduced. Macleod and colleagues conducted a randomised, double blind trial to compare the efficacy and safety of paracetamol 1g alone with paracetamol 1g combined with codeine 30mg for relief of pain following surgical removal of impacted third molars. The authors found no significant difference between the two groups in the proportion of subjects experiencing adverse events. The results also showed that paracetamol 1g with codeine 30mg was significantly more effective in controlling pain for 12 hours following third molar removal [20].

Based on available evidence from randomised controlled trials and systematic reviews, post-operative pain following oral surgical procedures may be best managed with a NSAID, unless otherwise contraindicated, followed by the addition of paracetamol or a compound analgesic. The aim of the clinical audit was to investigate the post-operative pain experience of patients undergoing oral surgery under day case general anaesthesia where we have adopted such an analgesic protocol and to compare the results with other centres as reported in the literature.

The objectives were to investigate the pain experienced by day case patients following oral surgery at two time points, type of analgesia provided, satisfaction of analgesia provided and overall satisfaction of pain relief. The study was registered with the Central Manchester University Hospitals NHS Foundation Trust Audit office.

Methods

Patient selection

All ASA I and II patients, aged 16 years and over requiring an oral surgical procedure under day case general anaesthetic were selected. Patients were assessed by an oral surgeon in the first place to ascertain the surgery required and the suitability for day case general anaesthesia. These patients were then pre-assessed by a general nurse to ensure all pre-operative documentation and necessary investigations had been carried out. An information leaflet and verbal explanation of the purpose of the study were provided.

Study procedure

All patients over a 3 month period requiring oral surgery procedures under day case general anaesthesia were invited to participate in this audit study. Having read the information leaflet and an explanation of the purpose of the study, patients who agreed to take part in the study gave verbal informed consent. Patients were then given a copy of the pain questionnaire and an explanation of how to complete it using the numerical rating scale.

Patient's demographic and contact details were recorded. General anaesthesia and surgery were undertaken by an anaesthetist and surgeons who regularly operated in the unit. Following recovery from general anaesthesia, the type of oral surgery procedure and discharge prescription was noted. The type and dose of post-operative analgesia prescribed were at the discretion of the surgeons who were not aware of this study. This was to ensure that the surgical technique would be unaltered and the choice of post-operative analgesic prescribed would not be influenced.

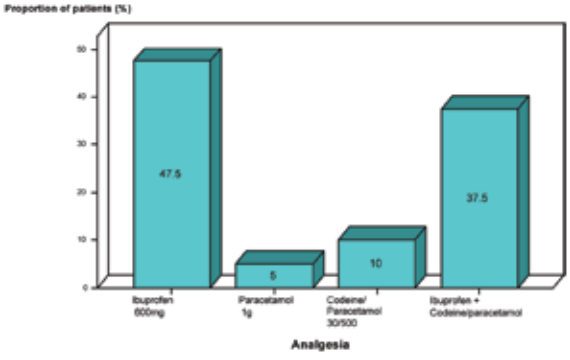
Patients were reminded prior to discharge to complete the pain questionnaire. They were then contacted by telephone 48 hours following surgery at a previously agreed allocated time for data collection. Patients were asked to rate their response to pain at 6 hours and 24 hours on a numerical rating scale of 0 to 10 (0 = no pain and 10 = intolerable pain). Patients were also asked if they were satisfied with the post-operative analgesics provided and to give an overall rating of their pain relief. We also noted if additional medication was required other than that prescribed.

Results

Data from 80 patients was collected. This was the total of all the patients invited over a 3-month period as none refused to participate. No patients were lost to follow up at telephone data collection. There were 32 males (40%) and 48 females (60%) ranging from 16 to 55 years, with a mean age of 30.74 years. The types of procedure performed included multiple dental extractions involving 3 teeth or more, surgical removal of buried or impacted teeth, endodontic surgery, dental implant placement and bone augmentation procedures with intra-oral harvesting sites in preparation for later dental implant surgery.

The proportion of each type of analgesic prescribed as discharge medication for post-operative pain management is shown in Fig. 1. Every patient was prescribed analgesia to take home, with the majority given ibuprofen alone (38, 47.5%) or both ibuprofen and codeine/paracetamol combination (30, 37.5%). The remaining patients had paracetamol alone or codeine/paracetamol combination alone. Only ibuprofen with the strength of 600mg was available for prescription in the unit. Patients' self reported pain intensity scores

Figure 1 Bar chart showing type of analgesic prescribed.



were categorised as follows. This validated data transformation enables a more sensitive analysis [21]:

0 = No pain
1 – 4 = Mild pain
5 – 6 = Moderate pain
7 – 10 = Severe pain

At 6h, 34 patients (42.6%) had moderate to severe pain (Table 1), and at 24h following surgery, there was only a minor reduction in the number of patients with moderate to severe pain.

Table 1 Pain scores at 6h and 24h after surgery.

Pain scores	Number of patients	
	6 hours	24 hours
No pain	12 (15%)	9 (11.3%)
Mild pain	34 (42.5%)	40 (50%)
Moderate pain	21 (26.3%)	15 (18.8%)
Severe pain	13 (16.3%)	16 (20%)

Tables 2 and 3 show the pain scores at 6h and 24h respectively in relation to the type of analgesic prescribed. Forty-seven per cent of patients who were prescribed ibuprofen 600mg alone had moderate to severe pain at 6 hours and 44.7% at 24 hours post-operatively.

In the group who were prescribed combination of ibuprofen and codeine/paracetamol combination to take home, 36.7% had moderate to severe pain at 6h and 30% at 24h.

Table 2 Pain scores and type of analgesic prescribed at 6 hours.

Analgesic	Number of patients			
	No pain (0)	Mild pain (1 to 4)	Moderate pain (5 to 6)	Severe pain (7 to 10)
Ibuprofen 600mg	4	16	11	7
Paracetamol 1g	1	2	0	1
Codeine/paracetamol 30/500	1	3	1	3
Ibuprofen + codeine/ paracetamol	6	13	9	2
Total	12	34	21	13

Table 3 Pain scores and type of analgesic prescribed at 24 hours.

Analgesic	Number of patients			
	No pain (0)	Mild pain (1 to 4)	Moderate pain (5 to 6)	Severe pain (7 to 10)
Ibuprofen 600mg	3	18	7	10
Paracetamol 1g	1	2	0	1
Codeine/paracetamol 30/500	1	3	2	2
Ibuprofen + codeine/ paracetamol	4	17	6	3
Total	9	40	15	16

Patients were asked if additional analgesics were required other than those prescribed and 13 patients (16%) reported using additional non-prescribed analgesics to manage their pain. Of these 13 patients, the majority (10 patients) were in the group given ibuprofen alone (Table 4).

Table 4 Additional analgesics for pain relief.

Analgesic	Additional pain relief medication		Total
	No	Yes	No
Ibuprofen 600mg	28	10	38
Paracetamol 1g	4	0	4
Codeine/paracetamol 30/500	7	1	8
Ibuprofen + codeine/ paracetamol	28	2	30
Total	67	13	80

Patients were asked whether or not they were satisfied with the prescribed analgesics in managing postoperative pain. Despite a high proportion of patients having moderate to severe pain, 71 patients (89%) reported satisfaction with their pain relief. The satisfaction about prescribed analgesics is shown in Table 5.

Table 5 Patient satisfaction about prescribed analgesics.

Drugs	Satisfaction of pain relief	
	No	Yes
Ibuprofen 600mg	6	32
Paracetamol 1g	1	3
Codeine/paracetamol 30/500	1	7
Ibuprofen + codeine/ paracetamol	1	29
Total	9 (11%)	71 (89%)

Patients rated their overall satisfaction about pain relief on a numerical rating scale (0 = totally unsatisfied and 10 = excellent). Patient self report satisfaction was categorised as follows:

0 = totally dissatisfied
1 – 4 = dissatisfied
5 – 7 = satisfied
8 – 10 = excellent

The results are shown in Table 6. Seventy percent of patients rated their pain relief as 'excellent'.

Table 6 Overall rating of pain relief

Analgesic	Number of patients		
	Dissatisfied (1 to 4)	Satisfied (5 to 7)	Excellent (8 to 10)
Ibuprofen 600mg	2	15	21
Paracetamol 1g	1	0	3
Codeine/paracetamol 30/500	1	1	6
Ibuprofen + codeine/ paracetamol	1	3	26
Total	5 (6%0	19 (23.7%)3	56 (70%)

Discussion

This study investigated the post-operative pain experienced by patients following oral surgery under day case general anaesthesia. We were disappointed to find 42.6% of patients experiencing moderate to severe pain at 6h after surgery and that this had reduced little at 24h. This finding was despite our prescription of ibuprofen, paracetamol and codeine according to the best research evidence and was no better than has been reported by other authors. Regardless of the quality of the intervention, pain following oral surgery may never be completely eliminated, but it should be minimised as much as possible. It has been suggested that the standard to strive for is for patients to experience post-operative pain that is not greater than mild in severity [10]. Other authors have reported similar results to us [22] or worse [23]. Our study recorded dispensed analgesics but made no attempt to check compliance of dosing. It may be that patients did not take the medication as recommended. Our verbal instructions are for patients to take analgesics regularly for 24h rather than on a "when necessary" basis. Patients may have taken medications only when necessary or not at all. Pain after the surgical removal of wisdom teeth is reported to peak at the first 12 h and therefore we were surprised that the severity of pain was diminished very little at 24h [24]. However, the patients in this study were undergoing procedures other than the surgical removal of wisdom teeth alone. Some patients reported no pain and this is likely to be because they were undergoing only simple surgery but required general anaesthesia because of their level of anxiety or lack of co-operation.

One study has investigated whether pre-packaged analgesics results in better compliance and improved post-operative pain relief. The authors found no significant difference in pain intensity between the group requiring analgesics at the discretion of the surgeon and those requiring the pre-packaged analgesics [25], although others have shown significant reduction in pain intensity using pre-packaging. This practice also has the advantage of reducing the risk of overdose [26].

It is often difficult to measure patient satisfaction. In this study, patients were asked about whether they were satisfied with the prescribed take home analgesic in managing their post-operative pain. In addition, they also gave an overall rating of satisfaction about their pain relief. Despite a large number of patients experiencing pain above the level of moderate pain, the majority were satisfied with the analgesics prescribed. The pattern and frequency of analgesic consumption varies depending on individual's pain threshold and most tend to consume analgesics only as required. Patient education may therefore be a requirement for improving the pain experience after surgery.

Overall, only 16% of patients required additional self-prescribed analgesics. This is much lower than the findings of McHugh and Thoms who found a high proportion of patients (43%) had to obtain additional analgesics to those prescribed following discharge from day case surgery [7]. In this study all patients were discharged with analgesics to take home but the choice of analgesic varied according to the surgeon's opinion of the anticipated patient post-operative pain. This may have been influenced by the complexity of surgery, time of surgery, and other factors such as knowledge, experience and attitudes. Improving patients' post-operative pain experience may therefore require staff education. The group who were prescribed ibuprofen only had the highest incidence of additional self-prescribed analgesic requirement. The results suggest that ibuprofen alone as take home analgesic may not be sufficient and patients would benefit from a broader spectrum of analgesic which include a combination of NSAID and a compound analgesic. We do have a departmental protocol for the type of analgesia to prescribe according to anticipated pain severity but protocol adherence may not have been ideal even if anticipated pain appropriately determined. It was however good that most patients received a NSAID and a range of analgesics.

The overall rating of patient satisfaction with pain relief was high despite a large proportion reporting moderate to severe pain at 6h and 24h. This finding is similar to that of previous studies [7, 12, 27]. The discrepancy may be due to different dimensions of patient satisfaction being measured with patients reporting satisfaction with care by staff [28]. This paradoxical relationship between patient satisfaction and pain severity suggests that general satisfaction questions should not be used in isolation as they are unreliable [29].

Conclusion

Despite a departmental recommendation of prescribed systemic analgesia based on best research we found that an unacceptably large proportion of patients experienced moderate to severe pain after day case oral surgery under general anaesthesia at 6h and 24h. Strategies need to be considered to improve the patient experience. These may include patient and staff education, consideration of the routine use of a wider spectrum of analgesics and interventions to minimise onset of pain with pre-emptive or protective analgesia.

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