Addition of Buprenorphine to 2% Lignocaine with Adrenaline 1:80,000 for Postoperative Pain Control After Mandibular Third Molar Surgery - A Split Mouth Study

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Abstract

The pain after surgical extraction of impacted third molars is considered moderate to severe in intensity and is often used as a parameter for assessing the efficacy of various painkillers. A number of trials have examined the peripheral analgesic effect of opioids; following this certain studies have shown the local efficacy of Buprenorphine added to local anesthetic solution on effective pain control. However only few studies have been done in the field of maxillofacial surgery.

To estimate the effectiveness of buprenorphine added to 2% lignocaine with adrenaline 1:80,000 in providing postoperative analgesia after mandibular third molar surgery.

15 consenting adult patients with bilaterally impacted mandibular third molars who were scheduled for surgical removal of the teeth were enrolled in the double - blinded study. The control side received lignocaine 2% with adrenaline 1:80,000 whereas the test side received Buprenorphine added to 2% lignocaine with adrenaline 1: 80,000 for nerve block. The study compared the post-operative pain on Visual Analogue Scale, quality of analgesia at various time intervals (every 2 hours for 24 hours, then at 36,48 and 72 hours), time at which 1st analgesic drug was consumed, and the total number of analgesic drugs consumed by the subjects to assess the effectiveness of buprenorphine in postoperative pain control.

There was difference between the two groups in post-operative pain experienced as assessed on Visual Analogue Pain Scale, with results being statistically significant at 2nd and 4th hours (P values: 0.001 and 0.028) indicating better analgesia in buprenorphine- lignocaine group. The mean duration to analgesic consumption was 11.4 hours in buprenorphine with lignocaine group as compared to 2 hours in lignocaine group and was statistically significant (p value <0.001). The average consumption of NSAIDs was found to be 4.1 in buprenorphine with lignocaine group as compared to 7.27 in the lignocaine group (p value of <0.001).

A single injection of buprenorphine mixed with lignocaine 2% with adrenaline 1:80,000 for nerve block has a significant effect on postoperative pain control following surgical extraction of impacted 3rd molars, thereby reducing the need of NSAIDs intake.

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Introduction

The surgical extraction of impacted third molars is a procedure that results in post-operative pain, inflammation and trismus due to the presence of loose connective tissue, vascularity and extensive innervation.[1] This pain is dominant on the first post-operative day and can linger for up to a week.[2] Quicker improvements in lifestyle and oral function can be expected with the proper management of postoperative pain.

Diverse classes of analgesic drugs are used postoperatively to provide adequate pain relief. These analgesics are classified mainly into three groups: non opioid drugs (non-steroidal anti-inflammatory drugs [NSAIDS]), Opioids and

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local anesthetics. Out of these, NSAIDS are most often used following surgical tooth removal to treat pain and inflammation. However, the resulting side effects like gastrointestinal bleeding, peptic ulcers, platelet dysfunction, altered liver function and renal dysfunction, limits their prescription.

Opioids offer many advantages over the untoward effects of NSAIDs. Opioid analgesics do not cause any direct organ damage as they lack true 'ceiling dose' for analgesia. The gold standard of opioid analgesics i.e., Morphine, is a mu opioid that is used to mitigate severe pain. The untoward effects of morphine like nausea, vomiting, respiratory depression, dizziness, pruritus, dysphoria, constipation, urinary retention, hypotension and increased biliary tract pressure limit its use. An opioid with lesser side effects and greater analgesic viability may be used.

Buprenorphine, a derivative of the morphine alkaloid, Thebaine is a potent centrally acting opioid analgesic, with a unique physicochemical profile.[3] It is a mu agonist and kappa antagonist, with analgesic and anti-hyperalgesic properties. It is known for its quick onset and a prolonged duration of action. Anti-nociceptive viability of buprenorphine is approximately 25 to 50 times greater compared to Morphine,[4] whereas adverse effects are lesser.

Various studies have stated that incorporation of opiates into local anesthetics can provide longer duration of postoperative analgesia,[5,6,7]. This is attributed to the fact that opioid receptors are established in the peripheral nervous system which offers the possibility of prolonged postoperative analgesia in the ambulatory surgical patient.[8,9] These peripheral opioid receptors are not pronounced in normal tissue but become obvious after inflammation sets in. A low dose of opioid administered to the peripheral nerve endings, result in good analgesic effects.

Research has demonstrated this effectiveness of opioids combined with local anesthetic for brachial plexus blocks.[3,7,10,11,12] Buprenorphine provides the longest duration of analgesia in outpatients compared to other opioids.

Only a few similar studies have been conducted in the field of oral surgery for third molar impaction. Most of these studies used 0.5% Bupivacaine (a long acting local anesthetic) combined with Buprenorphine. However, the prolonged duration of action of Bupivacaine is thought to have masked the analgesic efficacy of Buprenorphine. Hence, we have conducted a study with the widely used intermediate acting local anesthetic solution 2% Lignocaine with 1:80000 adrenaline in combination with Buprenorphine, to evaluate the duration of postoperative analgesia of Buprenorphine after mandibular third molar surgery.

The aim of the present study is to estimate the effectiveness of Buprenorphine added to 2% lignocaine with adrenaline 1:80,000 in providing postoperative analgesia after mandibular third molar impaction surgery.

The objectives of the study were -

1. To estimate the onset of anesthetic action (in seconds), determined by the loss of sensibility of the inferior lip, the corresponding half of the tongue and mucous membrane
2. To determine the duration of postoperative analgesia
3. Assessment of subjective postoperative pain experience using Visual Analogue Pain Scale
4. To determine the time to rescue analgesic intake and total number of analgesics (NSAIDs) consumed.

Materials and methods

This double blinded split mouth study was carried out in the Department of Oral and Maxillofacial Surgery for 22 months from December 2017 to October 2019. Study was conducted after obtaining approval from Institutional Ethics Committee.

The study included 15 subjects reporting to the Department of Oral and Maxillofacial Surgery for surgical extraction of bilaterally impacted mandibular 3rd molars.

Inclusion Criteria

- Subjects who required surgical removal of bilaterally impacted mandibular 3rd molars with Difficulty index 5-6 as described by Pederson.
- Healthy subjects aged 18–40 years with no significant medical history.
- Subjects who understood and were willing and able to participate in the study

Exclusion Criteria

- Subjects with a history of allergy to any of

the drugs used in the study
- Medically compromised patients with bleeding problems, diabetes, hypertension an immune-compromised status, or an osseous pathology affecting the surgical outcome and wound healing
- Patients with a history of asthma, neurological or psychiatric disease, or substance abuse
- Patients who had consumed analgesics within 6 hours prior to surgical procedure
- Patients not returning the questionnaire given to them after the surgical procedure to assess their postoperative status
- Patients in whom there was failure to achieve nerve block anesthesia
- Subjects unable or unwilling to provide Informed consent

Methodology

All patients reporting to the Department of Oral and Maxillofacial Surgery for extraction of impacted mandibular third molars bilaterally were screened. Demographic data such as age and sex, chief complaint, history of presenting illness, past medical history and drug history was recorded and physical examination was done.

Fifteen subjects with bilaterally impacted mandibular third molars were selected for the study. Intra oral periapical radiographs were obtained for pre-surgical evaluation of third molar. The orientation, depth, root morphology and relation to inferior alveolar canal was assessed and documented. After obtaining the written informed consent, subjects were scheduled for third molar surgery after randomization, with a time interval of one month between the two sides. The randomization for test and control sides was done using a predefined random number table which was enclosed in envelopes. Double-blinding was achieved by having one resident doctor who would prepare the solutions and maintain the record of the patient, a second resident doctor would perform the blocks and the procedure, and a third resident doctor monitored the anesthesia.

Surgical procedure

The control side received 2% lignocaine with adrenaline 1:80,000 alone for nerve blocks whereas the test side received buprenorphine 0.01 mg per milliliter of lignocaine 2% with adrenaline 1: 80,000. The surgical extraction was performed with a time interval of one month between the two sides.

To prepare the solution, one milliliter of 0.3mg buprenorphine was added to 30 ml of lignocaine 2% with adrenaline 1: 80,000. Thus, each milliliter of the reconstituted solution contained 0.01 mg of buprenorphine. The solution was freshly prepared and dispensed for nerve block immediately before the procedure.

Then, the classical direct inferior alveolar nerve block, lingual and long buccal nerve blocks were performed. Patients received a maximum of 3 ml of solution (2 ml for inferior alveolar nerve block, 0.5ml for lingual nerve block, and 0.5 ml for long buccal nerve block), irrespective of the group to which they belonged. Control side received 3 ml of lignocaine 2% with adrenaline 1:80,000, while test side received 3 ml of a reconstituted solution of a mixture of 30 ml lignocaine 2% with adrenaline 1: 80,000 and 1 ml buprenorphine 0.3 mg (thus receiving a total dose of 0.03mg
buprenorphine).

Surgical extraction of the impacted third molar was performed using a standard surgical procedure. Intraoperative variable assessed was the onset of anesthesia (in seconds), determined by the loss of sensibility of the inferior lip, the corresponding half of the tongue and mucous membrane. At completion of surgical procedure, both verbal and written postoperative instructions were given to the patient. Postoperative medications prescribed were analgesic, enzyme preparation and mouthwash.

- Tablet Ibuprofen 400 mg 3times a day for 3days
- Tablet Chymoral Forte 3times a day for 3 days
- Chlorhexidine mouthwash 3 times a day for 1 week.

Postoperative questionnaire was then given to the patients to record postoperative parameters. The period of postoperative analgesia was calculated as the number of hour's the patient remained in pain-free state after the procedure. After completion of surgery, patients were monitored to assess the quality as 'good', 'tolerable', or 'unsatisfactory' for every 2 hours for 24 hours and then at 36, 48, and 72 hrs.

The postoperative pain was assessed when the patient first felt pain, using a VAPS after which the patient consumed the prescribed rescue painkiller. The VAPS consists of a 10-cm line with two end-points representing 'no pain' and 'worst pain imaginable'. Patients were asked

to rate their pain corresponding to their current level of pain at various time intervals.

Patients were asked to document the number of post-operative analgesics taken and any postoperative adverse effects associated with buprenorphine, which could be local (prolonged anesthesia or paresthesia, hematoma, cellulitis, trismus, edema, tissue sloughing and ulceration, infection, facial palsy, or soft tissue injury) or systemic (drowsiness, nausea, vomiting, constipation, disturbed sleep, headache, sweating or shallow breathing.)

All the subjects were followed up for post-operative response and sutures were removed on the seventh postoperative day.

Statistical Analysis

Analysis was done by using descriptive statistics. Comparison among 2 sides was done by Student Unpaired "t" test and Chi -square test. A statistical package SPSS version 17.0 was used to do the analysis. P value <0.05 was considered as significant.

Results

15 subjects with bilateral impacted lower third molar teeth took part in this study. Out of 15 subjects 7 were females and 8 were males with age range of 18-35 (Chart 1). Impacted third molars were radio-graphically assessed and classified based on Winter's classification and Pederson's index. Surgical extractions were carried out in all the 15 patients, with a one – month gap between test and control side The frequency is grouped in Table-1.

Comparison of the subjective anesthesia (seconds) between the two groups shows that subjective anesthesia (seconds) is higher in Lignocaine group with a t value of 0.541 and this was statistically non-significant (p value of 0.593) whereas, objective anesthesia on probing was higher and more profound in case of Buprenorphine plus lignocaine group with a t value of -1.768 and this was statistically non-significant. (p value of 0.08) as shown in Table-2. Thus, the addition of buprenorphine to the LA had no effect on the onset of anaesthesia when assessed subjectively by the patient or objectively by the clinician.

The duration of post-operative analgesia (minutes) was higher in buprenorphine plus lignocaine group with a t value of -7.521 and this was statistically significant with a p value of <0.001 as shown in Table-2.

Winter's Classification Type	Pederson's Index	Number
Mesioangular Class1 Position A	3	5
Mesioangular Class 2 Position A	4	7
Mesioangular Class 1 Position B	4	2
Horizontal Class 1 Position A	4	3
Horizontal Class 2 position A	5	4
Horizontal Class 2 Position B	6	1
Vertical Class 1 Position A	5	2
Vertical Class 2 Position A	6	1
Vertical Class 1 Position B	6	3
Distoangular Class 1 Position A	6	2
		Total-30

Table 1. Impaction distribution according to Winter's Classification and Pederson's Index.

	GROUP	N	Mean	Std. Deviation	t	Df	P value
subjective anesthesia (s)	Lignocaine	15	77.000	18.377	0.541	28	0.593
	Buprenorphine	15	73.400	18.086			
0bjective anesthesia (s)	Lignocaine	15	156.670	16.655	-1.768	28	0.088
	Buprenorphine	15	168.270	19.200			
Post-operative analgesia(min)	Lignocaine	15	121.330	44.700	-7.521	14.682	**≤0.001**
	Buprenorphine	15	684.000	286.289			

Table 2. Evaluation of onset of anesthesia and duration of postoperative analgesia.

Post-operative pain as recorded on Visual Analogue Pain Scale, was significantly less in case of buprenorphine plus lignocaine group as compared to lignocaine group and the difference was significant postoperatively at 2nd and 4th hours. (P values: 0.001 and 0.028) as shown in Table-3. However, the score in lignocaine group did not differ much from buprenorphine plus lignocaine group in the later hours as patients had started taking the analgesic prescribed. The buprenorphine group had a lesser VAPS score and patient did not need rescue analgesics for a longer duration.

On comparing the quality of analgesia between two groups, in buprenorphine plus

lignocaine group 80% subjects had good quality of analgesia till 4 hours postoperatively without further analgesic intake which was significant (P: 0.028). In lignocaine group, a majority of patient reported tolerable (9) and unsatisfactory (5) analgesia by 2nd hours and were already consuming analgesics as shown in Table – 4.

Comparing the number of pain killers consumed by the two groups, it was found that the number of pain killers taken by the lignocaine group was much higher with a t value of 5.327 and was statistically significant (p value of <0.001) as shown in Table 5. Thus, buprenorphine when added to Lignocaine decreased the need for postoperative analgesics consumed.

Comparison of the VAPS score at the time of 1st pain killer between the two groups showed that VAPS score at the time of 1st pain killer is higher in lignocaine group with a t value of 2.165 and is statistically significant with a p value of 0.039 as shown in Table-3.

Discussion

Pain, a postoperative sequelae of surgical extraction of impacted third molars, can vary in intensity, ranging from moderate to severe. Post extraction pain is usually managed with analgesics, mainly NSAIDs. Though these drugs have proven their ability to manage postoperative pain, they are also associated with adverse effects that may contraindicate their use. NSAIDs are known to have a range of side effects, of which the commonest are gastrointestinal.

Addition of opiates to the local anesthetic used for peripheral nerve blocks can provide effective and long lasting postoperative analgesia.[13,14,15,16] It is speculated that activation of opioid receptors in the peripheral nervous system renders them effective. The peripheral administration of lower doses of opioid can overcome the potential central side effects like respiratory depression, nausea, vomiting and pruritus. Several trials have been performed to determine the peripheral analgesic effect of various opioids in different surgical settings,[11,12,14] results of these studies suggest that buprenorphine is effective perineurally and provided longer duration of postoperative pain control.

In the present study we have used lignocaine 2% with adrenaline 1:80000 as the anesthetic solution since it is readily available in all the dental settings and induces anesthesia for ample time to complete lower third molar surgery. Being an intermediate acting local anesthetic, there is no inadvertent masking of postoperative analgesic effect of buprenorphine.

Buprenorphine 0.3mg has been added to local anesthetic. Buprenorphine being highly lipophilic, readily diffuses into the perineurium. It is 20-50 times more potent than morphine in antinociception,[3,7,18] and has significantly longer duration of action due to slow dissociation from opioid receptors.[19,20]Some of the previous authors investigated the postoperative analgesic effect of buprenorphine in variety of dental procedures like pulp extirpation, apicectomy, cystic eneucleation , alveoloplasty, transalveolar extractions and incision and drainage of abscess.[21,22]Our study comprised only the patients undergoing bilateral third molar surgery, hence all of them had relatable levels of pain and inflammation. All the procedures were performed by same surgeon in order to overcome procedural bias.

Since bilateral impacted third molars were included in the study demographic parameters did not differ between the groups. A subjective assessment of local anesthetic onset time (seconds) is higher in Lignocaine group with a t value of 0.541. However, this was not statistically significant (P>0.05). Objective anesthesia tested with a dental probe, was found to be more profound in case of Buprenorphine combination group with a t value of -1.768 and statistically insignificant (p value of 0.08). Thus, the addition of buprenorphine to lignocaine had no effect on the onset of anesthesia in the present study.

Hence in accordance with other studies, buprenorphine when added to LA to prolong postoperative analgesia did not have any effect on onset of sensory blockade.[14,23,24] In agreement to these studies; Mathew et al.,[25] found that the mean time in group receiving buprenorphine with bupivacaine was 6.31min compared to the mean of bupivacaine alone group which was 6.17min. But in the study by Mehta et.al,[26] time of onset of anesthesia was prolonged when fentanyl was added to bupivacaine compared to bupivacaine alone. This difference could be attributed to the change in pH of bupivacaine when added to fentanyl. Rastoder et.al,[27] studied the mechanism that prolongs the duration of sensory block LA in

peripheral nerves when adjuvant drugs were added and concluded that the added drugs like buprenorphine influence the action of LA via indirect mechanism that remained unidentified.

In our study 2 out of 15 patients who received buprenorphine and lignocaine mixture on one side of bilateral third molar, reported with nausea on the 1st postoperative day and one patient reported with vomiting on 1st postoperative day followed by nausea on the next day. The studies by Kumar et al[22] and Chhabra et al[28] showed that there were no adverse effects following the addition of 0.03mg of buprenorphine to lignocaine 2%. In contrast to these studies, Paliwal and Karnawat[24] reported the incidence of nausea, vomiting and sedation in the group receiving 0.3 mg buprenorphine added to bupivacaine than bupivacaine alone for brachial plexus block. According to the authors these side effects are due to partial systemic absorption resulting in central actions of buprenorphine.

In our study, mixture of buprenorphine plus lignocaine used for peripheral nerve block significantly prolonged the duration of analgesia. This long lasting pain relief is because of unique characteristic of buprenorphine which dissociates very slowly from opioid receptors[9,21,29].

Viel EJ et al.[30] compared the effectiveness of morphine 50 mcg/kg with buprenorphine 3 mcg/kg added to local anesthetic in supraclavicular brachial plexus block. The duration of analgesia was nearly doubled in the buprenorphine group (35.05 +/- 1.95 hrs. versus 18.25 +/- 1.15 hrs.). Modi et.al, [21] found mean duration of postoperative pain relief after injection of the local anesthetic alone was 8.34 +/- 0.11 hours whereas it was 28.18 +/- 1.02 hours when buprenorphine was added, and the result was statistically significant (P < .001). Himanshu et.al,[31] obtained the result with mean duration of analgesia of 13.71 hours in lignocaine group and 39.58hrs. in buprenorphine combination group. Chhabra et al. [28] got a mean duration of postoperative analgesia of 3.5 h in lignocaine group and 12 h in buprenorphine with LA group. In our study the post-operative analgesia(min) was higher in Buprenorphine combination group compared to lignocaine group with a t value of -7.521 and was statistically significant (p value of <0.001).

Our study showed that mixture of buprenorphine and lignocaine significantly decreased the number of postoperative analgesic intake. Similarly, the study by Chhabra et al[28] the mean number of postoperative analgesics consumed was 5.8 in lignocaine group and 3.9 in Buprenorphine group.

Comparing quality of analgesia, buprenorphine group 80% subjects had good quality of analgesia till 4 hours postoperatively without further analgesic intake which was significant (P: 0.028). In lignocaine group, a majority of patient reported tolerable[9] and unsatisfactory[5] analgesia by 2nd hours and were already consuming analgesics. In the buprenorphine plus LA group, one patient began consuming analgesic at 5th hour. One patient began consuming analgesic after 20 hours. The mean duration to analgesic consumption was 11.4 hours in buprenorphine group as compared to 2 hours in lignocaine group. The current study clearly indicates that the single effective administration of buprenorphine and lignocaine mixture in 3rd molar surgery can be one of the best pain management solutions.

Conclusions

The study demonstrated that mixture of buprenorphine and lignocaine 2% with adrenaline 1: 80,000 has significant effect on postoperative pain control after surgical extraction of impacted 3rd molars, reducing the number of analgesics consumed. It can be concluded from our current study that Buprenorphine has local analgesic action. Single administration of buprenorphine mixed with lignocaine as a local injection tends to prolong the duration of postoperative analgesia resulting is lesser analgesic consumption following surgical extraction of impacted mandibular third molars.

Ethical policy and Institutional Review board statement:

The study has been conducted in accordance with the ethical principles mentioned in the Declaration of Helsinski (2013) and approved by Institutional Review Board (Ref. No. 17132). Written informed consent was obtained from all patients for participation in the study.

Declaration of Interest

The authors report no conflict of interest.

	GROUP	N	Mean	Std. Deviation	t	Df	P VALUE
VAPS score at the time of 1st pain killer	Lignocaine	15	7.530	0.990	2.165	28	0.039
	Buprenorphine	15	6.730	1.033			
VAPS 2hr	Lignocaine	15	5.470	3.021	6.449	15.167	<0.001
	Buprenorphine	15	0.330	0.617			
VAPS 4hr	Lignocaine	15	3.730	2.549	3.706	22.09	0.001
	Buprenorphine	15	0.930	1.438			0.928
VAPS 6hr	Lignocaine	15	1.800	2.077	0.092	28	
	Buprenorphine	15	1.730	1.907			
VAPS 8hr	Lignocaine	15	2.730	2.219	0	28	1
	Buprenorphine	15	2.730	2.604			
VAPS 10hr	Lignocaine	15	2.930	2.154	0.274	28	0.786
	Buprenorphine	15	2.730	1.831			
VAPS 12hr	Lignocaine	15	2.730	2.434	-0.074	28	0.941
	Buprenorphine	15	2.800	2.484			
VAPS 14hr	Lignocaine	15	2.470	1.922	-0.522	28	0.606
	Buprenorphine	15	2.870	2.264			
VAPS 16hr	Lignocaine	15	2.530	2.200	0.718	28	0.478
	Buprenorphine	15	2.000	1.852			
VAPS 18hr	Lignocaine	15	2.130	2.532	0	28	1
	Buprenorphine	15	2.130	2.326			
VAPS 20hr	Lignocaine	15	2.270	2.374	-1.407	28	0.17
	Buprenorphine	15	3.600	2.798			
VAPS 22hr	Lignocaine	15	2.400	2.098	0.293	28	0.772
	Buprenorphine	15	2.200	1.612			
VAPS 24hr	Lignocaine	15	2.270	1.751	1.275	28	0.213
	Buprenorphine	15	1.470	1.685			
VAPS 36hr	Lignocaine	15	2.530	1.506	1.534	28	0.136
	Buprenorphine	15	1.670	1.589			
VAPS 48hr	Lignocaine	15	1.800	1.821	1.134	20.984	0.27
	Buprenorphine	15	1.200	0.941			
VAPS 72hr	Lignocaine	15	1.000	1.195	1.79	18.882	0.09
	Buprenorphine	15	0.400	0.507			

Table 3. Postoperative Visual analogue pain scale scores at different time intervals

		N	GROUP				Chi square	P value
			Lignocaine		Buprenorphine			
			Count	Column N %	Count	Column N %		
Quality of Analgesia 2hrs	Good	14	1	6.70%	13	86.70%	19.74	<0.001
	tolerable	11	9	60.00%	2	13.30%		
	unsatisfactory	5	5	33.30%	0	0.00%		
Quality of Analgesia 4hrs	Good	17	5	33.30%	12	80.00%	7.155	0.028
	tolerable	11	8	53.30%	3	20.00%		
	unsatisfactory	2	2	13.30%	0	0.00%		
Quality of Analgesia 6hrs	Good	24	12	80.00%	12	80.00%	1.2	0.549
	tolerable	5	3	20.00%	2	13.30%		
	unsatisfactory	1	0	0.00%	1	6.70%		
Quality of Analgesia 8hrs	Good	22	11	73.30%	11	73.30%	2	0.368
	tolerable	4	3	20.00%	1	6.70%		
	unsatisfactory	4	1	6.70%	3	20.00%		
Quality of Analgesia 10hrs	Good	18	9	60.00%	9	60.00%	0	1
	tolerable	12	6	40.00%	6	40.00%		
	unsatisfactory	0	0	0.00%	0	0.00%		
Quality of Analgesia 12hrs	Good	19	9	60.00%	10	66.70%	0.164	0.921
	tolerable	9	5	33.30%	4	26.70%		
	unsatisfactory	2	1	6.70%	1	6.70%		
Quality of Analgesia 14hrs	Good	20	10	66.70%	10	66.70%	0	1
	tolerable	10	5	33.30%	5	33.30%		
	unsatisfactory	0	0	0.00%	0	0.00%		
Quality of Analgesia 16hrs	Good	23	11	73.30%	12	80.00%	1.043	0.593
	tolerable	6	3	20.00%	3	20.00%		
	unsatisfactory	1	1	6.70%	0	0.00%		
Quality of Analgesia 18hrs	Good	18	9	60.00%	9	60.00%	0	1
	tolerable	10	5	33.30%	5	33.30%		
	unsatisfactory	2	1	6.70%	1	6.70%		
Quality of Analgesia 20hrs	Good	20	13	86.70%	7	46.70%	6.3	0.043
	tolerable	8	1	6.70%	7	46.70%		
	unsatisfactory	2	1	6.70%	1	6.70%		
Quality of Analgesia 22hrs	Good	23	10	66.70%	13	86.70%	1.677	0.195
	tolerable	7	5	33.30%	2	13.30%		
	unsatisfactory	0	0	0.00%	0	0.00%		
Quality of Analgesia 24hrs	Good	24	12	80.00%	12	80.00%	0	1
	tolerable	6	3	20.00%	3	20.00%		
	unsatisfactory	0	0	0.00%	0	0.00%		
Quality of Analgesia 36hrs	Good	25	12	80.00%	13	86.70%	0.24	0.624
	tolerable	5	3	20.00%	2	13.30%		
	unsatisfactory	0	0	0.00%	0	0.00%		
Quality of Analgesia 48hrs	Good	26	11	73.30%	15	100.00%	4.615	0.032
	tolerable	4	4	26.70%	0	0.00%		
	unsatisfactory	0	0	0.00%	0	0.00%		
Quality of Analgesia 72hrs	Good	30	15	100.00%	15	100.00%	.	.
	tolerable	0	0	0.00%	0	0.00%		
	unsatisfactory	0	0	0.00%	0	0.00%		

Table 4. Postoperative quality of analgesia at different time intervals.

	GROUP	N	Mean	Std. Deviation	t	df	P value
No of pain killers taken	Lignocaine	15	7.270	1.438	5.327	28	<0.001
	Buprenorphine	15	4.130	1.767			
Age	Lignocaine	15	25.400	4.137	0	28	1
	Buprenorphine	15	25.400	4.137			

Table 5. Total no of painkillers consumed.

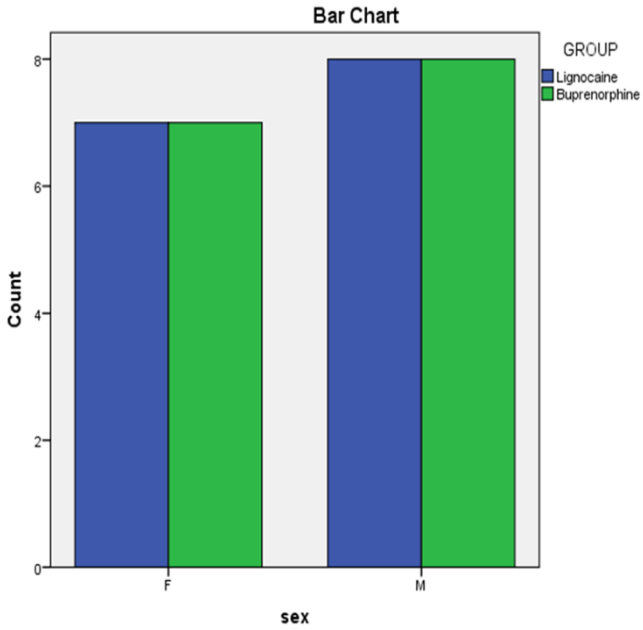

Chart 1. Sex distribution.

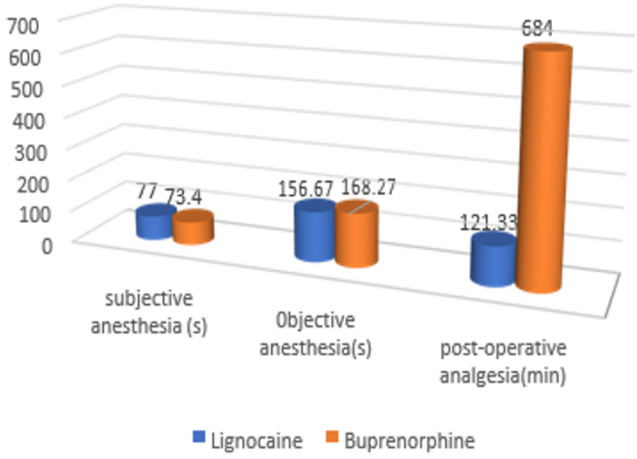

Chart 2. Evaluation of onset of anesthesia and duration of postoperative analgesia

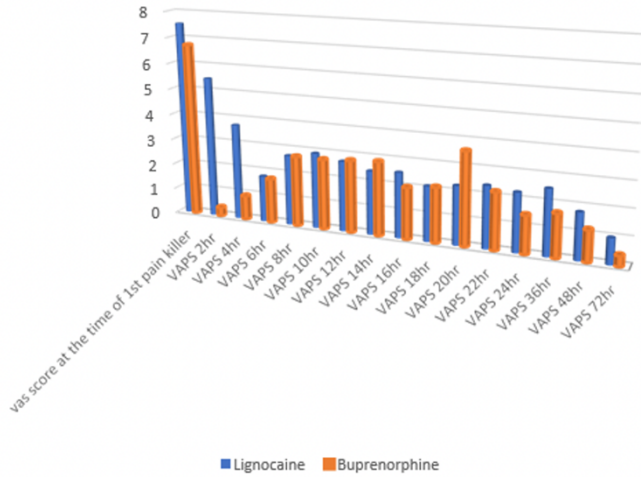

Chart-3: VAPS plotted against time for both groups. (statistically significant at the time of 1st pain killer and 2nd &4th hour respectively with p values 0.039, <0.001 and 0.001)

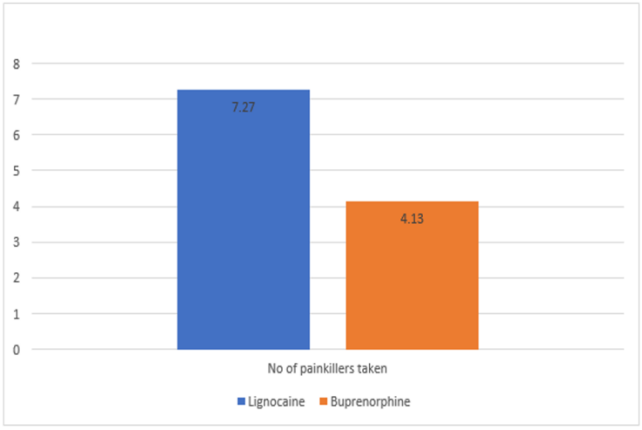

Chart 4. No of painkillers consumed. (statistically significant with P value <0.001)

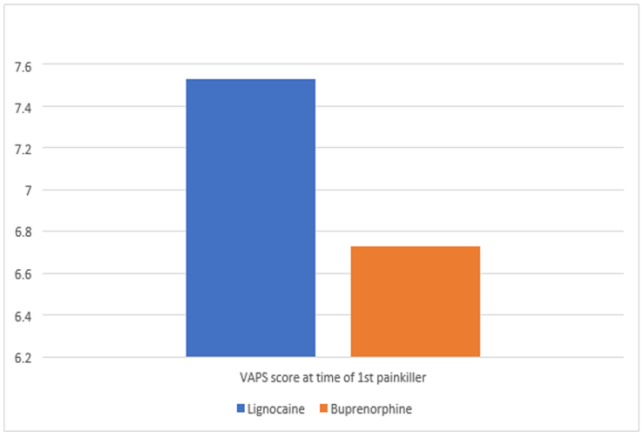

Chart 5. VAPS score at the time of 1st painkiller.

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