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Evaluation of the Effectiveness of Tramadol HCL as an Alternative to Lignocaine HCL as a Local Anesthetic Agent

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Abstract:-
Background and Objectives: Lignocaine Hydrochloride (HCl), an amide group of local anaesthetic continues to be used as the preferred local anaesthetic agent in exodontia. Alternatives such as diphenhydramine, an antihistamine is used in cases of allergy exhibited towards amide or ester group of local anaesthetic agents. Other alternatives such as opioids like tramadol hydrochloride (HCl) have recently shown peripheral anaesthetic activity. The present double-blinded split-mouth clinical study aimed to evaluate and compare the clinical anaesthetic efficacy, analgesic effect, and limitations of lignocaine HCl and tramadol HCl in orthodontic extractions.

Methods: 100 cases were selected for the orthodontic extraction of maxillary premolars. 50 healthy and ambulatory individuals of both sexes, aged 18- 30 years undergoing extraction of bilateral maxillary premolar teeth for orthodontic treatment, fulfilling the inclusion criteria were selected for the study. 2 mL of 2% lignocaine HCl with 1: 80000 adrenaline and 2mL of 50mg tramadol HCl diluted with sterile water in the ratio of 1:1 was used as a local anaesthetic agent in a double-blindedsplit-mouth design. The onset of action, pain during injection, intraoperative pain, post-operative pain, duration of action and postoperative analgesic effect of the agents used were recorded and studied.

Results: Results were statistically analysed by unpaired t test and chi-square test. A 'P' value of less than 0.001 was considered for statistical significance. Higher mean pain intraoperatively during extraction of maxillary premolars was recorded in the tramadol HCl group compared to the lignocaine HCl group, and the difference between them was statistically significant (P<0.001). A second dose of tramadol HCl was required in 50% of the cases studied, whereas only 4% of individuals needed a second dose of lignocaine HCl. No significant association was observed between the onset of anaesthesia and duration of action when compared between lignocaine HCl and tramadolHCl. The analgesic effect was of statistical significance (P< 0.001). Tramadol HCl offered excellent postoperative analgesia for a mean of 14.7 hours when compared with lignocaine HCl which was offered only for an average of 2.7 hours.

Conclusion: 2% lignocaine HCl is considered to be the gold standard local anaesthetic agent in exodontia in terms of its anaesthetic efficacy. Tramadol HCl can be considered as an alternative to lignocaine HCl, but may not be as efficient as the latter. The soft tissue anaesthesia provided by tramadol HCl can be considered equivalent to lignocaine HCl, but the hard tissue anaesthesia is weaker. In terms of postoperative analgesic effect, tramadol HCl offers excellent results. Hence the study can be concluded that tramadol HCl can be used as an alternative to lignocaine HCl, although the latter remains gold standard.

Keywords:- *Tramadol HCl, Lignocaine HCl, local anaesthesia, analgesic effect.*

I. INTRODUCTION

In oral surgery, various procedures are carried out under local anaesthesia. An ideal anaesthetic would be the one that can provide prolonged anaesthetic effect with postoperative analgesic effect to minimize the duration of postoperative analgesic drugs.

Lidocainehydrochloride (HCl) is one of the most widely used local anaesthetic agents in dentistry. LidocaineHCl provides fast relief, has excellent anaesthetic effects, and has minimal allergic reactions recorded.For this reason, lidocaineHCl is assumed to be the safest local anaesthetic for dental procedures[1].

However, some recent in vivo studies have shown that opioids, such as diamorphine, meperidine, fentanyl, and sufentanil, also have anaesthetic effects.One of these opioids is tramadol hydrochloride (tramadol HCl), which is known for its analgesic activity and has been used in medicine for many years[1].Tramadol HCl, is a centrally acting opioid analgesic.It exerts a double-action, functioning as both an opioid and a non-opioid, although classified as a weak opioid in terms of its analgesic properties.It acts on inhibition of the reuptake of monoaminergic receptors such as norepinephrine and serotonin, which are released from nerve endings. Thus, it inhibits the transmission of pain in

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the central nervous system and blocks nociceptive impulses, creating a combined analgesic and adjuvant effect[2]. Recent studies suggest that tramadol HClmay have specific local anaesthetic properties on peripheral nerves when used alone.It produces peripheral antinociceptive effects by interaction with the peripheral opioid receptors. When administered locally, it has both analgesic and anaesthetic properties[2]. Pang and colleagues in 1998 for the first time reported the anaesthetic property of commercially available tramadol when injected intradermally[3]. In 2013, Al Haideri reported that tramadol alone and in combination with adrenaline can be used as a local anaesthetic for the extraction of upper molar tooth under supraperiosteal infiltration. This was the first study where tramadol HCl was used with and without adrenaline as a local anaesthetic agent for tooth extraction[3].

In this study,we measured the efficacy of the anaesthetic use of pure tramadolHCl to determine the degree to which it can be used in daily practice compared with lignocaine HCl.

II. AIMS AND OBJECTIVES

The aim of the present double-blinded split-mouth clinical study was to evaluate and compare the clinical anaesthetic and analgesic efficacy of lignocaineHCl and tramadol HCl in orthodontic extractions.

III. OBJECTIVES

- To evaluate the local anaesthetic effect of tramadol HCl in comparison with lignocaine HClin therapeutic extraction of maxillary premolars.
- To evaluate the onset of action of tramadol HCl and lignocaine HCl.
- To evaluate the degree of pain during injection, intraoperatively and postoperatively.
- To evaluate the duration of action of tramadol HCl and lignocaine HCl.
- To evaluate the postoperative analgesic effect of tramadol HCl.

IV. MATERIALS AND METHODS

A. SOURCE OF DATA

The patients for this study were recruited from the Department of Oral and Maxillofacial Surgery and the department of Orthodontics and Dentofacial Orthopaedicsat Sri HasanambaDental College and hospital, Hassan, Karnataka, from December 2018 to November 2020, after obtaining ethical clearance. This study wasconducted on patients who had to undergo bilateral therapeutic extraction of maxillary premolars.

B. METHOD OF COLLECTION OF DATA

Informed consent was obtained from the patients after explaining the procedure to them. A randomised double-blinded controlled clinical trial in a split-mouth design was conducted on the patients who were satisfying the inclusion criteria as listed below. A total of 50 patients per group were taken up for the study.In group A 2% of lignocaine HCl was administered. In group B TramadolHCl 50mg was administered.

C. INCLUSION CRITERIA

- Age:- 18-30 years of age of either sex.
- Patients having bilaterally indicated therapeutic extraction of maxillary premolars.
- Patient with no history of allergy to drugs or anaesthetics used in the surgical protocol.
- Patients who are willing to participate in the study.

D. EXCLUSION CRITERIA

- Patients less than 18 years of age and above 30 years of age.
- Patients with deleterious habits
- Patients in whom extraction is medically contraindicated.
- Patients with systemic diseases.
- Patients with active local or systemic infection.
- Patients on long term steroid therapy.
- Patients with osseous pathology which may affect the surgical outcome and wound healing.
- Patients with psychiatric disease or substance abuse.
- Patients who are allergic to the drugs used for the surgical protocol.
- Patients who have consumed analgesics within 6 hours prior to the surgical procedure.
- Patients with Hb% less than 12gm/dL.
- Pregnant and lactating women and those taking oral contraceptives.
- Patients who are not willing for the study.

E. PRE-TREATMENT RECORDS

- Detailed medical, dental and personal history
- Routine and special blood investigations
- Orthopantomogram
- Identification of the tooth to be extracted atruamatically
- Clinical photographs

F. CLINICAL PARAMETERS

- Onset of action of the anaesthetic
- Pain assessment using Visual analogue scale (VAS) for the degree of pain, during injection, intraoperatively, and 2 hours postoperatively.
- Duration of local anaesthesia
- Side effects like nausea, vomiting, dizziness, drowsiness, dry mouth, allergic reactions are also recorded in both groups.
- The postoperative analgesic effect.

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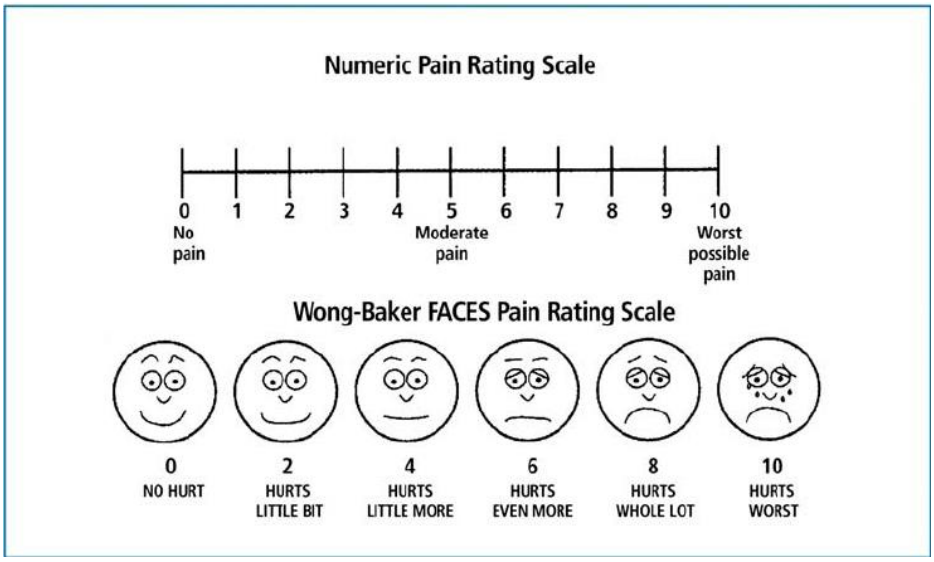

Fig. 1: Visual Analogue Scale

G. INVESTIGATIONS

Routine and special blood investigations such as Hb%, HbsAg were done to evaluate the patient prior to the procedure. Other investigations, as deemed necessary, were also done.

H. PREPARATION OF THE ANAESTHETIC AGENTS

In the double-blinded study, neither the investigator nor the patient was aware of which drug was being administered. The drug was loaded by the principal investigator of the study. In group A, 2mL of 2% lignocaine HCl and in group B Tramadol HCl 50mg diluted with 1mL of distilled water (total of 2mL) were used. The drugs were handed over to the co-investigator who carried out the extractions.

I. PROCEDURE

- It is a double-blindedsplit-mouth study, where the patients underwenta maxillary premolar extraction in the first appointment and after one week the contralateral tooth was extracted.
- 0.2mL of a test dose of the anaesthetic agentwas injected intradermally under all aseptic precautions on the forearm of the right hand using a 1mL disposable syringe. The injection site was evaluated for 15 minutes. Patients allergic to the drug were excluded from the study.
- In group A, 2% of lignocaine HCl was administered. In group B Tramadol HCl 50mg was administered after diluting it with 1mL of distilled water.
- The patient initially received 1.5mL of either tramadol or lignocaine as supra periosteal infiltration on the buccal side and 0.5mL on the palatal side.
- Onset of action of the anaesthetic was measured every 30 seconds, following the administration of the drug, by checking for objective symptoms using instrumentation in the buccal marginal gingiva.
- Pain was assessed using Visual Analogue Scale (VAS) for the degree of pain, during injection, intraoperatively, and 2 hours postoperatively.
- During the procedure, when the VAS pain score exceeded 3, an additional 0.5 mL of the same drug was administered and after waiting for 5 minutes extraction was carried out.
- Duration of local anaesthesia was recorded by pin prick test postoperatively. During the first one hour, the anaesthetic effect was checked every 5 minutes. Following this, the anaesthetic effect was checked every 15 min till 2 hours postoperatively.
- Side effects like nausea, vomiting, dizziness, drowsiness, dry mouth, allergic reactions were also recorded in both groups.
- The postoperative analgesic effect was monitored 6 hourly, 12 hourly and 24 hourly postoperatively. Rescue analgesics were prescribed and was consumed only when painoccurred.

J. Armamentarium:

- Mouth mirror
- Probe
- 2.5mL syringes
- 2% lignocaine with 1:80000 adrenaline
- 50mg Tramadol HCl
- Sterile water
- Periosteal elevator
- Maxillary premolar extraction forceps
- Cotton gauze

V. RESULTS

In the study, 100 cases were selected for extraction of maxillary premolar tooth. To avoid bias we decided on bilateral extraction of maxillary premolar teeth in a single patient, to compare between 2% lignocaine HCl and 50mg tramadol HCl for their anaesthetic efficiency. The study was a double-blindsplit-mouth design approach.Fifty healthy and ambulatory individuals of both sexes aged 18 – 30 years with a mean age group of 22.6 years, undergoing bilateral extraction of maxillary premolar teeth, who fulfil the inclusion criteria were included in the study. Out of 50 patients, 17 were males and 33 were females. Results were statistically analysed by chi-square test and unpaired t test. A ‘P’ value of less than 0.001 was considered for statistical significance.

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During the administration of supra periosteal infiltration in the maxilla using 2% lignocaine HCl and 50mg tramadol HCl in 50 patients, pain during injection, intraoperative pain and immediate post-extraction pain was assessed using the visual analogue scale (VAS). Mean pain during injection of 50mg tramadol HCl using VAS scale was 0.600 (standard deviation of 0.925) and during injection of 2% lignocaine HCl was 0.720 (standard deviation 0.969), as measured by unpaired t test. Intraoperative pain using 50mg tramadol HCl was found to be 1.68 and with 2% lignocaine HCl was 0.12 and the result was found to be statistically significant (P< 0.001). Immediate postoperative pain in the tramadol group was found to be 0.06 (standard deviation of 0.313) and in the lignocaine group was 0.04 (standard deviation of 0.282).Duration of action of tramadol (131 min) when compared to that of lignocaine (126 min) was similar and not statistically significant. Postoperative analgesia exhibited by tramadol was statistically significant when compared to that of lignocaine. Tramadol offered a mean of 14.7 hours of postoperative analgesia while lignocaineoffered only for a mean of 2.7 hours. A second dose of injection was required in 50 % cases of the tramadol group to achieve adequate anaesthesia and hence it was statistically significant (P<0.001). Rescue analgesic medication consumed by the tramadol group was statistically significant when compared to the lignocaine group. Adverse effects noticed in both groups were negligible.

VI. STATISTICAL ANALYSIS

- Data was collected and subjected to statistical analysis. It was done using SPSS version 20 of Microsoft excel 2007.
- Statistical analysis included descriptive statistics which are mean, standard deviation, frequency and percentage.
- Inferential statistics was done by using repeated measure ANOVA with Chi square test and unpaired t test.

VII. TABLES

Table 1: Statistical Analysis (Sex)

Sex			
		Frequency	Percent
SEX	Male	17	34.0
	Female	33	66.0

Table 2: Statistical Analysis (Descriptive Statistics)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	50	18.00	30.00	22.6800	3.95092

Table 3: Statistical Analysis (Unpaired t test)

unpaired t test					
	GROUP	N	Mean	Std. Deviation	P
TIME OF ONSET IN MIN	TRAMADOL	50	2.820	0.660	0.310
	LIGNOCAINE	50	2.700	0.505	
VAS INJECTION	TRAMADOL	50	0.600	0.925	0.528
	LIGNOCAINE	50	0.720	0.969	
VAS INTRA OP	TRAMADOL	50	1.680	1.420	**<0.001***
	LIGNOCAINE	50	0.120	0.479	
VAS POST OP	TRAMADOL	50	0.060	0.313	0.738
	LIGNOCAINE	50	0.040	0.282	
DOA IN MIN	TRAMADOL	50	131.400	18.07	0.267
	LIGNOCAINE	50	126.600	24.462	
ANALGESIC IN HR	TRAMADOL	50	14.740	5.774	**<0.001***
	LIGNOCAINE	50	2.700	0.685	

Table 4: Statistical Analysis (Chi Square test)

Chi square test					
			GROUP		P
			TRAMADOL	LIGNOCAINE	
2ND DOSE	NO	Count	25	48	**<0.001***
		% within GROUP	50.0%	96.0%	
	YES	Count	25	2	
		% within GROUP	50.0%	4.0%	

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Table 5: Statistical Analysis (Chi Square test)

Chi square test					
			GROUP		P
			TRAMADOL	LIGNOCAINE	
ADVERSE EFFECT	Nausea	Count	2	0	0.213
		% within GROUP	4.0%	0.0%	
	nil	Count	47	50	
		% within GROUP	94.0%	100.0%	
	vomitting	Count	1	0	
		% within GROUP	2.0%	0.0%	

Table 6: Statistical Analysis (Chi Square test)

Chi square test					
			GROUP		P
			TRAMADOL	LIGNOCAINE	
RESCUE MEDICATION	no	Count	24	0	**<0.001***
		% within GROUP	48.0%	0.0%	
	yes	Count	26	50	
		% within GROUP	52.0%	100.0%	

VIII. FIGURES

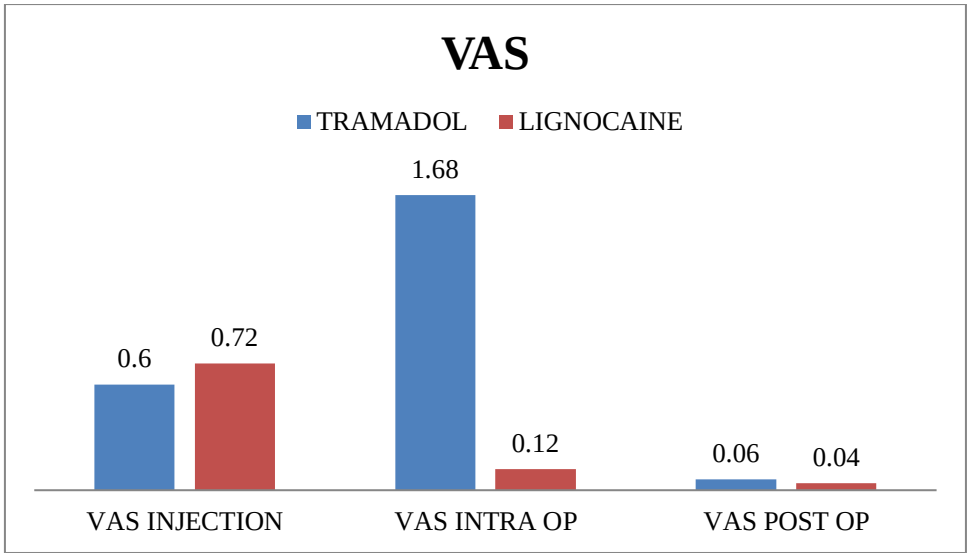

Fig. 2: VAS

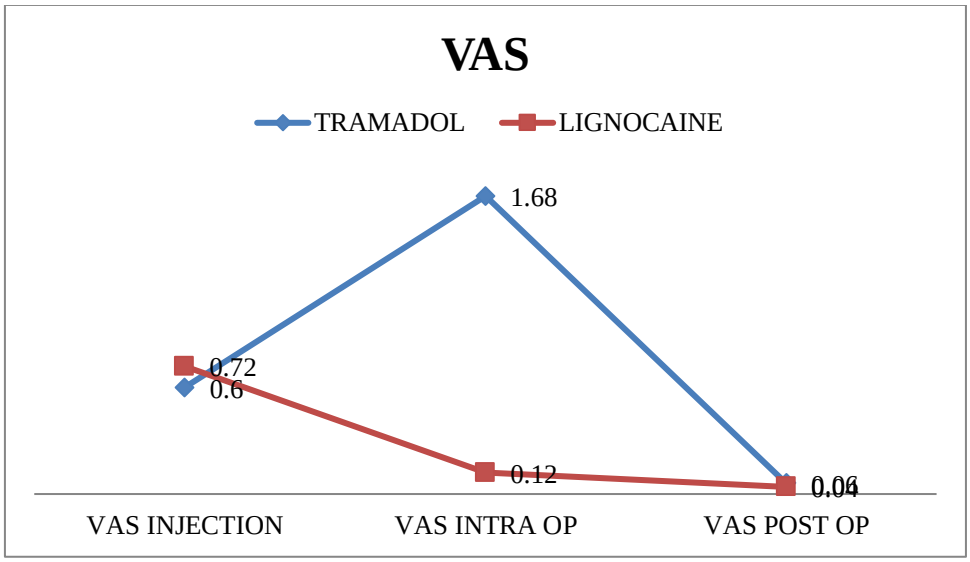

Fig. 3: VAS

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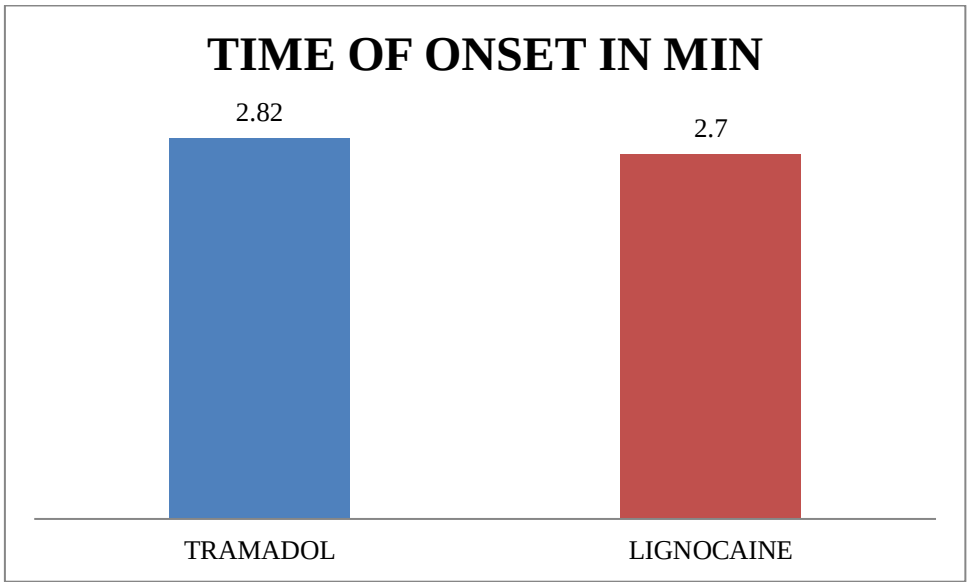

Fig. 4: Time of Onset in Min

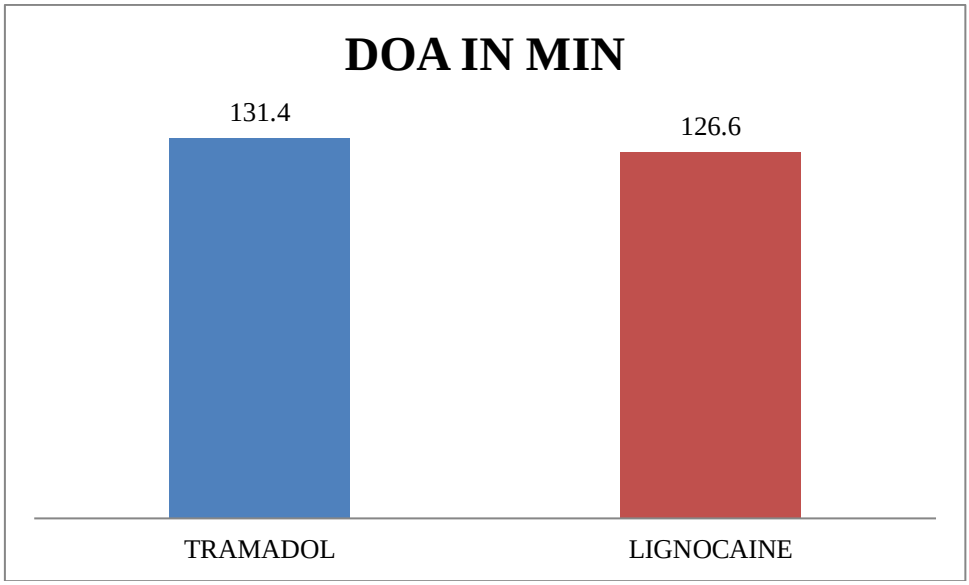

Fig. 5: Doa in Min

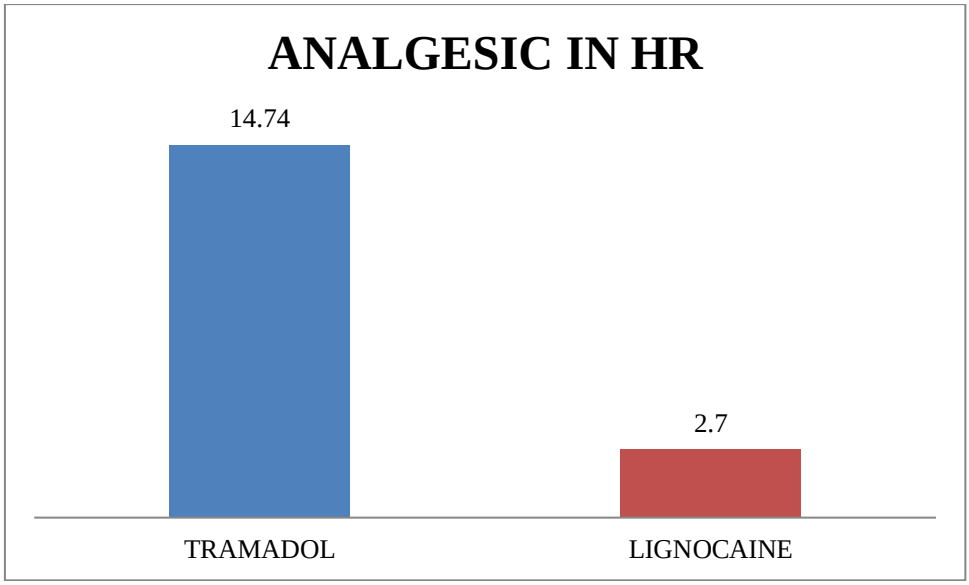

Fig. 6: Analgesic in HR

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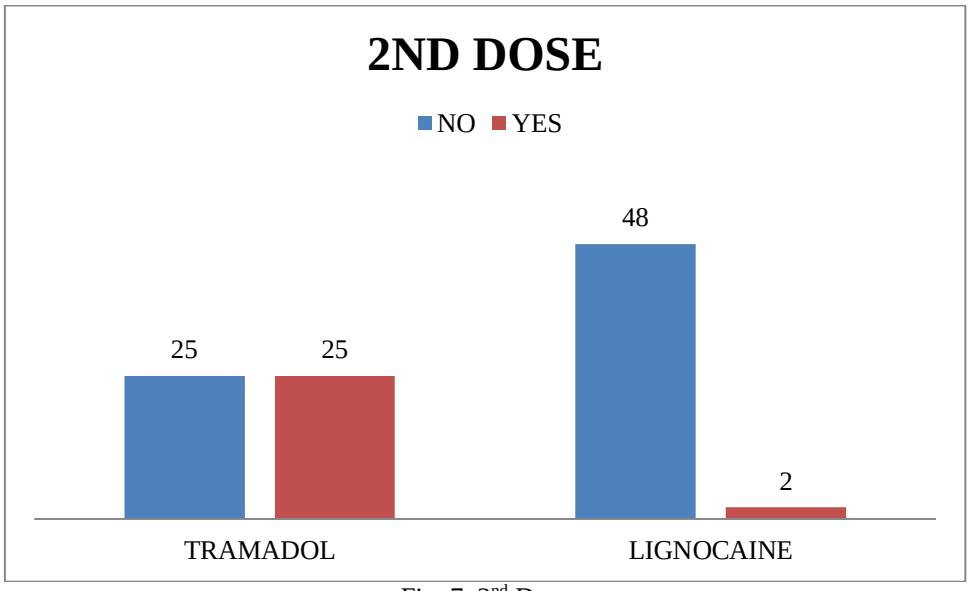

Fig. 7: 2nd Dose

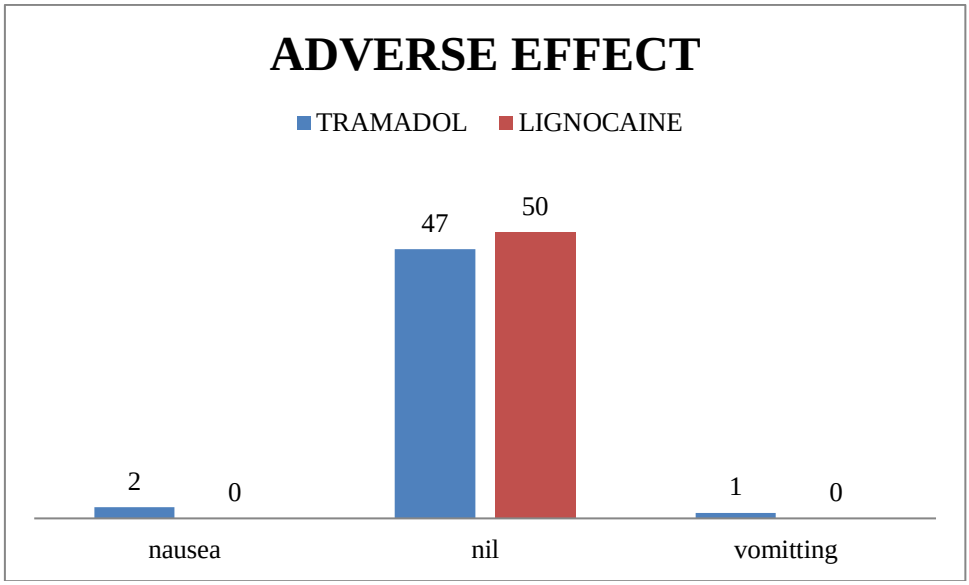

Fig. 8: Adverse Effect

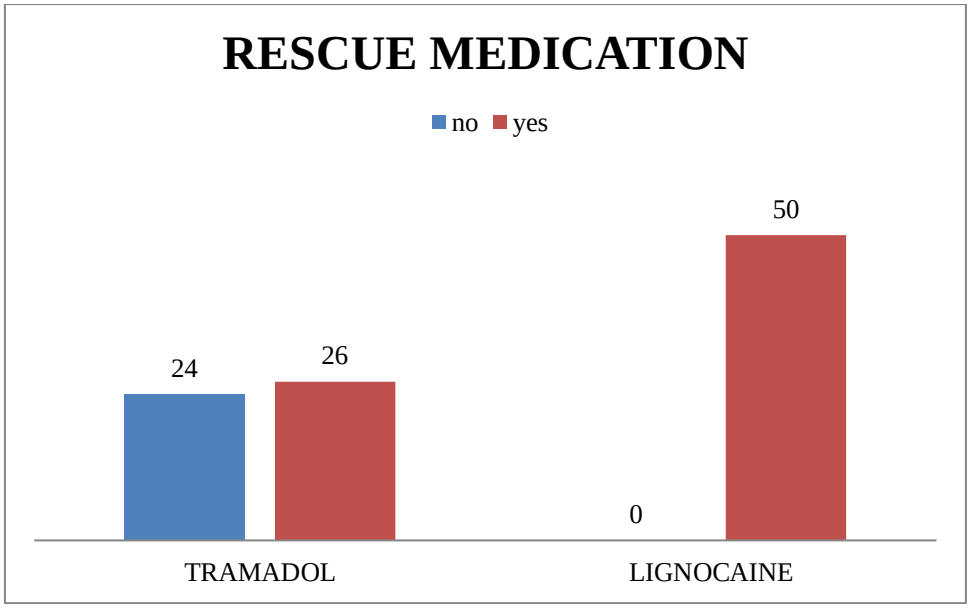

Fig. 9: Rescue Medication

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IX. DISCUSSION

Dental phobia is the excessive anxiety and agitation against procedures performed before dental treatment. It is not only quite common in some individuals but also can be so strong that it prevents people from undergoing dental treatment. Therefore, it is important to relieve the patient's anxiety during dental treatment by using a strong anaesthetic in combination with agents that can have analgesic effects[1]. In this study, we have compared the onset of anaesthesia duration of anaesthesia, post operative analgesic effect, possible side effects, and patient satisfaction between lidocaine HCl, which is the local anaesthetic used most often in dentistry, and tramadol HCl, which is an analgesic drug that has recently been shown to have anaesthetic activity.

Tramadol is an opioid analgesic with a dual mechanism and widely used for both acute and chronic pain in medicine. In dentistry, the studies have been mostly limited to its analgesic activity, such as the analgesic activity for impacted third molar surgery[2].

Tramadol is an atypical opioid that acts selectively on the mu receptors.The analgesic effects are achieved by inhibition of pain transport through both opioid and monoaminergic mechanisms. Tramadol also has a non–opioid Cl2-agonistic and serotonergic pain inhibitory effect, acting as a 5- hydroxytryptamine and norepinephrine inhibitor for nerve endings. When tramadol is administered locally, it can also exert its pharmacological effect directly on the inflamed pulp tissue. For example, Jaber et aldemonstrated the presence of mu receptors in human coronal and radicular pulp tissue[2].

Recent experimental and clinical studies have also reported a peripheral local anaesthetic effect of tramadol in addition to its analgesic properties.It was shown that, when injected via the intradermal route (Pang et al), tramadol has a local anaesthetic effect and decreased the requirement for propofol injections for pain[4]. When combined with mepivacaine, tramadol increased blockage of the brachial plexus[2].Intradermal injection of 5% tramadol in soft tissue lesions has been shown to have a local anaesthetic effect similar to that of 2% prilocaine[6].In addition, the combination of tramadol with adrenaline was found to be more effective than their individual use and that the use of 5% tramadol was safer and more effective than 2% prilocaine for local anaesthesia in the circumcision of children[2].These studies reported both local anaesthetic properties and the analgesic effect of tramadol.

Alsandook and Al-Haideriused epinephrine with lidocaine or tramadol in patients who underwent oral surgery (eg. tooth extraction and periapical surgery) and suggested that the combination of tramadol and epinephrine could be an alternative to lidocaine[1]. In another study, Al-Haideriinvestigated the anaesthetic efficacy of tramadol and tramadol plus epinephrine in the extraction of upper molar teeth[10]. He performed tooth extraction on these patients and suggested tramadol HCl could be used with epinephrine in oral and maxillofacial surgery.

Despite these findings, the mechanism of the anaesthetic effect of tramadol has remained unknown, in contrast to its analgesic activity. As far as is known, these local anaesthetic effects will not be reversed by naloxone; thus tramadol might use non–opioid receptor-dependent pathways and not opioid activation[10]. Much confusion prevails among different researchers as how this opioid analgesic works as a LA. Mert et al. proposed that tramadol may follow hydrophobic pathway like benzocaine by passing through the nerve membrane and blocking the sodium channels. In a study by Tsai et al., it was shown that the changes in somatosensory evoked potential by tramadol were not reversed by naloxone, suggesting that the LA effect of tramadol is not mediated by opioid receptors. Mert et al. suggested that tramadol may have a LA effect with a different mechanismof action than that of lignocaine and the presence of calcium concentrations increases this activity of tramadol. Mustafa G. and colleagues in 2005 suggested that tramadol may produce nerve conduction block by exerting a LA effect by blocking sodium channels following a hydrophilic pathway as lignocaine and it blocks potassium channels more than lignocaine. Mert et al. proposed that the LA effect of tramadol may be due to the non-specific binding to membrane proteins or non-specific membrane effects. Nizamettin and his associates in 2009 suggested that sodium channels in fast conducting fibres are more susceptible to the effect of tramadol than sodium channels in slow conduction fibres[3].

The present split-mouth study was designed to reduce potential research bias by avoiding the physiologic and psychological differences between the tested individuals that could affect the results. Compared with the formation of groups from independent subjects, as in other studies, the design we used ensures that the individual characteristics of each patient and subjective pain assessment will not affect the results of the study.

Similar to other studies, 2mL of lidocaine was administered to 1 side of the face and 2 mL of tramadol was administered to the other side using infiltration anaesthesia. The onset of anaesthesia, duration of action, anaesthetic efficacy, postoperative analgesia (VAS) score, possible side effects, and patient satisfaction were the parameters investigated in the present study.

No significant difference was found between the groups in terms of the onset of anaesthesia in the present study which is similar to the results of previous studies recorded.

In terms of intraoperative analgesia, although Alsandook and Al-Haideriobserved no significant difference between the lidocaine and tramadol groups, Al-Haiderireported a significant difference between the pure tramadol and tramadol–epinephrine combinations. Thus, the combined use of tramadol with epinephrine resulted in lower pain scores and, therefore, provided more effective anaesthesia. In this study, efficacy of pure tramadol was the objective. Intra operatively significant difference was found in the pain scale between the tramdol and lignocaine groups. This maybe due to the absence of epinephrine in tramdol

group, as plain tramadol was used to evaluate the anaesthetic property of pure tramadol in this particular study.

We investigated whether the experience of postoperative pain would differ between the two groups in our study. We measured this using a 10-point VAS, for the next 24postoperative hours. Tramadol provided more effective analgesia than lidocaine, which had a longer duration of total anaesthesia. In addition, almost 70% patients in the lidocaine group had required additional analgesics after tooth extraction. In contrast, this was the case for only 10% patientsin the tramadol group. These results further support that tramadol has effective analgesic activity in the postoperative period, as well as intraoperative anaesthetic efficacy.

The possibility of physical and psychological addiction to tramadol, respiratory depression, and hemodynamic side effects is distinctively less than those of other opioids.Also, studies have reported that the risk of developing addiction or resistance to tramadol is rather low compared with that of other analgesic agents[2]. The most common side effects have been nausea and vomiting; however, occasionally, headache, sweating, dizziness, and sedation have been reported. In addition, the side effects of tramadol administered as locoregional or intravenous regional anaesthesia have included skin rash, urticaria, and bleeding. However, these side effects of tramadol are known to be minimal in therapeutic use and many are preventable. In many studies, no statistically significant differences between groups were reported. In the present study, nausea was observed in both groups; however, no statistically significant difference was found between the two groups in terms of the side effects. Thus, both drugs can be well tolerated by patients.

In our study, we found a statistically significant difference in the degree of satisfaction between the 2 groups. 50% of individuals receiving tramadol required a second dose of injection as the VAS was above 4 and was not well tolerated as compared to lignocaine. The reason to it, maybe attributed to the absence of epinephrine in the tramadol group as compared to that of previous studies by Ege et al.

X. CONCLUSION

In conclusion, 5% tramadol has a LA property similar to 2% lignocaine but is a weaker anaesthetic as compared to lignocaine and it can be used as an alternative to lignocaine for extraction of tooth, like diphenhydramine, in situations where lignocaine cannot be used due to some unusual reason. However, it cannot be recommended as a first choice drug due to its weaker anaesthetic effect. Although, tramadol can be recommended for its use as local infiltrations in the oral and facial soft tissues, for soft tissue minor surgeries like excision of mucocele, suturing of oral and facial lacerated wounds etc.

➢ *Disclaimer:*

- The work has been approved by the Institutional Ethical committee and informed consent has been obtained from the subjects.
- The work is registered with the Clinical Trials Registry-India (CTRI)
- The research complies with the principles stated in the Declaration of Helsinki.

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INSTITUTIONAL ETHICAL COMMITTE

(Reg. No: ECR/983/Inst/KA/2017)

Ref. No.: SHDCH /2018-19/ 2482 Date: 22/11/18

ETHICAL CLEARANCE CERTIFICATE

To,

DR. JINU ELIZABETH JAMES
POST GRADUATE
Department of **Oral And Maxillofacial Surgery**
Sri Hasanamba Dental College & Hospital,
Hassan-573202.

SUB:- 'COMPARING THE EFFICACY OF TRAMADOL HCl WITH THAT OF LIGNOCAINE HCl, AS A LOCAL ANAESTHETIC IN SUPRAPERIOSTEAL INFILTRATION FOR THERAPEUTIC EXTRACTION OF MAXILLARY PREMOLARS : A SPLIT MOUTH STUDY'

At the ethical committee meeting held on 12th Nov 2018, your referenced letter and the above mentioned study related documents were examined and discussed. After due consideration, the committee has decided to approve the conduct of the above mentioned study under your guide's supervision.

The approval of your study is subject to the conditions that you are required to notify the Institutional Ethical Committee any modifications to the approved protocol, any adverse events reported in relation to the study and submit annual status report and a final report to the Institutional Ethical Committee at the completion of the project.

MEMBER SECRETARY
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Sri Hasanamba Dental College & Hospital,
Hassan-573202.

CHAIRPERSON
Institutional Ethical committee
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CLINICAL TRIALS REGISTRY - INDIA
ICMR - National Institute of Medical Statistics

PDF of Trial
CTRI Website URL - http://ctri.nic.in

Clinical Trial Details (PDF Generation Date :- Fri, 26 May 2023 11:49:59 GMT)

CTRI Number	CTRI/2020/07/026573 [Registered on: 14/07/2020] - **Trial Registered Prospectively**
Last Modified On	11/03/2021
Post Graduate Thesis	Yes
Type of Trial	Interventional
Type of Study	Drug Dentistry
Study Design	Randomized, Parallel Group Trial
Public Title of Study	Tramadol HCl as a local anaesthetic in exodontia.
Scientific Title of Study	Comparing the efficacy of TRAMADOL HCl with that of LIGNOCAINE HCl , as a local anaesthetic in supra periosteal infiltration for therapeuitic extraction of maxillary premolars: A SPLIT MOUTH STUDY.

Secondary IDs if Any

Secondary ID	Identifier
NIL	NIL

Details of Principal Investigator or overall Trial Coordinator (multi-center study)

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