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ABSTRACT
Introduction
The success of a minor oral procedure relies on the efficiency of the local anaesthetic and the dexterity of the operator. Local anaesthetic with an extended duration of action, good analgesia, and negligible toxicity is an optimal choice. A common standard option is 2% lignocaine hydrochloride with adrenaline (1:80,000). However, lignocaine is not recommended for long procedures or in patients with cardiovascular compromise.Various clinical trials have suggested other options, one of which is ropivacaine.The aim of the survey was to assess the knowledge, attitude and practice of ropivacaine in prosthodontics.
Materials and methods
An online questionnaire based cross-sectional study was conducted during 1st July to 12th July 2021, among undergraduate and postgraduate dental students of Saveetha Dental College. An online questionnaire survey which consisted of 17 questions, was circulated among the dental practitioners (n=100) within the city based on the inclusion and exclusion criteria of the study and the response was subjected to analysis.
Results
According to the survey 88.89% of the participants are aware that Ropivacaine falls under long acting amide link. According to the survey 55% of the participants think lidocaine is the most commonly used Local anaesthesia followed by ropivacaine 35%. About 92 % of the participants think Ropivacaine is better than bupivacaine due to its less lipophilic and have a significantly higher threshold CNS toxicity. According to the survey 85% of the participants think 14 minutes is the half life of ropivacaine followed by 2mins, 10mins, 4mins. Ropivacaine can be used in long prosthodontics procedures like FPD. According to the survey 58% know the commercial name of ropivacaine whereas 31% don't know the commercial name.
Conclusion: Within the limitations of the study, the participants are aware of ropivacaine.

Keywords: ropivacaine, long acting anesthesia, innovative technique, lignocaine, prosthodontics.

INTRODUCTION

The success of a minor oral procedure relies on the efficiency of the local anaesthetic and dexterity of the operator. Local anaesthetic with an extended duration of action, good analgesia, and negligible toxicity is an optimal choice(1–3). A common standard option is 2% lignocaine hydrochloride with adrenaline (1:80,000). However, lignocaine is not recommended for long procedures or in patients with cardiovascular compromise. Various clinical trials have suggested other options, one of which is ropivacaine(4). Lignocaine is considered as the gold standard anesthetic agent against whom all other agents are compared(5,6). However, lignocaine with adrenaline is not the preferred blend for extended procedures owing to its brief duration of action and undesirable effects on CVS and CNS system at higher doses(7–9).

A local anesthetic agent with prolonged duration of action and prolonged analgesia with minimal effects on CNS and CVS system is an appropriate choice(10). Bupivacaine for a considerable time was considered as an ideal long-acting anesthetic agent; however, it soon fell out of favor owing to its cardiotoxic effects(11,12). Recently, ropivacaine gained a better clinical recognition owing to its safer profile and equivalent potency compared to bupivacaine(9,13). At lower concentrations, it is a vasoconstrictor, obviating the need for additional vasoconstrictor. One of its discerning features is the residual analgesic property which instigates enhanced postoperative analgesia(14). It replaced bupivacaine as a gold standard amongst long-acting local anesthetics. Ropivacaine is commercially available at various concentrations, viz., 0.5%, 0.75%, and 1%(15,16).
However, its utility in dentistry is limited to few studies in endodontics, L3M surgeries and periodontic procedures evaluating its anesthetic efficacy. In a recent comparative analysis between 0.5 and 0.75% ropivacaine for inferior alveolar nerve block in L3M surgery, it was concluded that 0.75% ropivacaine was more efficacious and desirable(17). Ropivacaine can be used in long procedures like during fixed partial denture which requires a long acting local anesthesia. The aim of the survey was to assess the knowledge, attitude and practice of ropivacaine in prosthodontics.Our team has extensive knowledge and research experience that has translate into high quality publications (18–33)

MATERIAL AND METHODS

This cross-sectional questionnaire based study was conducted among dental undergraduate and postgraduate students of Saveetha Dental College, through an online survey. The online mode was chosen for the survey as it is time-saving, and a majority of the population can be covered. A total of 100 dental students from different years of dental undergraduate and postgraduate participated in this study. The Sampling method was simple random sampling. A 13 point validated questionnaire was posted for the online survey using google forms, of which --- questions assessed the knowledge, --- questions assessed the attitude and -- questions assessed the practices of the participants. The questionnaire was formed after scrutinizing literature. Anonymity was maintained, the purpose of the study was explained to the participants in detail and the questionnaire was filled with their consent. The extracted data were tabulated in MS Excel sheets and were subjected to statistical analysis using SPSS software. The descriptive data obtained were plotted in bar graphs. The statistical test used for analysis was correlation analysis done by Chi-Square test using SPSS software. Age, Gender, year of study were considered as independent variables.

RESULTS AND DISCUSSION

According to the survey 88.89% of the participants are aware that Ropivacaine falls under long acting amide link. According to the survey 55% of the participants think lidocaine is the most commonly used Local anaesthesia followed by ropivacaine 35%. Today Lignocaine is the most commonly used local anesthetic agent in dentistry and is referred to as the “gold standard” for dental procedures . Although its properties resemble an ideal LA agent, it is not completely free from cardiovascular toxicity and has an inherent vasodilating property(34). According to the survey most of the participants know that ropivacaine is long acting local anesthesia.
According to the survey 85% of the participants think 14 minutes is the half life of ropivacaine followed by 2mins, 10mins, 4mins. Ropivacaine can be used in long prosthodontics procedures like FPD. According to the survey 58% know the commercial name of ropivacaine whereas 31% don’t know the commercial name(13). According to a survey 92% of the participants think ropivacaine is better than bupivacaine because ropivacaine is less lipophilic than bupivacaine and ropivacaine has a significantly higher threshold CNS toxicity than bupivacaine(11). According to other research a high frequency of anaesthesia was obtained with ropivacaine. The pulpal anaesthesia mean onset time was 2.1 and 1.6 min after end of infiltration and 2.9 min and 4.5 min following end of nerve block injection for the 1 and 2 ml ropivacaine respectively(10). Pulpal anaesthesia mean duration was 0.4 and 1.3 h after infiltration and 3.7 and 4.3 h for nerve block respectively. The mean lip numbness duration ranged from 3.7 to 5.1 h for the upper lip and from 7.5 to 8.4 h of the lower lip.
According to the survey 63% of the participants think ropivacaine can be used in all surgeries like flap surgery, minor surgery, during FPD, extraction of teeth.Each patient was randomly administered one of the following ropivacaine concentrations: 0.75%, 0.5%, 0.375%, or 0.25% (18 patients per group). Onset of block (mean ± SD) was rapid for both 0.75% (1.4 ± 0.4 minutes) and 0.5% (1.7 ± 0.5 minutes) ropivacaine but significantly slower for the 0.375% (4.2 ± 2.5 minutes) and 0.25% (10.7 ± 3.0 minutes) concentrations. Tooth extraction was performed successfully with the 0.5% and 0.75% concentrations, and supplemental injections were not required.
Ropivacaine, like other local anaesthetics, causes nerve block by inhibiting sodium ion influx in nerve fibres. ropivacaine has a pKa of 8.2, identical to bupivacaine and levobupivacaine, but unlike racemic bupivacaine, it is the pure S()-enantiomer of propivacaine. It has a reduced lipid solubility and is less likely to permeate big, myelinated

motor fibres than bupivacaine. The degree of sensory and motor block caused by ropivacaine is dose and age dependant.

Ropivacaine, like other local anaesthetics, blocks sodium ion inflow in nerve fibres, causing nerve block. ropivacaine has a pKa of 8.2, the same as bupivacaine and levobupivacaine, but it is the pure S()-enantiomer of propivacaine, unlike racemic bupivacaine. It has a lower lipid solubility than bupivacaine and is less likely to permeate large, myelinated motor fibres. The amount of sensory and motor block generated by ropivacaine varies depending on the dose and the patient's age.

Ropivacaine, like other local anaesthetics, can cause cardiovascular toxicity such as arrhythmias and decreased myocardial conductivity and contractility, as well as CNS toxicity such as seizures at high plasma concentrations, such as those seen after large doses or inadvertent intravascular administration. In animals and healthy volunteers, it has a substantially greater cardiovascular and CNS toxicity threshold than bupivacaine.When delivered by various ways, ropivacaine has been shown to provide a thorough sensory and motor block suitable for anaesthesia as well as a sensory/motor block profile adequate for postoperative or labour pain in randomised, double-blind, comparative clinical trials in humans

CONCLUSION

From this survey, it is evident that most dental practitioners are aware that Ropivacaine falls under long acting amide link and participants are aware that ropivacaine is better than bupivacaine because ropivacaine is less lipophilic than bupivacaine and ropivacaine has a significantly higher threshold CNS toxicity than bupivacaine.

FUNDING

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CONFLICT OF INTEREST

None

GRAPHS

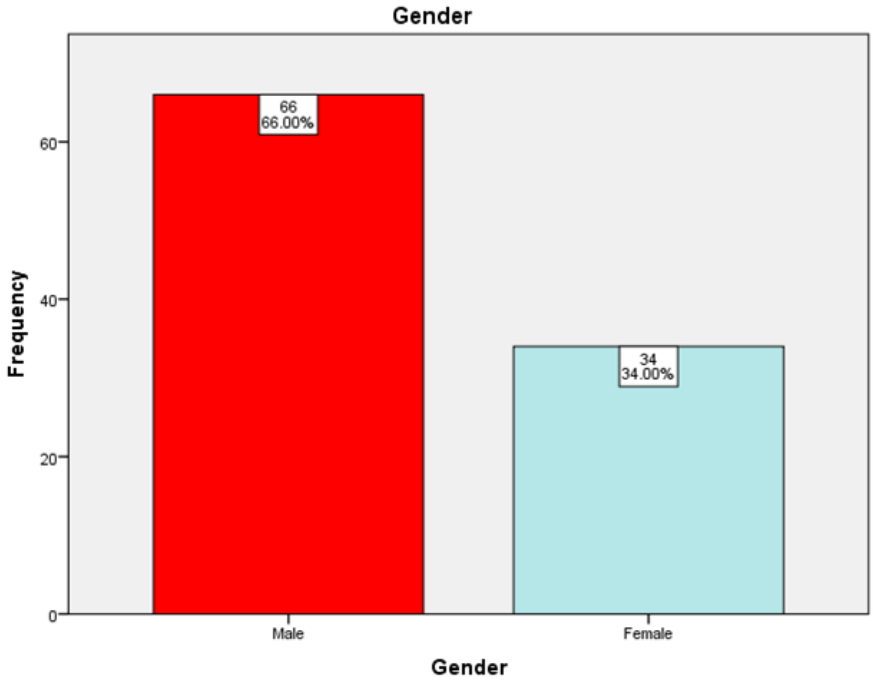

Fig.1: The bar graph shows the distribution of gender, 66% male and 34% female, where red denotes male and blue denotes female.

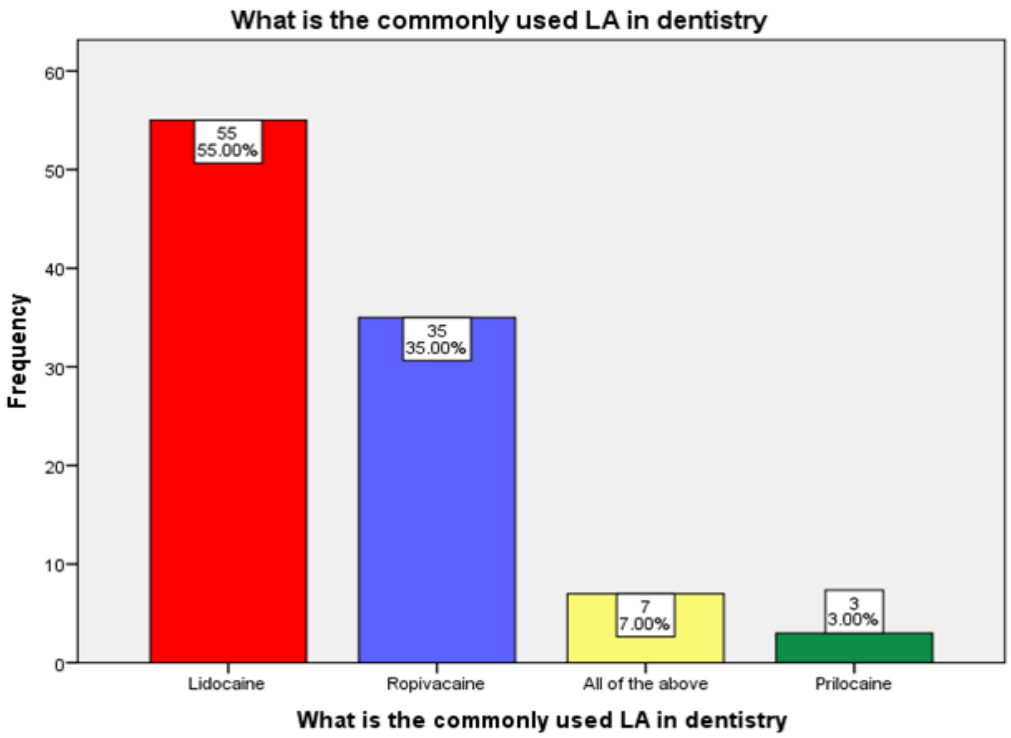

Fig.2 : The bar graph shows the distribution of commonly used LA in dentistry, where red denotes Lidocaine (55%), blue denotes ropivacaine (35%),green denotes prilocaine (3%) and yellow denotes All the above (7%).

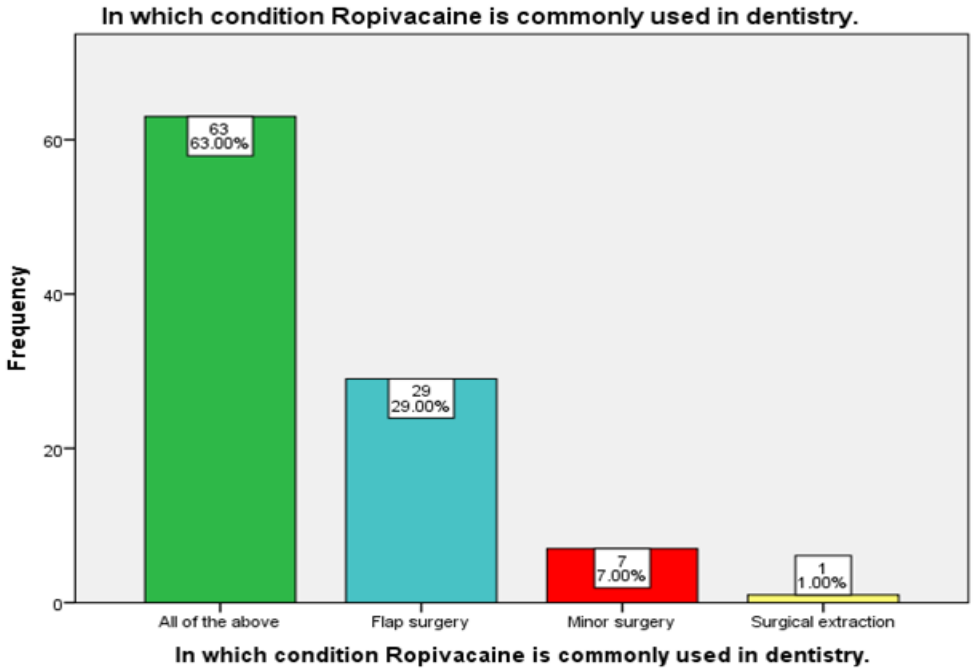

Fig.3: The bar graphs shows the distribution of conditions where ropivacaine is commonly used in dentistry, where blue denotes Flap surgery (29%), red denotes minor surgery (7%), yellow denotes surgical extraction (1%) and green denotes all of the above (63%).

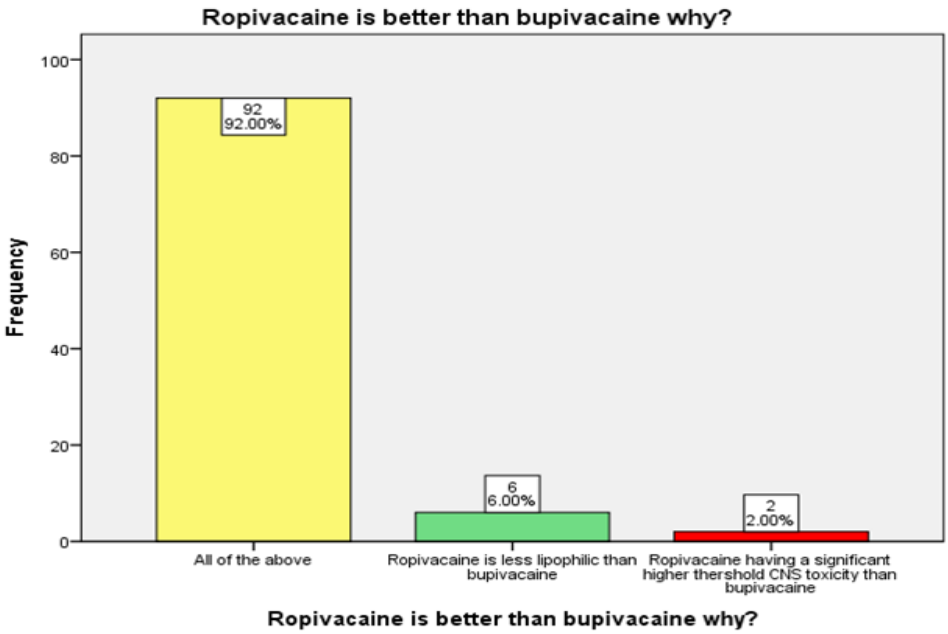

Fig.4: The bar graphs shows the distribution comparison of ropivacaine and bupivacaine, where green denotes Ropivacaine is less lipophilic than bupivacaine(6%), red denotes ropivacaine having a significant higher threshold CNS toxicity than bupivacaine(2%) and yellow denotes all of the above (92%).

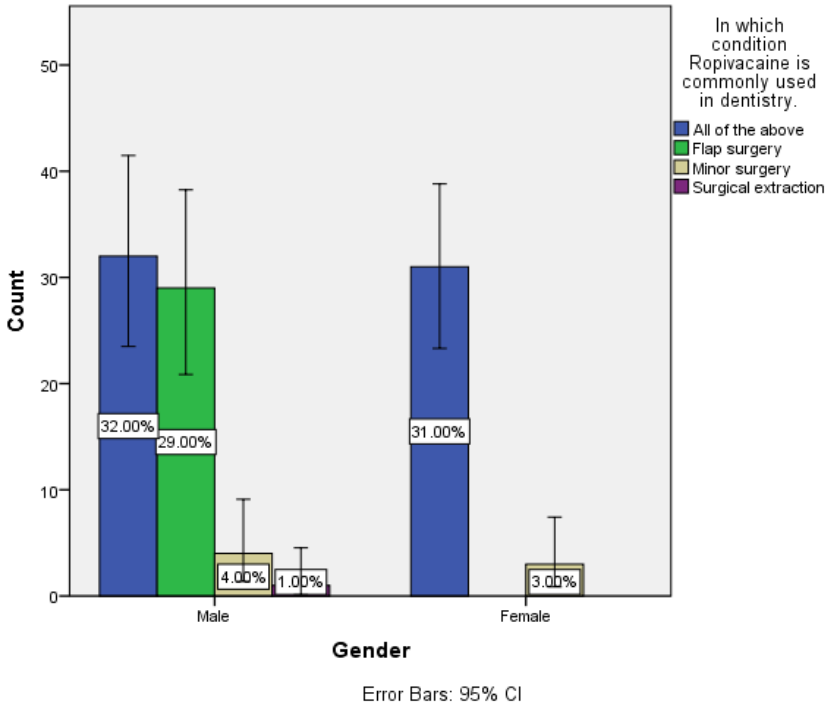

Fig.5: Error Bars help to indicate estimated error or uncertainty to give a general sense of how precise a measurement is. This is done through the use of markers drawn over the original graph and its data points. Typically, Error bars are used to display either the standard deviation, standard error, confidence intervals or the minimum and maximum values in a ranged dataset.The graph represents the association of gender and classification of ropivacaine. X axis denotes gender and Y axis denotes classification. Chi-square value =3.289; P- value =0.348 (> 0.05), hence statistically not significant.

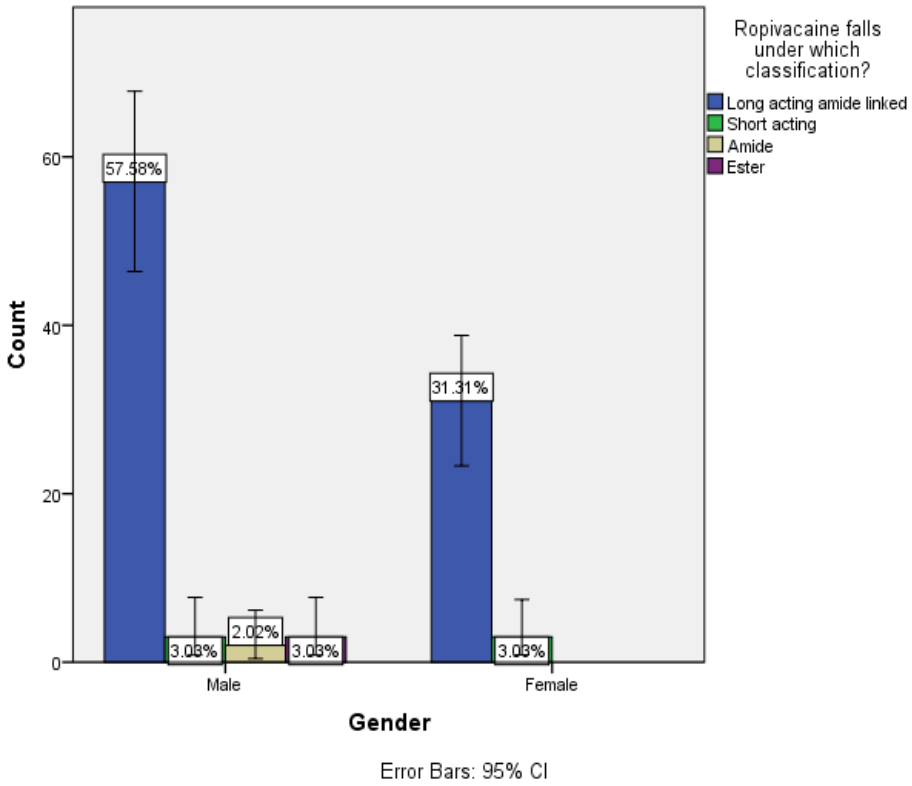

Fig.6: Error Bars help to indicate estimated error or uncertainty to give a general sense of how precise a measurement is. This is done through the use of markers drawn over the original graph and its data points. Typically, Error bars are used to display either the standard deviation, standard error, confidence intervals or the minimum and maximum values in a ranged dataset.The graph represents the association of gender and condition ropivacaine commonly used in dentistry. X axis denotes gender and Y axis denotes condition ropivacaine commonly used in dentistry. Chi-square value = 22.191; P- value =0.00 (> 0.05), hence statistically significant.

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