

summary

Ropivacaine is equivalent to bupivacaine in maxillary infiltrations

Anaesthetic efficacy of ropivacaine in maxillary anterior infiltration. Kennedy M, Reader AI, Beck M, Weaver J. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2001; 91:406–412

Question: In patients requiring maxillary lateral incisor infiltration is ropivacaine as effective as bupivacaine?

Objective To compare the anaesthetic efficacy of 0.5% ropivacaine with and without 1:200,000 epinephrine and 0.5% bupivacaine with 1:200,000 epinephrine in maxillary lateral incisor infiltrations.

Design Randomised controlled trial in hospital setting.

Intervention Forty subjects received three sets of injections randomly assigned at three separate appointments at least 1 week apart. Topical anaesthesia was used at the injection site.

Outcome measures Subject rated pain of insertion, placement and deposition. Depth and duration of anaesthesia, onset and duration of lip numbness and post injection discomfort.

Results See Table 1

Conclusion The pharmacological action of 0.5% ropivacaine with 1:200,000 epinephrine is equivalent to 0.5% bupivacaine with 1:200,000 epinephrine for maxillary lateral incisor infiltrations.

Evidence-Based Dentistry (2002) 3, 67–68. doi:10.1038/sj.ebd.6400117

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Table 1 Efficacy of ropivacaine compared with bupivacaine

	0.5% ropivacaine		0.5% ropivacaine+ 1:200,000 epinephrine		0.5% bupivacaine+ 1:200,000 epinephrine	
	No	%	No	%	No	%
Needle insertion						
No pain	26	65	23	57	28	70
Severe pain	0	0	0	0	0	0
Needle placement						
No pain	16	40	81	45	18	45
Severe pain	0	0	1	3	0	0
Solution deposition						
No pain	9	23	7	17	1	3
Severe pain	0	0	0	0	8	20
Anaesthetic success	27	68	30	75	32	80
Onset of pulpal anaesthesia	1.73 mins (± 2.54) SD		3.15 mins (± 3.54) SD		3.0 mins (± 3.84) SD	
Duration of pulpal anaesthesia	12.43 mins (± 11.12) SD		33.3 mins (± 28.7) SD		33.40 mins (± 24.00) SD	

Commentary

This trial compared the use of 0.5% ropivacaine with and without 1:200,000 epinephrine to 0.5% bupivacaine with 1:200,000 epinephrine as an agent for maxillary lateral incisor infiltration anaesthesia. Bupivacaine and ropivacaine are considered to be 'long-lasting' anaesthetics. The authors studied anaesthetic efficacy and injection discomfort.

There is little published data on the use of ropivacaine in dentistry.

Ropivacaine is a pure l-isomer unlike bupivacaine, which is a racemic mixture of the d- and l-isomers. It is suggested that this relatively recent addition to the local anaesthetic armamentarium offers a number of benefits. Firstly, ropivacaine produces less cardiovascular toxicity than bupivacaine. Secondly, there is evidence in the medical literature that ropivacaine has some inherent vasoconstrictive action. It is well known that vaso-

constriction increases efficacy in dental anaesthesia.

Here electrical pulp testing was used to assess anaesthesia and injection discomfort was measured using a 4-point pain scale.

The results showed no difference between solutions in the number of lateral incisor teeth that were successfully anaesthetised. However, the duration of pulpal anaesthesia was less for the plain ropivacaine solution

compared to the epinephrine-containing anaesthetic. Injection discomfort was greater with bupivacaine and epinephrine compared to the ropivacaine/epinephrine solution and the authors suggest that this is due to the lower pH of the former solution. This confirms the work of others¹ that solution pH influences injection pain during buccal infiltration anaesthesia.

The use of long-acting solutions such as ropivacaine and bupivacaine can be considered appropriate if they decrease post-operative pain following surgical procedures. However, this long-lasting effect is only apparent after regional block injections. Long-acting anaesthetics do not offer advantages over

conventional solutions such as lidocaine with epinephrine during infiltration techniques. Indeed, in this study the mean duration of pulpal anesthesia was a little over 30 min for the epinephrine-containing solutions. The fact that plain ropivacaine had a shorter duration of activity compared to the epinephrine-containing ropivacaine solution suggests that for optimal action of this agent the addition of a vasoconstrictor is required. It seems that any inherent vasoconstrictive action of ropivacaine offers little benefit during intra-oral infiltration anaesthesia.

The authors suggest that future studies should investigate the efficacy of ropivacaine for inferior alveolar

nerve block anaesthesia. This is a more appropriate model for assessing clinical effectiveness as long-acting solutions are only indicated in dentistry when performing regional block anaesthesia.

1. Oikarinen VJ, Ylipaavalnpemi P, Evers H. Pain and temperature sensations related to local analgesia. *Int J Oral Surg* 1975; 4:151-156.

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