POST - TONSILLECTOMY PAIN : DIFFERENT MODES OF PAIN RELIEF

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ABSTRACT : *Sixty patients aged 15 to 40 years of either sex, American Society of Anaesthesiologists (ASA) grade I and II, undergoing tonsillectomy, were randomly allocated to receive either preoperative intramuscular diclofenac sodium(group A) or pre-incisional bilateral infiltration of bupivacaine in the peritonsillar fossa (group B) or post operative Transcutaneous Electric Nerve Stimulation - TENS (group C) at fixed time intervals. Pain scores (Visual analogue scale VAS, 0-100 mm) were assessed at rest and on deglutition at 1,3,6,9,12 and 24 hours after surgery. Pentazocine lactate 15 mg IV was given as rescue analgesic whenever VAS estimation was more than 30 mm at rest (not deglutition). Constant incisional pain was significantly less ($p < 0.01$ ANOVA) in group C after 3 hours of surgery as compared to group A and B. Similarly pain on deglutition was significantly less ($p < 0.01$, ANOVA) in group C during the entire study period as compared to Group A and B. There was significant reduction of VAS ($p < 0.01$) immediately after TENS therapy at 0, 4 and 8 hours. Rescue analgesic consumption was significantly lower in TENS group. Thus, TENS seems to be an effective therapeutic modality for post tonsillectomy pain relief as compared to the other two methods.*

Key Words : *Pain, tonsillectomy; diclofenac sodium; bupivacaine; Transcutaneous Electric Nerve Stimulation (TENS).*

INTRODUCTION

Pain is the most significant obstacle to the rehabilitation of a patient following tonsillectomy. Inadequate analgesia causes poor oral intake, which leads to lassitude, delayed recovery of strength and well being and occasionally requires overnight hospitalization in day case surgical practice.

In the light of the problems associated with post-operative pain, various strategies for the management of post-tonsillectomy pain have been proposed like infiltration of local anaesthetic,[1,2] non-steroidal anti-inflammatory drugs (NSAID)[3], narcotics and oral analgesics[4]. Application of sucralfate as a protective barrier following tonsillectomy has been found to promote healing with significant pain reduction in the post-operative period[5]. Recently encouraging results following use of transcutaneous electric nerve stimulation (TENS) for post tonsillectomy pain has also been reported[6].

Thus, the present study was designed to compare the efficacy of TENS and pre-operative local infiltration of local anaesthetic (bupivacaine) with the conventional parenteral administration of an NSAID, diclofenac sodium.

MATERIALS AND METHODS

A protocol for a controlled prospective trial was designed and approval gained from the hospital ethics committee along with an informed written individual consent. Sixty patients of either sex, age 15 to 40 years, ASA grade I and II were randomly assigned to each group using a list of random numbers, and received either of the three treatment modalities.

Group A: Received diclofenac sodium 1.5 mg/kg intramuscular, 30 min. before surgery.

Group B: Received bilateral pre-incisional infiltration of 3 ml of 0.25 percent bupivacaine in the peritonsillar fossa.
Group C: Received TENS for 20 minutes, at 30 minutes, 4 hours and 8 hours after surgery.

Following premedication with, intravenous atropine 0.6 mg, general anaesthesia was induced with thiopentone sodium 5 mg^{-kg} and suxamethonium chloride 1 mg^{-kg} given to facilitate nasal endotracheal intubation. Maintenance of

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Table I : Pain Scores (VAS at rest)

Time interval (hrs)	Group A	Group B	Group C
1	26.25±6.66	28.50±4.89	26.50±5.40
3	32.00±5.47	32.00±4.70	28.25±5.20[b]
6	30.50±4.84	30.50±4.84	23.25±6.12[a]
9	21.75±4.66 [a]	26.25±5.59	17.50±7.52[a]
12	14.25±4.37	17.25±5.95	8.25±5.44[a]
24	9.50±1.53	8.25±3.35	1.50±3.28[a]

a ($p< 0.01$) : Significant difference between group C and group A, B and group A and B at 9 hours, b ($p < 0.05$) : Significant difference between group C and group A, B at 3 hours.

anaesthesia was achieved with $N_2O:O_2$ (70:30) and 0.5-1 percent halothane with intermittent doses of atracurium. On completion of surgery reversal was achieved with neostigmine (0.08 mg^{-kg}) and atropine (0.02 mg^{-kg}).

In the post-operative period, after 30 minutes in group C patients, TENS electrodes were applied just below the angle of mandible avoiding the area of carotid sinus. Nerve stimulation was given using a "J-290, Electonic pain reliever" dual channel machine. Maximum electric current (from TENS) tolerated comfortably by the patient, was given for a period of 20 minutes and repeated at 4 hrs and 8 hrs in the post operative period.

Pain was estimated in all patients by an observer who was unaware as to the group allocation only in group A and B. Visual analogue score (VAS) was assessed on a 0-100 mm scale (0 mm: no pain; 100 mm : maximum imaginable pain) was estimated at rest and on deglutition at 1 hour, 3 hours, 6 hours, 9 hours, 12 hours and 24 hours after surgery.

Pentazocine lactate 15 mg IV was given as rescue analgesic on patient demand or whenever VAS estimations at rest was more than 30 mm. Adverse reactions like nausea, vomiting, headache, excessive bleeding etc. were noted . Statistical analysis was done by analysis of variance (ANOVA : one way analysis) to compare VAS between different groups at rest and after deglutition while student's t test was used to analyze the statistical significance, in Group C, before and after TENS therapy.

RESULTS

There was no significant difference in demographic data between the three groups. VAS at rest (Table I) and on deglutition in all the three groups at different time intervals show a significant decrease ($p< 0.01$, ANOVA) in group

Table II : Pain score (VAS) immediately before and after TENS (Mean ± SD)

Time interval (hours)	Status	Before TENS	After TENS	% change in VAS
0	At rest	35.5±8.72	26.00±4.75**	26.76
	On deglutition	42.25 ± 8.34	34.75 ± 4.43**	17.75
4	At rest	28.5 ± 7.27	20.0 ± 7.14**	29.82
	On deglutition	37.5 ± 6.78	32.0 ± 6.15**	14.66
8	At rest	25.0 ± 7.07	19.25 ± 6.54**	23.00
	On deglutition	35.5 ± 6.86	31.0 ± 6.40**	12.67

* $p <0.05$, ** $p < 0.01$.

C as compared to group A and B. Constant incisional pain was significantly less in TENS group after 3 hours of surgery when compared to other two groups, but immediately after surgery when VAS was measured at 1 hour interval pain intensity was same in all the three groups. There was no statistically significant difference between group A and B at all time intervals except at 9 hours where pain score was significantly more in group B. Similarly pain on deglutition was markedly and significantly reduced in TENS group for entire study period when compared to other two groups. Deglutition caused significantly less ($p < 0.05$) pain in group A (36.25 ± 6.25 and 27.50 ± 7.16) as compared to group B (41.50 ± 4.89 and 32.50 ± 6.38) at 9 and 12 hours of surgery. Following TENS, VAS decreased significantly in Group C at all time intervals during both rest and deglutition (Table II).

Rescue analgesics were given whenever VAS estimation at rest was more than 30 mm. In more than 50% of the patients in group A and B, pain score was more than 30 mm upto 6 hours after surgery during deglutition but no analgesia was given for this momentary pain to avoid side effects of excess doses of pentazocine lactate. Rescue analgesic was required as single does of pentazocine lactate 15 mg in 9, 8 and 6 patients respectively in group A, B and C, while 1 patient in group A and C and 2 patients in group B required 2 doses of pentazocine lactate. Though less number of patients required rescue analgesics in group C, it was not statistically significant. The total dose of rescue analgesics varied in different groups (group A : 165 mg ; group B : 180 mg ; group C : 120 mg) while the total dose requirement of rescue analgesics showed a 9 percent increase (165 mg : 180 mg) in group B and 27 percent decrease (165 mg : 120 mg) in group C as compared to group A. In group A, 4 patients suffered from nausea and 1 each from vomiting, headache and excessive bleeding in post-operative period. In group B only 2 patients suffered from nausea while in group C, 3 patients suffered from nausea and 1 each from vomiting and sleeplessness.

DISCUSSION

Throat pain, referred otalgia and bleeding after tonsillectomy contribute to making recuperation difficult and prolonged. Therefore adequate analgesia is necessary to relieve the agony of pain and reduce incidence of bleeding since increased vascular congestion of the head and neck associated with crying may precipitate bleeding[7].The most common method of providing post-operative analgesia is systemic administration of narcotic analgesics though these drugs have their own side effects. Post tonsillectomy pain is probably the result of muscle spasm caused by inflammation and irritation of the pharyngeal musculature[5]. Diclofenac sodium 1 mg/kg intramuscular, given after induction of anaesthesia, was found to be an effective alternative to opiates in paediatric tonsillectomy patients[4].

During surgery, pain impulses entering the central nervous system, create a hyperexcitable state inspite of general anaesthesia. Blockade of these impulses by preoperative analgesic drugs[8] or infiltration of local anaesthetic agents have a pre-emptive analgesic effect[1]. Therefore we planned to give parenteral diclofenac and local infiltration before the tissue trauma.

Several hypotheses like the gate control theory[9], a central biasing mechanism, neuropharrnacology, and a peripheral blocking mechanism have been proposed[10]. TENS is still applied empirically and electrodes are most commonly placed over the dermatome, peripheral nerve trunk, spinal root supplying the painful area or on the painful area, with promising results. No convincing relationship has been demonstrated between pain releif and any given stimulation parameter[11]. Visual analogue scales were used in this study because they have been found to be a sensitive method of assessment of pain[12].

Our results showed that TENS therapy given post-operatively was the most effective method for treating pain among the three study groups. Similarly, Lombard et al[6], 1996 found significant pain relief in 40 out of 45 patients following tonsillectomy. Preoperative diclofenac in group A and preincisional infiltration in group B were found to be equally effective methods for treating constant incisional pain while during deglutition pain intensity was significantly less in diclofenac group as compared to bupivacaine infiltration group at 9 and 12 hours of surgery. Even the rescue analgesic requirement in group B was more than in group A and C.

NSAIDs have been shown to reduce platelet aggregation and may increase intraoperative or post operative blood loss[13]. Similarly TENS may cause vasodilatation due to heating effect of discharged current or it may cause hyperemia which may lead to blood loss[14]. In the present study there was increased bleeding post operatively in only one patient of group A while nausea, vomiting and headache was observed in some patients in post operative period but there was no significant difference between the three groups.

We conclude, that TENS for post tonsillectomy pain relief is a safe, easy and promising method over alternative analgesic regimes which can be safely employed by the recovery staff. Larger studies with TENS for post tonsillectomy pain relief are required to establish its undisputed beneficial effects.

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