

REDUCE HOSPITAL STAY AFTER TONSILLECTOMY BY VARIOUS METHOD

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Abstract: Reduce hospital stay after tonsillectomy by various drugs because after tonsillectomy pain is most common complication and it delays hospital discharge and it is painful both patients and attendant, so peritonsillar infiltration of drugs it reduce pain so that discharge early.

Keywords: Hospital Stay, Discharge Timing, Pain Control.

1. INTRODUCTION & HISTORY

Pain is a highly unpleasant sensory and emotional experience and postoperative pain control in children is a big challenge for their inability to express and react. In the past two decades, there has been a considerable progress in the understanding of children's perception of pain and responses to pain and various pharmacological agents and analgesic delivery to avoid under treatment of pain in children. A parallel noteworthy advancement has occurred in the knowledge of anatomy, physiology and pharmacology of regional anesthetic techniques. Some of these techniques are now an integral part of perioperative and procedure- related pain management in all ages, in part because of a greater concern about postoperative pain management in patients and in part because of technical advances in equipment to perform the blocks.

Thus the present prospective comparative study is designed to evaluate the post operative analgesic efficacy of pre-incisional peritonsillar infiltration using tramadol, ketamine alone and combine with bupivacaine, xylocaine & normal saline.

2. AIMS & OBJECTIVES

1. To Provide Post Tonsillectomy Analgesia to patients.
2. To evaluate the post operative analgesic efficacy of pre incisional peritonsillar (PT) infiltration using various agents.
3. To evaluate the effect of various agents infiltration on start of oral intake and discharge from the hospital after tonsillectomy.
4. To investigate the possibility of any complication in relation to drugs infiltration into the peritonsillar Fossa.

3. ANATOMY AND PHYSIOLOGY

Embryology:

Pharyngeal Grooves and Pouches and Their Derivatives. The lateral walls and floor of the cranial part of the early foregut become much altered by the development of the pharyngeal pouches in this region. These pouches first appear as grooves which extend ventrally across, or towards, the middle line. In their later development, however, they become greatly modified to give origin to a number of diverse structures. These include the tympanic (middle ear) cavity, the parathyroid glands, tonsils and the thymus.

Preoperative Assessment:

Preoperative assessment in patients undergoing adenotonsillectomy is crucial and may reveal potential problems that may complicate either surgery or the patient's postoperative course. It is crucial to elicit the existence of any coagulation abnormalities. A family history of coagulation disorders or easy bruising may be a warning sign of an underlying bleeding disorder warranting further hematologic evaluation. Routine evaluation of coagulation studies before surgery in patients undergoing adenotonsillectomy is controversial. Manning and others determined that evidence of coagulation disorders in patients with no clinical history of or examination consistent with a hematologic disorder was extremely low, thereby not justifying routine preoperative coagulation studies

Analgesia:

Adequate analgesia is important in the immediate postoperative phase. Narcotics have a potent emetic effect and should be used with caution if at all. A single dose of narcotic may be administered in the recovery phase and codeine may be used in the early postoperative period, but subsequent to this, paracetamol is the drug of choice on the grounds of safety and efficacy. For some children this may not be adequate and a non-steroidal anti-inflammatory drug (NSAID) may be needed. There were concerns that the effect of these drugs on platelet adhesion might increase bleeding from the tonsil bed, but a recent meta-analysis found no such risk and a significant reduction in postoperative nausea and vomiting when compared with other analgesics notably narcotics. Aspirin should not be used in children because of the risk of Reye syndrome.

4. INDICATIONS AND CONTRAINDICATIONS

Indications:
Absolute Indications:

- .Respiratory obstruction
- .Huge hypertrophy causing difficulty in feeding
- .Sleep apnea syndrome

Relative Indication:

- .Peritonsillar abscess
- .Chronic tonsillitis
 - failure of medical treatment to reduce the size
 - more than 3-4 acute episodes in per year
 - Acting aseptic focus for rheumatic heart disease, glomerulonephritis, arthritis etc.
- .Primary tuberculosis of the tonsil
- .Diphtheria carrier
- .Tumor of tonsils
- .Tonsillar cyst, tonsillolith, embedded FB in tonsils etc.

Surgical approaches:

- .Elongated styloid process
- .Glossopharyngeal neurectomy
- .As a part of Uvulo- palato- pharyngo- plasty (UPPP)

Contraindications:

Active infection/Acute exacerbation, Aneurysm of internal carotid artery, age below 3 years, Active menstruation
 Bleeding/Clotting disorders
 Cervical spine pathology
 Diphtheritic tonsillitis,
 Drugs-aspirin, oral contraceptives etc
 Endemic of polio
 Failure to control systemic diseases like hypertension, diabetes, bronchial asthma, LRTI etc.

5. MATERIAL & METHODS

After approval of the study protocol by the local Ethical Committee and obtaining fully informed written consents, 60 patients assigned for tonsillectomy enrolled in the study of age group 5 to 35 yr. The study conducted at Department of Otorhinolaryngology, MBS Hospital Kota Rajasthan from Dec. 2010 to Oct. 2012. Patients with history of bleeding diathesis allergy to study drugs, or tonsillar abscesses excluded from the study.

Patients randomly divided into 6 equal study groups (n=10); Group I (Negative control group) included patients assigned to receive PT saline infiltration as placebo, Group II (Positive control group) included patients assigned to receive xylocaine (1 %) PT infiltration. Group III included patients assigned to receive tramadol (2mg/kg) PT infiltration, Group IV included patients assigned to receive ketamine (0.5mg/Kg) PT infiltration, Group V received combination of Bupivacaine (5mg/ml) with Tramadol (2mg/kg), Group VI received Bupivacaine (5mg/ml) with Ketamine (0.5mg/Kg). All medications prepared as 2ml in volume and injected as 1ml per tonsil 3 min. prior to incision (pre-incisional).

All study patients premedicated with midazolam intravenously before the procedure and received nalbupine i.v. immediately after induction of general anesthesia.

6. OPERATIVE TECHNIQUES

Tonsillectomy operation performed by dissection method Before making incision, infiltration of tonsillar bed through ant. Pillar with various analgesic agents likes xylocaine, Ketamine. Tramadol & Placebo (Normal Saline), bupivacaine with tramadol/ketamine as their combination (regimen).

7. REVIEW OF LITERATURE

Tonsillectomies are done since 3000 years ago in india & also done now a days,now a days surgeons are concentrated on the postoperative analgesia after tonsillectomy because after tonsillectomy patients suffer from pain,decrease in oral feeding also in psychological & financial burden

Alhamarneh (2008) et al⁽²⁾ reported that a significantly greater than normal secondary haemorrhage rate was noted in patients who had undergone tonsillectomy & experienced postoperative pain & concluded that adequate analgesics, for first week posttonsillectomy, is essential in order to keep the secondary haemorrhage rate within an acceptable range

Smith et al(2009)⁽³⁾ reported that after tonsillectomy in children, postoperative pain management is essential yet often challenging task, In addition to discomfort, lack of pain management can leads to delays in oral intake of patients, resulting in external stays & increased costs.

Costas-gastiaburo (1998) et al⁽⁴⁾ found peritonsillar infiltration decrease intraoperative bleeding & pain independent of the type of solution infiltrated

Dr.Akbar Pizadeh,Mo-Ali.Mohammadi,Sooreh Allaf-Akbari,Masood Entezarias(10)-The Effect Of Ketamine On Post-tonsillectomy Pain in Children:A Clinical Trial;Iranian Journal of Otolaryngology No.1,Vol.24,Serial No.66,winter 2012.

Moller (2010) et al(11) showed that postoperative pain in the preoperative peritonsillar injection with bupivacaine was less compared with the control (placebo) group injected with no .In a large scale study on 1026 patients, pain levels in the ketamine group were shown to be lower than in the control group and patient satisfaction to be more.

8. DRUGS

Lignocaine(Lidocaine):

This is an intermediate potency & duration agent of local anaesthetics(LAs), it is an amide linked LA introduced in 1948, currently most widely used, injected around a nerve it blocks conduction within 3 min. It is used for surface application, infiltration, nerve block, epidural, spinal, i.v. (intravenous) and regional block anaesthesia. Cross sensitivity with ester LAs is not seen. Early central effects of lignocaine are drowsiness, mental clouding, altered taste & tinnitus. Overdoses cause muscle twitching, convulsion, cardiac arrhythmias, fall in BP, coma, respiratory arrest. Lignocaine is a popular antiarrhythmic.

Features of amide LAs(compared to ester LAs)-

- produce more intense & longer lasting anaesthesia
- bind to $\alpha 1$ acid glycoprotein in plasma
- not hydrolysed by plasma esterase
- Rarely cause hypersensitivity reaction; no cross sensitivity with ester LAs

Mechanism of action

-The LAs block nerve conduction by decreasing the entry of Na^+ ions during upstroke of action potential (AP) as the concentration of LAs is increased, the rate of rise of AP & maximum depolarization decreases causing slowing of conduction. Finally local depolarization fails to reach the threshold potential & conduction block ensues.

Local action

The clinically used LAs have no/minimal local irritant action & block sensory nerve endings, nerve trunks, neuromuscular junction, ganglionic synapse & non selective receptors, i.e. structures which function through increased Na^+ permeability. They also reduce release of acetylcholine from motor nerve endings. Injected around a mixed nerve they cause anaesthesia of skin & paralysis of voluntary muscle supplied by that nerve.

Addition of a vasoconstrictor, eg adrenaline(1:50000 to 1:200000)

1. Prolongs duration of action of LAs
2. Reduce systemic toxicity of LAs
3. Provides a more bloodless field for surgery
4. May raise BP
5. Makes the injection more painful

Systemic action

Any LAs injected or applied locally is ultimately absorbed & can produce systemic effects depending on concentration attained in the plasma & tissues.

C.N.S. - all LAs are capable of producing a sequence of stimulation followed by depression. Lignocaine on the contrary usually causes drowsiness & lethargy, but higher doses produce excitation followed by depression.

C.V.S.-little effect on contractility & conductivity, it abbreviates effective refractory period (ERP) & is used as an antiarrhythmic.

Pharmacokinetics-

Surface soluble anaesthetics are rapidly absorbed from mucous membrane & abraded areas but absorption from intact skin is poor. Lignocaine is degraded only in liver microsomes by dealkylation & hydrolysis.

Adverse effects

Systemic toxicity on rapid i.v. injection is related to the intrinsic anesthetic potency of the LA. Toxicity after topical application or regional injection is influenced by relative rates of absorption & metabolism.

- 1.-CNS effects are light headedness, dizziness, auditory & visual disturbance, mental confusion, disorientation, shivering, twitching, tremors, finally convulsion & respiratory arrest.
- 2.-CVS toxicity of LAs is manifested as bradycardia, hypotension, cardiac arrhythmias & vascular collapse.
3. - injection of LAs may be painful, but local tissue toxicity of LAs is low
4. Hypersensitivity reactions like rashes, angioedema, dermatitis, asthma, & rarely anaphylaxis occurs. Common with ester group rare with lignocaine.

Bupivacaine:

Bupivacaine Hydrochloride is a white odorless crystalline powder or colourless. Crystals. It is freely soluble in water; freely soluble in alcohol; slightly soluble in acetone and in chloroform. A 1% solution in water has a PH of 4.5 to 6.0 and should be protected from light. A potent & long acting amide LA: used for infiltration, nerve block, epidural & spinal anaesthesia of long duration. It has high lipid solubility; distribute more in tissue than in blood after spinal/epidural injection .Bupivacaine appears to be more cardiotoxic than other local anesthetics. Cardiac arrest due to bupivacaine can be resistant to electrical defibrillation and a successful outcome may require prolonged resuscitative efforts. it is more prone to prolong QTc interval & induce ventricular tachycardia or depression –should not be used for intravenous regional analgesia.

Local nerve blockade by bupivacaine Wong AK (1995) reduces short & long term pain in children undergoing tonsillectomy & adenoidectomy in the presence of general anesthesia.

Ketamine:

It is pharmacologically related to hallucinogen phencyclidine; induces-profound analgesia, immobility, amnesia with light sleep & feeling of dissociation from one's own body & surroundings so called "*DISSOCIATIVE ANAESTHESIA*" the primary action is cortex & sub cortical areas; heart rate , cardiac output & BP are elevated due to sympathetic stimulation. A dose of 1-3(average 1.5) mg/kg i.v. or 6.5-13(average 10) mg/kg i.m. produces the above effect within a min, recovery starts after 10-15 min, and patient remains amnesic for 1-2 hrs. , emergence delirium, hallucination, & involuntary movements occur in up to 50%pts., but inj. Is not painful, children tolerate drug better. Its elimination t_{1/2} is 3-4 hrs. Ketamine also recommended for operation on the head & neck, in those who do not want to lose consciousness & for short operation. It may be dangerous for hypertensive & ischemic heart disease but good for hypovolemic pts.

Ketamine al Yu M (2007) et al suppressed injury induced tumor necrosis factor (TNF)- α and IL-6production & nuclear factor –kappa-B activator.

Tramadol:

It is centrally acting analgesic relieves pain by opioids as well as additional mechanism .its affinity for μ opioids receptor is modest while that for kappa & delta is weak, it inhibit reuptake of NA & 5-HT,& thus activates monoaminergic spinal inhibition of pain. Its analgesic action is only partially reversed by opioids antagonist naloxone. Injected i.v.100 mg tramadol is equanalgesic to 10 mg morphine; oral bioavailability is good (oral: parenteral dose ratio1.2) the t_{1/2} is 3-5 hrs & effect last 4-6 hrs. Tramadol causes less respiratory depression, sedation, constipation, urinary retention, & rise in inhibitory pressure than morphine it is well tolerated, side effect are dizziness, nausea, sleepiness, dry mouth, & sweating. Safer in compromised cardiovascular function, it is indicated for medium intensity short lasting pain due to diagnostic procedure, injury, surgery as well as chronic pain in cancer, but not effective in severe pain.

Tramadol (Ugur MB(2008) to prevent pain in children undergoing tonsillectomy & found peritonsillar infiltration with tramadol provided good intra-operative analgesic, less post operative pain on awaking &lower analgesics requirements after surgery with no significant difference between both routes of administration for any of these parameters

Bupivacaine and Ketamine:

Bupivacaine (5 mg/kg) & ketamine (0.5 mg/kg), both combination decrease pain & prolong the duration of analgesia without increasing side effects

Bupivacaine and Tramadol:

Bupivacaine (5 mg/ml) & tramadol (2 mg/kg),

*bupivacaine plus ketamine, bupivacaine plus tramadol Choudhuri AH (2008) for post operative pain management in children having surgery for inguinal hernia & reported that caudally administered 0.5ml/kg bupivacaine 0.25% plus tramadol 1 mg/kg provided significantly longer duration of analgesia without an increase in the adverse effects when compared to bupivacaine alone

All medication prepared as 2 ml in volume & was injected as 1 ml per tonsil 3 min. prior incision.

9. OBSERVATION AND RESULTS

Patients randomly divided into 6 equal study groups (n=10); Group 1 (Negative control group) included patients assigned to receive PT saline infiltration as placebo; Group 2 (Positive control group) included patients assigned to receive xylocaine (1%) PT infiltration. Group 3 included patients assigned to receive tramadol (2mg/kg) PT infiltration, Group 4 included patients assigned to receive ketamine (0.5mg/Kg) PT infiltration, Group 5 received combination of Bupivacaine (5mg/ml) with Tramadol (2mg/kg), Group 6 received Bupivacaine (5mg/ml) with Ketamine (0.5mg/Kg)

Gp1-normal saline

Gp2-xylocaine (1%)

Gp3-tramadol (2mg/kg)

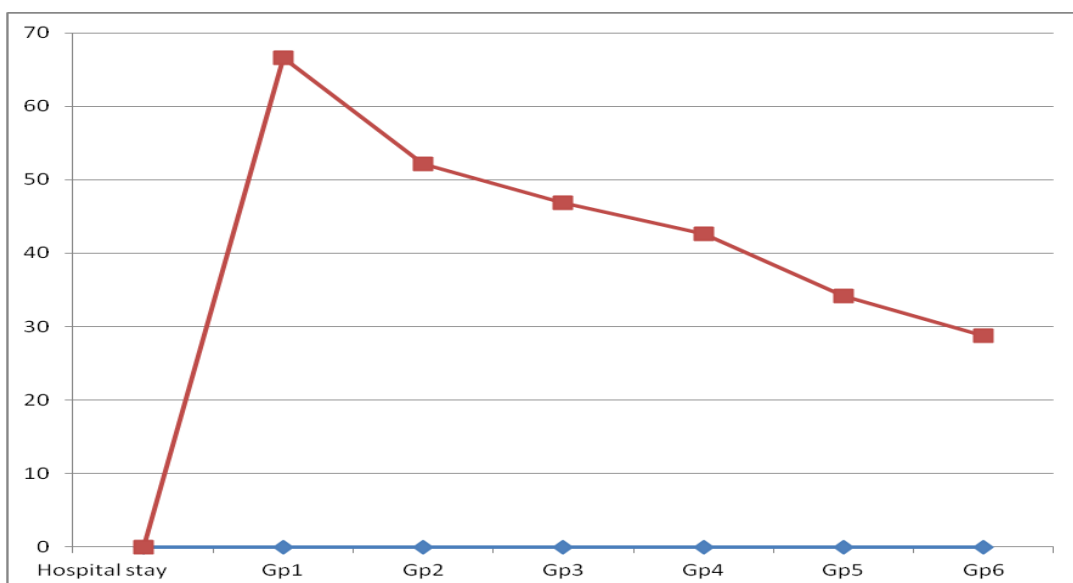
Gp4-ketamine (0.5mg/kg)

Gp5-bupivacaine (5mg/ml) with tramadol

Gp6-bupivacaine with ketamine

Distribution of patients according to hospital stay (Hrs.) after tonsillectomy

Hospital stay	Time(Hrs.)	Mean
Gp1	60,72,66,60,72,66,60,72,72,66	66.6
Gp2	48,60,54,48,54,48,60,54,48,48	52.2
Gp3	42,48,42,54,48,54,42,48,42,48	46.8
Gp4	36,42,36,48,54,36,42,36,54,42	42.6
Gp5	36,24,42,36,24,42,36,42,36,24	34.2
Gp6	24,36,36,24,24,24,36,24,36,24	28.8



10. DISSCUSSION

We have divided patients in six groups according to drugs which were injected to patients preoperatively in tonsillar fossa.

According to Table Hospital stay depends on oral intake, pain relief and feeling of well being and analgesic efficacy. If surgery and postoperative period is uneventful The early discharge depends on early oral intake and pain relief which depend on efficacy of analgesic drugs. Thus early discharge is a parameter of analgesic efficacy.

According to table shows the distribution of patients according to hospital in various groups. Hospital stay does not depend on one parameter, it depends on many factors. Some patients was discharge early even without need of 1st oral analgesic dose

In our study in gp1 (normal saline) avg. hospital stay is 66.6 hrs. In gp2 (xylocaine) 52.2 hrs. In gp3 (tramadol) 46.8 hrs. In gp4 (ketamine) 42.6 hrs. In gp5 (bupivacaine and tramadol) 34.2 hrs And In gp6 (bupivacaine and ketamine) 28.8 hrs Minimum hospital stay in gp6 means this group have best efficacy in among groups as for analgesic efficacy.

The difference between all groups was statistically significant ($P < 0.05$).

Our study is similar to the study carried out by DR. Mohsen pazoki Mangalore in 2010 Journal of International medical research 2005; 33:188-195 and Mo. Ibrahim, E.L. Sonbaty et al. M.E.J. Anesth 21(1) 2011.

According to Ehab Saaid 2009 Analysis Postoperative hospital stay data revealed significantly shorter hospital stay duration in patients received infiltration of combination therapy (gp5 and 6) compared to other groups. Patients received bupivacaine alone showed significantly longer hospital stay compared to combination of drugs. The comparison was non-significant between tramadol and ketamine alone; all groups showed significantly shorter hospital stay compared to patients received saline infiltration. The hospital stay was significantly low when bupivacaine was used in combination with ketamine or tramadol as compare to ketamine/tramadol alone. The hospital stay was non-significant between gp5 and gp6. Bupivacaine was used with tramadol and ketamine.

11. CONCLUSSION AND SUMMARY

Preincisional infiltrations of various agents are effective method to reduce post-tonsillectomy pain. This method also effective for earlier start of oral feeding and discharge from the hospital

We recommend the routine use of pre incisional peritonsillar infiltration of various agents in all tonsillectomy cases, irrespective of the age of the patient to reduce the post-tonsillectomy pain and other morbidities

Summary:

This is prospective, randomized, single blind controlled clinical trial to assess the effect of preincisional peritonsillar infiltration of various agents on pain after tonsillectomy, which was performed on Dec.2010 till Oct.2012 in the department of ENT, Govt. Medical College, Kota.

A volunteer sample of 60 patients, aged 5 to 35 yrs with history of recurrent or chronic tonsillitis were included in this study and planned for tonsillectomy with or without adenoidectomy

Patients were divided into 6 equal study groups (n=10); Group I (Negative control group) included patients assigned to receive PT saline infiltration as placebo; Group II (Positive control group) included patients assigned to receive xylocaine PT infiltration. Group III include patients assigned to receive tramadol (2mg/kg) PT infiltration, Group IV included patients assigned to receive ketamine (0.5mg/Kg) PT infiltration, Group V received combination of Bupivacaine (5mg/ml) with Tramadol (2mg/kg), and Group VI received Bupivacaine (5mg/ml) with Ketamine (0.5mg/Kg).

All medications prepared as 2ml in volume and injected as 1ml per tonsil 3 min prior to incision (pre-incisional).

Postoperative pain was assessed using OPS and ALDRETE score for severity of pain at different time after the surgery. The time of oral intake start and total admission days after the surgery also were noted.

Comparison of various agents for pain, oral intake and postoperative admission days were noted.

No complication of preincisional peritonsillar infiltration of various agents was seen in this study.

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REFERENCES

- [1] Doshi J, Damodara M, Gregory S, Anari S(2008)S:Post-Tonsillectomy morbidity statistics:are they underestimated?J Laryngol Otol.;122(4):374-7
- [2] Alhamarneh O, Raja H, England RJ (2008): Inadequate analgesic prescription increases secondary post-tonsillectomy bleed rates: a completed audit loop. J Laryngol Otol.; 122(7):719-21.
- [3] Smith J, Newcomb P, and Sundberg E, Shaffer P (2009): Relationship of opioid analgesic protocols to assessed pain and length of stay in the pediatric post anesthesia unit following tonsillectomy. J Perianesth Nurs.; 24(2):86-91.
- [4] Costas-Gastiaburo LA, Rajah V, Rubin J (1998): Tonsillectomy and the value of peritonsillar infiltrations. S Afr J Surg.; 36(4):142-5.
- [5] Nordahl SH, Albrektsen G, Guttormsen AB, and Pedersen II, Breidablikk HJ (1999): Effect of bupivacaine on pain after tonsillectomy: a randomized clinical trial. Acta Otolaryngology. 119 (3):369-76.
- [6] Vasani NR, Stevenson S, Ward M (2002): Preincisional bupivacaine in post tonsillectomy pain relief: a randomized prospective study. Arch Otolaryngology Head Neck Surg.; 128(2):145-9.
- [7] Tripti PA, Palmer JS, Thomas S, Elder JS (2005): Clonidine increases duration of bupivacaine caudal analgesia for ureteroneocystostomy:a double- blind prospective trial.J Urol.;174(3):1081-3.
- [8] Dr. A.K. Gupta, Dharam s. meena: Post-tonsillectomy Pain: Different Modes of Pain Relief Indian Journal of Otolaryngology and Head and Neck Surgery. April-June 2002.
- [9] Dr.Sona Chaturvedi, Dr.Domkondwar U.G; A Comparative Study of Topical Analgesia with 4% Lignocaine and 0.5% Bupivacaine Following Tonsillectomy: Indian J. Anaesth.2005;
- [10] Dr.Akbar Pizadeh, Mo-Ali.Mohammadi, - The Effect Of Ketamine On Post-tonsillectomy Pain in Children: A Clinical Trial; Iranian Journal of Otolaryngology 2012.
- [11] Carstensen M, Moller AM. Adding ketamine to morphine for intravenous patient-controlled analgesia for acute postoperative pain. Br J Anaesth 2010; 104(4): 401-6.