AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: http://www.ajptr.com/

The Efficacy of Bupivacaine with Adrenaline in Reducing Pain and Bleeding associated with Subtotal Thyroidectomy

Maher Jabbar*[1], Estabraq Jadooa[2], Hamoudi mosah[3]

1. C.A.B.S. General Surgery, Alkharkh General Hospital, Bagdhad, Iraq
2. M.Sc. Pharmacology, Alkindy college of medicine, Bagdhah, Iraq
3. Ph D, Pharmacology, Alkindy college of medicine, Bagdhah, Iraq

ABSTRACT

Thyroid surgery commonly associated with perioperatively and postoperative bleeding and some initial pain on swallowing after surgery, and these are a common problems encountered till now. The use of certain medications might help to minimize blood loss during and after surgery with reduction of pain and operative time. The aim is to have a better surgical field with a good analgesia**.**A randomized study in Al Karkh hospital was performed including 22 cases submitted to bilateral subtotal thyroidectomy surgery divided into 2 groups; group A; 10 patients had the usual type of surgery with using the combination of bupivacaine 0.25% and adrenaline 1:200000 after induction of anesthesia to be injected in the operative site. The second group B involves the other 12 patients who were operated on without local infiltration. This study was designed to compare differences in both groups regarding to total blood loss, analgesic effect and duration of surgery Our study included 20 females and 2 male with enlarging goiter involving both lobes, with less blood loss in suction apparatus and drains as well as there was a less scores regarding pain relief during and after surgery in group A than group B. No significant statistical differences in term of morbidity and mortality for both groups regarding the local bleeding control during thyroid, peri-incisional infiltration provided better pain relief in early postoperative period.

Key words: Thyroid surgery, Bupivacaine, Adrenaline, Pain scores, Bleeding and Suction drains, suction apparatus

* Corresponding Author Email: ibram_maher2@yahoo.com

Received 7 May 2012, Accepted 26 May 2012

Please cite this article in press as: Jabbar M *et al.*, The Efficacy of Bupivacaine with Adrenaline in Reducing Pain and Bleeding associated with Subtotal Thyroidectomy. American Journal of PharmTech Research 2012.

INTRODUCTION

Subtotal thyroidectomy is one type of surgery for benign thyroid gland disease, it is commonly used for multinodular goiter especially those causing symptoms by pressure affect, while total thyroidectomy done commonly for malignant goiter. Bleeding is the main problem in thyroid surgery till now which is the main cause for elongation of the operative time, even with the use of the best diathermy techniques, it is mainly recognized from the incised skin area and deeper subcutaneous tissue reaching to the platesmal layer (deep investing layer of the collar inscion in lower part of the neck done before recognizing thyroid tissue).

Bupivacaine which is a local anaesthetic drug with 1:200,000 adrenaline to accomplish it is complete effect. Bupivacaine was chosen, as lignocaine has been shown to lead to a short duration of action, it is utilized in our practice preoperatively for intra- as well as postoperative analgesia. It is contraindicated in patients with a known hypersensitivity to local anesthetic agents of the amide group. It has CNS reactions which are similar for all amide local anesthetics, as well as cardiac reactions which are more dependent on the drug, central nervous system toxicity is a graded response with symptoms and signs of different severity, the first symptoms are usually light-headedness, circumoral paraesthesia, numbness. Cardiovascular system toxicity appear later in severe cases and is generally preceded by signs of toxicity in the central nervous system, such reactions are caused by high blood concentrations of a local anesthetic, which may appear due to (accidental) intravascular injection, overdose or exceptionally rapid absorption from highly vascularized areas (head and neck), in our patients receiving a general anesthetic, such CNS symptoms may be absent.

MATERIALS AND METHODS:

22 cases (2 males, 20 females) were submitted to bilateral subtotal thyroidectomy for benign nontoxic thyroid disease as a standard type of surgery during the period from June 2009 to Aug. 2011.

The mean age of patients is 30 years, divided into two groups:

- **10 patients had subtotal thyroidectomy (ST) with local infiltration of Bupivacaine and adrenaline, Group A.**
- **Other 12 patients had ST without local infiltration, Group B**

All patients had full history and were examined clinically, biochemically and radiologically (ultrasound, thyroid scan) to exclude any contraindication for general anesthesia, specific tests like Bleeding time, clotting time, PTT and PT to exclude any bleeding tendency or coagulopathy.

It is a randomized clinical study using Bupivacaine in concentration of 0.25 mg with 1:200000 Adrenaline as multiple injection of 3-5 ml as a test dose, up to 10 ml (50mg=10ml) in the area of planned surgical incisions or what is called the operating site (collar incision as usual incision for thyroid surgery-lower aspect of the neck 2 cm above suprasternal notch of the anterior chest wall as seen in **figure 1**).

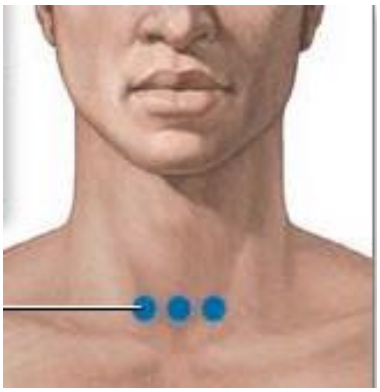

Figure (1): Collor Incision

Since an intravascular injection of adrenaline will be quickly recognized by an increase in heart rate. Frequent measurements of the heart rate, preferably by electrographic (ECG) monitoring, which should be maintained throughout a period of 5 minutes following the test dose (1-2 ml), great care must be taken in order to prevent an accidental intravascular injection, always including careful aspirations, which should be repeated prior to the administration of the total dose. The maximum dosage must be determined by evaluating the size and physical status of the patient and considering the usual rate of systemic absorption from a particular injection site. Duration of surgery, total estimated blood loss were recorded with hemodynamic monitoring parameters (The heart rate, and systolic blood pressure were also monitored at pre operatively, 0, every 10 min for duration of surgery and then at 2, 6, 12, and 24 hours after tracheal extubation.

The main dose should be injected slowly, if mild toxic symptoms develop, the injection must be immediately stopped. The lowest dosage required to achieve effective an anesthesia should be given; the dose will vary and will be dependent on the area to be anaesthetized, the vascularity of the tissues, individual tolerance and the technique of anesthesia used.

Anesthesia was induced with halothane in nitrous oxide (inhalational) and oxygen, intraoperatively ECG and systolic blood pressure were monitored. Parameters like pulse rate, and BP were noted down as baseline every 10 minutes intra-operatively for a period of operation and thereafter at 2, 6, 12, and 24 hours. Duration of surgery and intra-operative complications if any (hypotension, cardiac arrhythmias, bupivacaine toxicity, bleeding) were noted.

For group A, infiltration done to the skin and subcutaneous tissue deep to platesmal layer (peri-incisional area) after induction of anesthesia preoperatively (for most indications, the duration of anesthesia with bupivacaine solutions is such that a single dose is sufficient(10ml).

The perioperative blood loss was calculated by suction apparatus during surgery and postoperative drainage was measured during 24 h by using suction drains, both groups had the same standard surgical procedures for bilateral partial removal of the diseased thyroid tissue with excising the isthmus keeping ruminants of thyroid tissue on each side of thyroid gland (Bilateral Subtotal Thyroidectomy). Postoperative pain was assessed using visual analogue scores (ten point scores) at postoperative (postop.), 2, 6, 12 and 24 h following infiltration as well as the time for first analgesic requirement were compared between the two groups.

RESULTS AND DISCUSSION:

At 2, 6, 12 and 24 h postoperatively, the scale indicating a lower pain in group A than in group B, the analgesic requirement was significantly lower in group A when compared with that in group B (by reducing the time of surgery. The results showed that group A had significantly better pain relief at 24 hrs; time for first analgesic was higher in group A than B.

There was a reduction in perioperative blood loss in group A infiltrated with bupivacaine and adrenaline. The mean blood loss in the suction apparatus and drains from the infiltrated cases was also less than that from the cases without infiltration at 24 h post-infiltration without any complications recorded in both groups as seen in **table 1**.

Table 1: reveals changes in time or bleeding in both groups:

Group	Duration time	Rate of Bleeding	Complication	Time for first analgesia
Group A	40-60 min.	100-120 ml	Nil	20-26hr.postop.
Group B	60–70 min.	200-210 ml	Nil	1-2hr.postop.

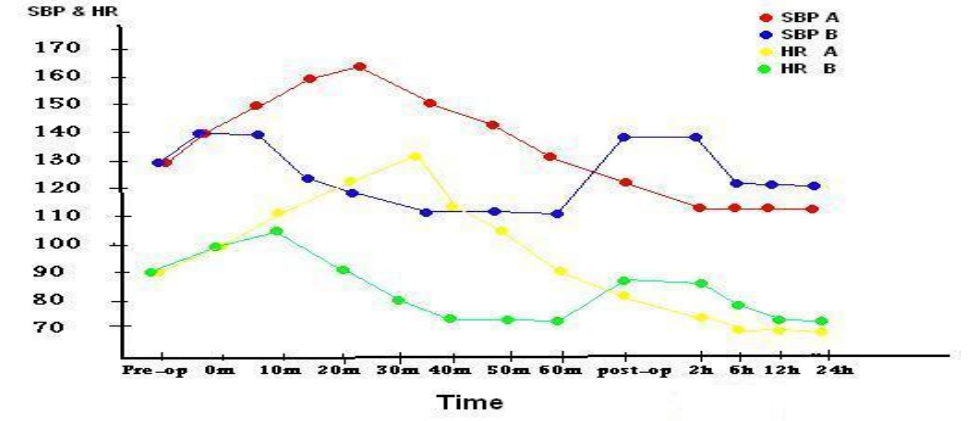

Figure 1: reveals main homodynamic changes in both groups in pre, peri, and postoperative period in Systolic Blood Pressure (SBP) & Heart Rate (HR).

Hemodynamically, there was an increase in systolic blood pressure and heart rate in group A as compared to group B due to highly vascularised areas we were dealing with, especially in early surgery (20min. after infiltration) which were usually settled thereafter spontaneously without any anesthetic medications as showed in Figure 1.

The use of local bupivacaine and adrenaline for postoperative pain relief in surgery has gained popularity in recent years, as it provides a better pain-free period and avoids the complications of opioid analgesics in early postoperative period. Adrenaline was added to 0.25% bupivacaine in our study to delay the absorption and hence prolong the effect, reduce the circulatory bupivacaine levels, and for early detection of intravascular injection to avoid bupivacaine toxicity, the rate of intraoperative bleeding is influenced by epinephrine concentration, higher concentration might have better field by increasing it's vasocontrictive action, but it might compromise general health via increasing heart rate and systolic blood pressure.

CONCLUSION:

It is concluded that, for local anesthesia, and that 1:200:000 epinephrine provided a better operative field but with no significant statistical differences in term of morbidity and mortality for both groups regarding the local bleeding control during thyroid surgery without causing serious hemodynamic changes. However our results had confirmed a beneficial effect of bupivacaine with adrenaline on postoperative pain, since the quality of analgesia provided by peri-incisional infiltration was better especially during the first 24 hr. postoperatively without the need for strongest analgesia(morphine or pethidine),that might compromising respiratory function and avoid complications of opiates analgesia.

REFERENCES:

1. Metaxotos NG, Asplund O, Hayes M, The efficacy of bupivacaine with adrenaline in reducing pain and bleeding associated with breast reduction: a prospective trial. Br J Plast Surg1999; 52(4):290-3.
2. Demiraran Y, Ozturk O, Guclu E, Iskender A, Ergin MH, A, Vasoconstriction and analgesic efficacy of locally infiltrated levobupivacaine for nasal surgery. Anesth Analg. 2008; 106(3):1008-11.
3. Javer AR, Gheriani H, Mechor B, Flamer D, Genoway K, Yunker WK ,Effect of intraoperative injection of 0.25% bupivacaine with 1:200,000 epinephrine on intraoperative blood loss in FESS. Am J Rhinol Allergy 2009; 23(4):437-41.

4. Ihvan O, Seneldir L, Enöz M, Gökçeer T, Köksal S.Evaluation of the duration of postoperative pain control obtained with bupivacaine injection into the tonsillar region in children who underwent tonsillectomy. Kulak Burun Bogaz Ihtis Derg. 2011; 21(5):270-5. doi: 10.5606/kbbihtisas.2011.040. Turkish
5. Zielinski J, Jaworski R, Smietanska I, Irga N, Wujtewicz M, Jaskiewicz J. A randomized, double-blind, placebo-controlled trial of preemptive analgesia with bupivacaine in patients undergoing mastectomy for carcinoma of the breast. Med Sci Monit 2011; 17(10):CR589-97.
6. Karaman E, Gungor G, Alimoglu Y, Kilic E, Tarakci E, Bozkurt P, Enver O.The effect of lidocaine, bupivacaine and ropivacaine in nasal packs on pain and hemorrhage after septoplasty. Eur Arch Otorhinolaryngol. 2011; 268(5):685-9.
7. Law-Koune JD, Szekely B, Fermanian C, Peuch C, Liu N, Fischler M Scalp infiltration with bupivacaine plus epinephrine or plain ropivacaine reduces postoperative pain after supratentorial craniotomy.J Neurosurg Anesthesiol. 2005; 17(3):139-43.
8. Nikki DP, Laaka V, Tarkkanen A.Comparison of Bupivacaine with and without Adrenaline and Mepivacaine with Adrenaline in intraoccular surgery Article first published online: 27 MAY 2009 DOI: 10.1111/j.1755-3768.1972.tb03782.x
9. V Gaonkar, Swati R Daftary. Comparison of preoperative infraorbital block with peri-incisional infiltration for postoperative pain relief in cleft lip surgeries Department of Anaesthesia, Lokmanya Tilak Munciple Medical College and General Hospital, Mumbai - 400 022, India
10. Nicodemus HF, Ferrer MJ, Decastro L, et al. Bilateral infraorbital block with 0.5% bupivacaine as postoperative analgesia following cheiloplasty in children. Scand J Plast Reconstr Surg Hand Surg 1991; 25:253
11. Tucker JH, Flynn JF. Head and neck regional blocks. In: Brown DL, editor. Regional Anesthesia and Analgesia. Philadelphia: W B Saunders Company; 1996: 240-53.
12. Hanallah RS, Broadman LM, Belman AB. Comparison of caudal and ilioinguinal / iliohypogastric nerve blocks for control of post orchiopexy pain in pediatric ambulatory surgery. Anesthesiology 1987; 66:832-4.
13. Datta A, Ahuja S, Krishnan A. Infra-orbital nerve block for relief of postoperative pain in following cleft lip surgery in infants. Anaesthesia 1994; 49:

14. Franks SC, Harmston C, Hickey NC. A randomized controlled trial of preoperative infiltration with bupivacaine and adrenaline in varicose vein surgery, Department of Vascular Surgery, Worcestershire Royal Hospital, Worcester, UK.
15. Emma Hitt, PhD Long-Acting Bupivacaine Effective for Hemorrhoidectomy Pain. January 3, 2011 from Medscape Medical News.