

ORIGINAL ARTICLE

Comparison of Ligasure versus Bipolar Diathermy Tonsillectomy

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ABSTRACT

Aim: To compare the operational time, blood loss and consequences of tonsillectomy with Ligasure versus bipolar diathermy.**Methods:** A total of 106 individuals were randomized to have their Tonsillectomy done with either Ligasure or bipolar diathermy in this prospective trial. The length of procedure, amount of blood lost during it, degree of post-operative pain and the outcomes all were documented and studied.**Results:** In total, 106 cases were studied, with 53 cases in to the Ligasure Group and 53 cases to Bipolar Tonsillectomy Group. During surgery, bipolar diathermy group lost more amount of blood. The Ligasure group had an average operative time of 4 minutes less. Both groups had similar degrees of postoperative pain. Despite the fact that the Ligasure group had less postoperative hemorrhages than the diathermy group, there was no statistically significant difference.**Conclusions:** Study concluded that tonsillectomies using ligasure took longer than those with bipolar diathermy. Both groups had similar perioperative hemostasis. The rate of postoperative bleeding was higher than anticipated.**Keywords:** Ligasure, bipolar diathermy hemorrhage, hemostasis, blood loss during surgery

INTRODUCTION

The tonsillectomy is believed most commonly utilized surgical procedures worldwide. To reduce the problems and increase the safety and speed, several strategies have been proposed. In spite of the reality that it is a routine procedure, there has yet to be devised a universal technique with the fewest possible consequences¹⁻³.

The perioperative hemorrhage, postop discomfort as well as postop bleeding are all serious complications that can occur after surgery, or common consequences or side effects after surgery^{4,5}. The mortality associated with tonsillectomy is an uncommon but well-known consequence^{6,7}. The tongue swelling, altered taste, eye injury, lip burn, carotid artery injury and a mandibular condyle fracture have all been described as complications to tonsillectomy^{8,9}. Velopharyngeal incompetence or nasopharyngeal stenosis can affect the valving of the nasopharynx. The most common postoperative problems are fever, otalgia, sore throat, uvular edema and dehydration. The infection, at lantoaxial subluxation, mandible condyle fracture, pulmonary edema, psychological stress and Eustachian tube injury are some of the less usual problems¹⁰.

During 1960, diathermy was initially utilized to attain hemostasis after tonsillectomy in the 1960s, and it has since grown in popularity, despite evidence that patients who have tonsillectomy with diathermy have a higher rate of postoperative secondary hemorrhage than those who have dissection and hemostasis without diathermy^{11,12}. Bipolar diathermy has been found to be a safe and effective approach to cut, dissect, and hemostatically treat wounds. Heat is used by all electro-surgical instruments, including bipolar diathermy, to denature proteins and cause hemostasis. Use of such heat energy in surgery has the drawback of spreading heat across the operational zone. Tissue damage, wound healing delays, and even higher postoperative pain are all risks^{13,14}.

The LVSS (Ligasure Vessel Sealing System) is a bipolar electro-surgical system along with effective feedback control as well as minimum heat spread (Valley lab, Boulder, CO). In parotid and thyroid gland surgical treatment, in addition to entire laryngectomy & radical neck dissection techniques, the LVSS has been shown to be safe and effective. Also, it was discovered to be useful and safe during tonsillectomy surgeries, ensuring good hemostasis as well as minimum postop discomfort^{15,16}.

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The purpose of this research was to evaluate the operative time, perioperative blood loss, postoperative discomfort and postoperative hemorrhage with Ligasure tonsillectomy against bipolar diathermy tonsillectomy.

MATERIAL AND METHODS

Study Design: It was a randomized controlled trial**Setting:** The study was carried out at ENT Department, DHQ Teaching Hospital, Dera Ghazi Khan.**Duration:** The duration of study was one year.**Randomization Process:** The lottery process was utilized to randomize two procedures: bipolar diathermy and ligasure Tonsillectomy.

Before being randomly allocated to one of the two surgical methods, all patients signed a consent form. All of the procedures were carried out under general anesthesia, pre- and postoperative information and patient care all were similar in both groups. On the second day after surgery, patients were discharged with instructions to return for a follow-up examination. Patients were given specific instructions – both orally & written – to contact the ENT Emergency, if there was any concern of throat bleeding during both admission and discharge from the hospital.

The tonsil was gripped with a tonsil holding and retracted in toward the midline with a tonsil holding forceps, and a mouth gag was applied to all groups. There were no mucosal incisions performed.

The tissue bundles of the anterior pillar mucosa were gently grasped and coagulated using Bipolar Diathermy utilizing the same power supply unit setting, and then separated.

The tissue was detached around lateral tonsil capsule. Before removing the tonsil specimen using the bipolar hand piece, inferior pole was congealed. Tips of the devices were used to grip and seal visible blood vessels.

Ligasure was a 'precise' instrument that could be used for both dissection and hemostatic purposes. Ligasure system comprises a hand piece, foot switch and electro-surgical generator. The tissue is held in hand-piece and clamped when the foot pedal is pressed, and generator detects the grabbed tissue density and regulates the energy amount provided automatically. Once generator generates a tone, the pulse is complete. Within vessel walls, the transferred energy denatures collagen and elastin, forming a seal. This method can seal vessels with a size of up to 7mm, reducing heat spreading to the surrounding tissue.

From the time the mouth-gag was placed until the tonsils were removed and hemostasis was achieved, the operating time

was calculated. During surgery the blood lost amount was calculated by weighing the cottoned sponges after the procedure and measuring the volume of the suction container. Following the period, the questionnaires were recorded and analyzed.

Inclusion Criteria:

- Both Gender
- Age from 05 year to 30 year
- Recurrent or chronic tonsillitis
- Obstructive sleep apnea due to tonsillitis

Exclusion criteria:

- Bleeding diathesis patients
- Patients on anticoagulants
- Peritonsillar abscess

- Suspicion of malignancy
- Old patient
- Comorbid patient

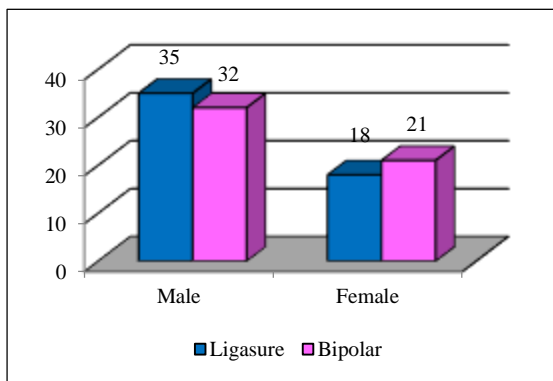
The SPSS software was used for statistical analysis. The t-test was performed to compare the two groups.

RESULTS

This study involved a total of 106 patients. There are 67 males and 39 females in the group. The ages of the participants ranged from 5 to 30, with a median age of 13 years. The Ligasure group had 53 patients, while the bipolar diathermy tonsillectomy group had 53. All (106) individuals met the inclusion criteria.

Patient Characteristics:

Characteristics	Total Patients (n=106)		Ligasure Group (n=53)		Bipolar Group (n=53)	
	N	%	N	%	N	%
Male	67	63.20	35	52.3	32	47.76
Female	39	36.79	18	46.15	21	53.84
Mean age (years)	13.6	--	13.5	--	13.8	--
Mean operating time (min)	13.4	--	11.05	--	15.7	--
Mean preop blood loss (ml)	14.40	--	10.28	--	18.5	--
Postop bleeding	11	10.37	4	7.54	7	13.2



Preoperative blood loss: During surgery, none of the patients in the Ligasure Tonsillectomy group experienced any major bleeding. Mean intraoperative bleeding in ligasure group was 10.28ml. Mean blood loss in bipolar tonsillectomy group was 18.5ml.

Operative time: The surgery took an average of 13.4 minutes to complete. The Ligasure group had a mean time of 10.2 minutes. It took 18.5 minutes for diathermy.

Postoperative bleeding: During the trial, 11 patients (10%) developed postoperative bleeding, including 4(7%) in the Ligasure tonsillectomy group and 7(13%) in bipolar diathermy tonsillectomy group. None of these patients had any primary hemorrhages. They all experienced secondary hemorrhages (the first 24 hours after surgery). All (11) cases were treated with overnight monitoring and systemically injection of tranexamic acid plus antibiotics to stop and decrease the risk of subsequent bleeding.

DISCUSSION

The most noticeable difference between the Bipolar and the Ligasure was that tonsillectomy with the bipolar device took an average of 4 minutes longer (11.05 min vs 15.7 min). However, it appears that there is a learning curve. The maximum operative time was similar in 2 groups.

Postoperative bleeding was substantially higher in the bipolar group than in the ligasure group. There were 11 patients with post-operative hemorrhage, 7 from the bipolar group and 4 from the ligasure group. Patients were not taken to the operation room; instead, they were monitored overnight and given tranexamic acid and antibiotics systemically. Secondary bleeding was present in all of the individuals. So none of the postoperative hemorrhages were primary, it's likely that only a few of them

required surgery. This increased risk of postoperative hemorrhage is concerning, and it has prompted more vigilance and more frequent follow-up after tonsillectomies in order to assess our postoperative hemorrhage rate. More research is needed, and our current approach to tonsillectomies may need to be adjusted. In terms of postoperative discomfort, there were no distinctions between the groups. Because the amount of energy produced by the device is supposed to limit the spread of heat in the surgical field, in the Ligasure tonsillectomy group, a decreased in pain would have been expected.

Perioperative bleeding was low in both groups. The ligasure group lost about 11 ml and the bipolar tonsillectomy group lost about 15 ml, compared to tonsillectomy study using cold procedures, where mean perioperative blood loss frequently exceeds 100 ml.

Considering the fact that this hand piece was not designed specifically for tonsillectomy using the Ligasure method; a hand piece which is a bit lengthier and has a more sleek profile in the instrument's jaws should make dissection in the inferior pole of the tonsils easier and possibly faster.

Tonsillectomies in Bipolar Group took longer than those in the Ligasure Group in this study. There was minimal to no perioperative blood loss in both groups, however the Bipolar Group had a greater rate of postoperative hemorrhage. More research is needed to determine whether any of the techniques give enough protection against postoperative bleeding. In comparison to our previous data, no postoperative hemorrhages necessitated a return to the operating room. Ligasure is a disposable tool that offers adequate protection against CJD transmission.

A novel hand piece created exclusively for tonsillectomy surgery could likely increase surgical performance in terms of operating time.

CONCLUSIONS

Study concluded that tonsillectomies using ligasure took longer than those with bipolar diathermy. Both groups had similar perioperative hemostasis. The rate of postoperative bleeding was higher than anticipated.

Conflict of interest: Nothing to declare

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