

Original Research

Comparison of Intraoperative Parameters of Tonsillectomy Performed Using Molecular Resonance Generator Technique and Conventional Method

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Abstract

Introduction: The quantum molecular resonance (QMR) device is an innovative energy-based devices (EBDs) that has been safely and effectively applied in otolaryngology-head and neck surgeries. The present study was undertaken to compare intraoperative parameters of tonsillectomy performed using molecular resonance generator technique and conventional method.

Materials and Methods: The present study was conducted in the Department of Otorhinolaryngology among 80 Patients attending ENT OPD who were randomly selected for tonsillectomy by Molecular resonance generator and Conventional method. Time needed to perform surgery on each patient, blood loss during surgery, post operative pain, postoperative hemorrhage and extent of wound healing after surgery was recorded.

Results: The majority of patients were in the age group 7 to 10(46.25%) years, The next majority age group was 4 to 6 years (26.25%). It took an average of 11 minutes 3 seconds more mean duration to perform conventional technique as compared to MRG procedure and this difference was statistical significance (p value <0.0001). The amount of intra operative blood loss on an average in MRG method is approximately 16 ml and the amount of intra operative blood loss in conventional is 44 ml which was statistically significant p -value (< 0.001).

Conclusion: Molecular resonance generator method tonsillectomy is relatively easy technique to perform providing a near bloodless field and minimal surrounding tissue damage. The operative time required to perform molecular resonance generator method tonsillectomy was less than the conventional method. The intra operative blood loss was significantly less on the molecular resonance generator method than on the dissection method.

Keywords: Otolaryngology; Tonsillectomy; Quantum molecular resonance (QMR).

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INTRODUCTION

The quantum molecular resonance (QMR) device is an innovative energy-based devices (EBDs) that has been safely and effectively applied in otolaryngology-head and neck surgeries such as phonomicrosurgery, tonsillectomy, oral surgery and adenoidectomy.¹ The various methods for tonsillectomy are dissection, guillotine, cryosurgery, monopolar and bipolar diathermy dissection, suction diathermy dissection, bipolar scissor dissection, ultrasonic scalpel removal, radiofrequency surgery and laser surgery.²

QMR is used in surgical devices through the product lines Vesalius®, Quantum® and Essential®. These are excellent tools that allow the surgeon to operate with the greatest care and respect of the surrounding structures and tissues. Unlike the traditional electrosurgery and radiosurgery, its working principle is a mere transfer of thermal energy (heat generated by the flow of electric current), these devices employ a spectrum of frequencies such that the transferred energy translates only minimally in thermal rise; the predominant component of energy transmitted to the tissue interacts directly at the level of molecular bonds, breaking them up in a non-thermic way. Using

Quantum Molecular Resonance (QMR) technology, energy from the MCNplus generator is converted into potential energy (breaking molecular bonds) and not kinetic energy (causes an increase of local temperature).³ QMR is generated by means of alternate current of defined high-frequency where electron waves at 4, 8, 9 and 16 MHz break molecular bonds with minimal temperature elevation.⁴⁻⁶ Thus, present study was undertaken to compare intraoperative parameters of tonsillectomy performed using molecular resonance generator technique and conventional method.

MATERIALS AND METHODS

The present study was conducted in the Department of Otorhinolaryngology, Sardar Patel Medical College & A. G. of Hospital, Bikaner among 80 Patients attending ENT OPD who were identified as candidates for tonsillectomy and were randomly selected for procedure tonsillectomy by Molecular resonance generator and Conventional method.

Inclusion criteria consisted of patients who attended ENT OPD with indication of tonsillectomy above the age of 3 years and had given the consent and were fit for surgery.

Exclusion criteria comprised of asymmetrical and unilateral enlarged tonsil, children with chronic tonsillitis who were below the age of 3 years and patients who needed adenoidectomy, myringotomy and grommet insertion. All patients included in the study were subjected to detailed history taking and examination pertaining to ear, nose and throat.

All patients included in study were examined and investigated by clinical examination, pure tone audiometry (in selective cases for exclusion criteria), impedance audiometry (in selective cases for exclusion criteria), x-ray skull soft tissue lateral view (in selective cases for exclusion criteria), diagnostic nasal endoscopy (in selective cases for exclusion criteria), routine blood investigations (complete blood count, renal function tests etc.), chest x-ray and ECG. All patients who were planned for tonsillectomy were assessed for general anaesthesia.

After complete work up, patients were randomly selected, Through this study, in half of the patients tonsillectomy was done by using molecular resonance generator and in the other half of the patients

tonsillectomy was done by conventional method. Under general anaesthesia using nasotracheal intubation, patient put in Rose position. After painting and draping Boyle Davis mouth gag with tongue blade introduced. Tonsil was retracted medially and held by using Dennis Brown tonsil holding forceps. An incision made in the mucosal reflection site and the medial margin of anterior pillar. Plica semilunaris at the upper pole released. Posterior pillar mucosal reflection released with curved scissors. Tonsil dissected from its bed using Mollison dissector upto inferior pole and inferior pole snared. Tonsillar fossa packed, after securing haemostasis, pack removed, and similar procedure was done on the other side. The patient undergoing conventional tonsillectomy was regarded as control in comparison to the patient undergoing tonsillectomy by using molecular resonance generator in terms of post operative pain, wound healing and bleeding.

Time needed to perform surgery on each patient, blood loss during surgery, post operative pain, postoperative hemorrhage and extent of wound healing after surgery was recorded. Time taken from incision to attaining hemostasis was taken as duration of surgery. Intraoperative blood loss was measured by Swab weighing technique and using separate collecting chambers for each method.

RESULTS

It is seen that majority of patients were in the age group 7 to 10(46.25%) years, The next majority age group was 4 to 6 years (26.25%).

The mean duration is measured from giving incision over the tonsil upto achieving complete hemostasis, for MRG tonsillectomy the mean duration was 24 minutes and 6 seconds and for conventional tonsillectomy mean duration was 35 minutes and 9 seconds thus it took an average of 11 minutes 3 seconds to perform MRG procedure compared to conventional technique and this difference was statistical significance (p value <0.0001)

The amount of intra operative blood loss on an average in MRG method is approximately 16 ml and the amount of intra operative blood loss in conventional is 44 ml. The difference was statistically significant p value (< 0.001).

Table 1: Age Distribution Among Patients

Age in years	Patients
4 to 6	21(26.25%)
7 to10	37(46.25%)
11 to 15	10(12.5%)
16 to 20	44(5%)
21to 25	22(2.5%)
>25	66(7.5%)
Total	80

Table 2: Comparison of Duration of Surgery (In Minutes) in MRG and Conventional Method

DS in Min	N	Mean	Std. Deviation	P Value
Conventional	40	35.2	5.0376	<0.0001
MRG	40	24.1	3.83	

Table 3: Comparison of Intra Operative Blood Loss (in Milli Liter) in MRG and conventional method

IOP blood loss	N	Mean	Std. Deviation	P Value
Conventional	40	42.90	7.123	<0.001
MRG	40	15.98	4.373	

DISCUSSION

Tonsillectomy is a 3000-year-old operation. It is one of the major surgical procedures in terms of volume in the general otolaryngological practice. There has been a conceptual change in the indications and surgical technique in the last 40 years.⁷

In our study it was found that 37% of patients in age group 7-10 which was the predominant one, similar age distribution was adapted in studies conducted by Paramasivam VK⁸ et al (2012), Friedman Met al.⁹

In our study the mean duration of surgery for molecular resonance generator method is 24.1 min (ranging from 15 min to 30 min) the mean duration of surgery for conventional method is 35.2 min (ranging from 27 to 50 min) F. Lorusso et al¹⁰ described the duration of surgery in their studies showed evidence that molecular resonance generator method had less duration compared to conventional method. The p value is <0.05 and it is statistically significant.

The mean Intra operative blood loss in conventional method was 43.44ml ranging from 15 to 60ml and for molecular resonance generator method was 18.74ml ranging from 10 to 50ml. Vangelin G et al¹¹ in a meta-analysis report showed intra operative bleeding was significantly less in molecular resonance generator method. Hong SM et al¹² conducted a study in pediatric patients undergoing tonsillectomy and demonstrated tonsillectomy by molecular resonance generator method has lesser blood loss. In our study we found that conventional (44.2ml) had more amount of blood loss compared to molecular resonance generator method (18.74ml) p value <0.001 statistically significant. Similarly, D'Agostino R et al compared operative time, intraoperative bleeding using molecular resonance bipolar tonsillectomy and blunt dissection tonsillectomy among 800 children, aged from 3 to 10 years and reported that duration of surgery and blood loss were significantly much lower in the group undergoing electronic molecular resonance bipolar tonsillectomy (p<0.0001) as well as revealed that reduced operative time and intraoperative bleeding make EMRBT more cost effective and allow an increased number of operations. Another study by D'Eredità R¹³ compared outcomes of molecular resonance (MR) technology for tonsillectomy to standard cold-knife (CK) and monopolar cautery (MPC) for pediatric tonsillectomy and concluded that MR for pediatric tonsillectomy resulted in reduced histopathologic thermal injury, lower pain scores, and reduced postoperative

morbidity compared with CK and MPC techniques in an 11-year study.

CONCLUSION

Molecular resonance generator method tonsillectomy is relatively easy technique to perform providing a near bloodless field and minimal surrounding tissue damage. The operative time required to perform molecular resonance generator method tonsillectomy was less than the conventional method. The intra operative blood loss was significantly less on the molecular resonance generator method than on the dissection method.

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