Microdebrider Tonsillotomy in Children with Obstructive Tonsillar Hypertrophy

Obstrüktif Tonsil Hipertrofisi olan Çocuk Hastalarda Mikrodebrider Tonsillotomi

Mikrodebrider Tonsillotomi / Microdebrider Tonsillotomy

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Özet

Amaç: Obstrüktif tonsil hipertrofisi nedeniyle opere olan çocuklarda mikrodebrider kullanarak gerçekleştirdiğimiz intrakapsüller tonsillotomi yöntemi ile klasik tonsillektomi yöntemlerinin karşılaştırılması. Gereç ve Yöntem: Mikrodebrider tonsillotomi uygulanan 37 çocuk hasta, klasik soğuk disseksiyon tonsillektomi uygulanan 45 çocuk hasta ile intraoperatif kan kaybı, operasyon süresi, oral alım zamanı, ağrı kesici kullanımı, iyileşme zamanı ve postoperatif ağrı yönünden karşılaştırıldı. Bulgular: İntrakapsüler mikrodebrider tonsillotomi uygulanan çocuk hastaların iyileşme dönemlerinde konvansiyonel tonsillektomi uygulanan çocuk hastalara göre belirgin olarak daha az ağrıları vardı. Mikrodebrider tonsillotomy uygulanan grupta intraoperatif kan kaybı, operasyon süresi, oral alım zamanı, ağrı kesici kullanımı ve postoperatif ağrı skorları konvensiyonel tonsillektomi uygulanan gruptaki hastalardan daha azdı (p< 0,05). Mikrobebrider tonsillotomy uygulanan iki hastada tonsil hipertrofisi tekrarladı. Tartışma: İntrakapsüler tonsillotomi pediatrik hastalardaki uyku apne semptomlarını gidermede konvansiyonel tonsillektomi kadar efektif ve güvenilir bir yöntemdir. İntrakapsüler tonsillotomi postoperatif ağrıyı azaltır, yaşam kalitesini arttırır ve iyileşme süresini kısaltır. Ayrıca bu yöntem obstrüktif tonsil hipertrofisi olan çocuklarda konvensiyonel tonsillektomiye göre daha çok tolere edilebilir bir yöntemdir.

Anahtar Kelimeler

Mikrodebrider Tonsillotomi; Obstrüktif Tonsil Hipertrofisi; Çocuk

Abstract

Aim: To compare intracapsular microdebrider tonsillotomy with conventional cold dissection tonsillectomy in the management of tonsillar hypertrophy causing obstructive airway problems in children. Material and Method: 37 children who underwent microdebrider tonsillotomy were compared with other 45 children who had conventional cold dissection tonsillectomy to examine intraoperative blood loss, operation time, duration of oral intake, intake of analgesics, recovery time and post-operative pain. Results: Children who underwent intra-capsular micro-debrider tonsillotomy had significantly less pain throughout their recovery period than those who had conventional tonsillectomy. In the microdebrider tonsillotomy group intraoperative blood loss, operation time, duration of oral intake, intake of analgesics, and postoperative pain score were found to be less than the conventional tonsillectomy group scores(p <0,05). Tonsillar hypertrophy recurred in two patients of micro-debrider tonsillotomy group. Discussion: Intracapsular tonsillotomy is as effective and safe as conventional tonsillectomy to relieve obstructive sleep apnea in pediatric patients. Intracapsular microdebrider tonsillotomy reduces postoperative pain, improves quality of life and shorthens the recovery time. Therefore; this procedure is more tolerable in children with obstructive tonsillar hypertropy in respect to conventional tonsillectomy.

Keywords

Microdebrider Tonsillotomy; Obstructive Tonsil Hypertrophy; Children

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Introduction

The history of tonsillectomy in Ear & Nose & Throat Practice as the oldest and the most frequently performed operation, dates back to Indian Medicine of 3000 years ago. Approximately 1000 years after this date ,Galen (25-50 A.D.) defined tonsillectomy with 'Snare' technique. Later; Aetius (490 A.D.) proposed partial extraction of tonsils so as to preserve peripheral tissues [1].

Tonsillectomy is presently performed using different techniques, in case of indications of recurrent acute tonsillitis, peritonsillar abscess, obtructive sleep apnea, airway obstruction and snoring. Minimizing postoperative morbidity is one of the most important points in choosing the appropriate technique.

Postoperative pain and bleeding are the mostly encountered problems in the post operative period of tonsillectomy. Complaints of bleeding and pain stem from direct and indirect traumas (such as excessive dissection or thermal effects and post operative inflammation) on pharyngeal muscles where nervous and capillary network take place.

Several methods such as using analgesics locally or sytemically are preferred for decreasing post operative pain problem [2,3], diverse devices and techniques (unipolar cautery, bipolar cautery, dissection) [4], subtotal resection of tonsils, in recent years and in chosen cases tonsillotomy (microdebrider,CO2 laser, low-heated plasmo lancet) [5-8].

In microdebrider intracapsular tonsillotomy technique which was first defined by Koltai; while larger portion of tonsil tissues is resected, the capsule of tonsil is left in place, together with a lymhpoid tissue as a protective tissue on the pharyngeal muscle layer [9]. Thus, pharyngeal muscles are protected against direct and indirect traumas in an intraoperative way; and against inflammations due to secondary infections in postoperative period.

Today, symptomatic tonsillar and adenoid hypertrophies are indications of this technique [10].

In this article, our observations were evaluated in a comparative technique on patients who underwent intracapsular microdebrider tonsillotomy and conventional disection tonsillectomy regarding intraoperative blood loss, operation time, postoperative pain in early and late stage and recovery time.

Material and Method

The present study was approved by the Instutional Review Board of Ufuk University Medical School with decision number 080660 in June 2009 and all patient's parents signed informed consent before entering the study.

This study covers 82 children who suffer from snoring, evidenced apnea , sleeping with mouth-open. Diagnosis was 'Obstructed Airway' according to tonsil hypertrophy based upon the information given by parents and clinical inspection.

Through random selection; 45 patients were operated by conventional dissection technique, whereas other 37 patients were operated by intracapsular micro-debrider technique. All patients were operated by the same senior surgeon.

Patients who had successive streptococcal tonsillitis attack more than three times within two years; who had a peritonsillar abscess story; those who were suspected to have chronic infected tonsillitis during consultation (upon pressure, tonsils generates pus); obese children who possibly has Complex Obstructive Sleep Apnea Syndrome; who has craniofacial abnormalities and those who were suspected to have coagulopathy; were excluded. Parents were informed on the subject operation and their written approvals were taken.

Operations were performed in standart Rose position, using Crowe-Davis (Lawton 80-0218) mouth–opener and through endotracheal intubation. In both two groups operations performed under general anesthesia with using inhalation anesthesia (2 mg / kg di- hydroxypropylphenol, 0.6 mg /kg Rocuronium bromide, 1 µgr / kg fentanyl for induction and % 2-3 sevoflurane, % 50-50 mix of nitrogen and air for maintanence). In the group conventional dissection is used; tonsillar tissue was dissected from anterior tonsillar plica using a tonsil lancet; tonsil tissue was separated from fossa tonsillaris using the obtuse dissection method from superior pole down to inferior pole; then tonsillar gause was put in the tonsillar space for bleeding control. Bleedings which can not be controlled by gause pressure; were coagulated bipolar cautery at 25 watt.

In microdebrider tonsillectomy operations; 2,7mm. STORZ (Figure 1) straight microdebrider was used at 1500-2000 rpm. in

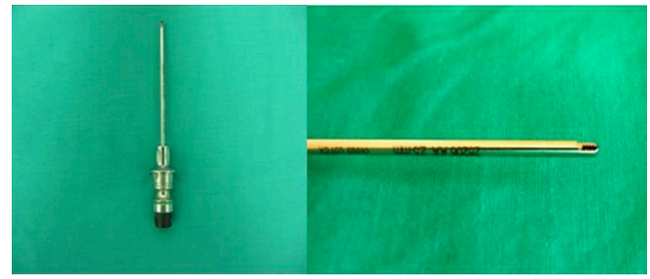


Figure 1. The microdebrider is a powered rotary shaving device often used during sinus surgery. 2.7 mm straight microdebrider (Storz).

oscillation mode and complying with the technique of from inferior to superior; from medial to lateral (5). The shaving was performed in tonsil capsule locus until the stiffness of capsule tissue is felt, paying a particular attention so as not to inflict a damage to mucosa of frontal and posterior plica and tonsillar capsule itself (Figure 2). Bleedings on the shaved surface were coagulated with bipolar cautery at 25 Watt.

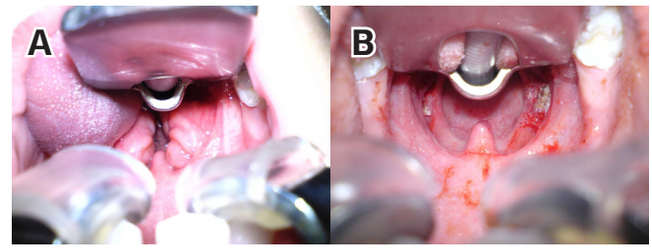


Figure 2. Preoperative intra-oral view of microdebrider tonsillotomy patient's (A), Postoperative intra-oral view of microdebrider tonsillotomy patient's (B).

In preoperation time, midozolam was given orally 2 (mg/kg) diluted with 10 cc.fruit juice; as a premedication-agent. During operation no additional medication was given by the anesthesiologist.

In recovery room; pain scores were determined by the anesthesiologist at 15th, 30th, 60th and 120th minutes; according to

Modified Hannallah Pain Score (MHPS). MHPS is an observational pain score. It is developed so as to have a valid and reliable method for children (10). For pain control, in the first hour 10 mg/kg paracetamol infusion and tramadol HCl 1 mg/kg were done. After 4th hours, as oral nutrition starts; pain scoring was done by Visual Analogue Scale (VAS), in every 6 hours. Patients with a score of 6 and above were given paracetamol at 15 mg/kg ratio, orally, in every 6 hours.

In all patients, in postoperative period a prophylactic antibiotic treatment was administered with amoxicillin- clavunic acide suspension for a 7 days period, in oral. In some patients with an allergy suspicion, clarithromycin 25 mg/day was given. First oral nutrition; on water, milk, ice-cream was started after 4th hour. All patients were discharged after a 24 hours observation time. After that time all of them were observed through telephone supervision.

In post operative 2 weeks; patients were observed from painkiller requirements, otalgia, sorethroat and oral nutrition points of view. First face to face checking was done on the 5th day, followingly on 10th and 14th days they were examined and VAS scores were evaluated by doctors.

Results

Patients selected for this study were composed of 46 boy and 36 girl with mean age was 7,09 ± 3,33. The conventional dissection method was applied in 45 patients (mean age was 8,24 ± 3,71), whereas the microdebrider method was used in 37 patients (mean age 5,68 ± 2,11).

T test was performed so as to show the relation among these groups, due to the fact that the operation times values suggest a normal distribution. There was no statistically significant difference between the operation times for two different methods (p>0,05).

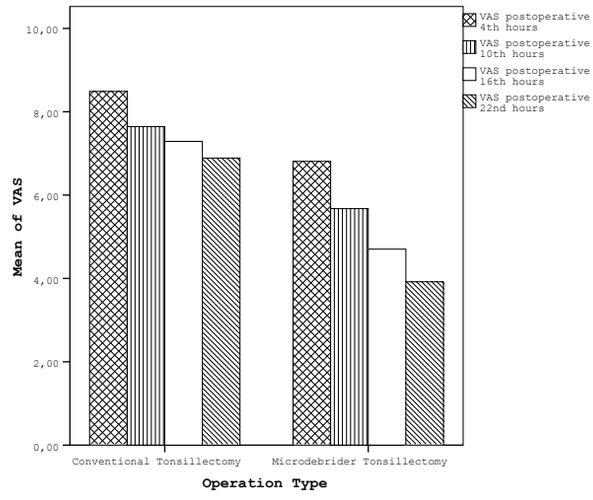
The relation between the two groups in blood loss, recovery day, MHPS, VAS values and analgesic intake showed an non-normal distribution, so; it was evaluated through Mann Whitney U Test. The values related to intraoperative and postoperative periods belonging to both methods, were found statistically significant (p<0,05). All these results shows that intraoperative blood loss, operation time, MHP scores and the amount of analgesic intake in postoperative period are lower in microdebrider group (Table 1).

Table 1. Differences between findings in operation groups.

	Conventional Tonsillectomy			Microdebrider Tonsillotomy			p
	n	mean	sd	n	mean	sd	
Operation Time (min)	45	29,53	7,27	37	24,76	10,04	0,717
Blood Loss (cc)	45	113,87	75,96	37	39,46	17,71	0,000
Recovery Day	45	12,27	2,40	37	5,22	1,11	0,004
Numbers of oral analgesic intake	45	3,93	0,33	37	1,62	0,64	0,000
MHS postoperative 15th minutes	45	1,69	0,87	37	0,73	0,90	0,000
MHS postoperative 30th minutes	45	2,02	0,97	37	1,24	1,14	0,000
MHS postoperative 60th minutes	45	1,76	1,26	37	0,59	1,01	0,000
MHS postoperative 120th minutes	45	1,34	1,18	37	0,51	0,93	0,000

In first the 22 hours of postoperative period, VAS values are less in microdebrider tonsillotomy group in respect to the conventional tonsillectomy group (p=0,000) (Graphic 1) . In late postoperative period; on 5th,10th and 14th days; VAS values are different between two groups of patients only on the 5th day in favor of the group operated by microdebrider method (p<0,05) ; but on all other days after the 5th day; this difference is disappears. Our study has revealed that microdebrider tonsillotomy which is applied in obstructive pediatric tonsillar hypertrophy; is more successful in respect to conventional tonsillectomy, from operation time, intraoperative blood loss, postoperative pain, analgesic use and transition to painless oral nutrition points of view. In all patients, a recovery has been achieved in obstruction induced symptoms. No patient applied hospital prior to normal checking times with complaints related to pain, problems in oral nutrition, dehydration or bleeding. In our study, no recurrent tonsillitis attack was reported but in two patients, within one year of observation, relapse was seen. In a total one year of postoperative observation, in the appraisal of both groups; from microdebrider tonsillotomy group two relapse occurred whilst no relapse occurred from conventional tonsillectomy group.

Graphic 1. Differences between two groups in early postoperative period (p= 0,00 for each parameters.).



Discussion

When intraoperative blood loss and operation times are compared, microdebrider tonsillotomy method has been seen as being more advantageous in compliance with the literature [11-13]. This advantage most probably stems from the fact that the operational practice is simpler and causes less tissue damage. Herewith, duration of the operation gets shorter and blood loss diminishes. These advantages also shorten the period of patients' recovery. This situation provides material and moral advantages for both the patient and their family. In our study because microdebrider tonsillotomy technique we started to use newly we thought that the operation time was longer than expected.

It is wise to have a look at the anatomy in order to comprehend the advantages of microdebrider tonsillotomy in respect to conventional tonsillectomy. Tonsil tissue takes place in between

anterior and posterior plicas is adjacent to superior pharyngeal constrictor muscle. Tonsil capsule is a thickened form of pharyngobasillar fascia and hardly coherent to tonsil tissue. It makes an invasion into tonsil medially in fingerlike formations. Peritonsillar cavity is the potential area between tonsil capsule and pharyngeal constrictor muscles. Blood vessels advance in a transverse formation into tonsil as fingerlike grooves. Since it is not possible to separate tonsil from tonsil capsule through surgical applications; in conventional dissection is made through peritonsillar cavity; in microdebrider tonsillectomy only tonsil tissue is intervened in medial.

In conventional tonsillectomy; lateral pharyngeal muscle is exposed to a temporary super-infection and infected wound healing risk stemming from oral cavity bacteria together with surgical trauma. All these factors are major determinants which cause postoperative pain by most authors [13,14]. Lactic acide and inflamatory mediators (leukotriens, prostaglandines) which are formed after surgical operations stimulate nerve terminals and cause muscle spasms and local ischemia. This is the main reason of pain cycle [15].

In conventional dissection method, mucosa of anterior and posterior plicas are also dissected together with tonsil itself, a larger area of muscle remains with its mucosa scraped in respect to intracapsular method. We think this is one of the reasons a lesser degree of pain felt in intracapsular method. We also believe that radiofrequency tonsillotomy and bipolar tonsillotomy which is done with appropriate tips; that also preserve capsular structure; will bring about similar results.

In postoperative period, it is known that prophylactic antibiotic use has a role in pain prophylaxis [16,17]. Bacterial inflamation which is formed in tonsil log is an another reason for bleeding in post-operative period. Thereby; antibiotic usage proved to be another factor decreases bleeding [18]. For these reasons, in all of our patients antibiotic was used in post operative period.

It is known that as the level of the heat used in electro-surgery techniques utilized for coagulation or dissection; decreases, the level of the pain and the tissue damage are also minimized [19,20]. In microdebrider method, that high level heat is not generated; is yet another advantage of this method. We used bipolar cautery so as to control micro bleedings in tonsil tissues, during operations. The width of the tissue left on the capsule is important to preserve tonsil log, as being another measure to stop heat transfer. For this reason, during surgery; surgeon must pay attention to keep optimum level of tissue to leave on the log.

However, we should not rule out some disadvantages of microdebrider tonsillectomy along with its advantages. Residual lymphoid tissues after intracapsular tonsillectomy may cause a lymphoid hyperplasia, an increase in tonsil tissue in postoperative period and also recurrent tonsillitis attack. Koltai and friends have shown that there had been some relapses in a small group of patients, after tonsillectomy [13-15]. In microdebrider tonsillectomy application, financial dimension of the material is important factor. Microdebrider that we use during application costs only 120 USD. It is possible to sterilize this equipment in autoclave and can be used in many applications. For this reason the method used cost becomes very limited.

Microdebrider tonsillectomy method causes minimal tissue damage due to smallness of the equipment. For this reason, operation time gets shorter, intraoperative blood loss becomes minimal and post operation pain phase gets shorter. Also lesser volume of analgesics are used, oral nutrition starts earlier then patient and his family are exposed less psychological stress. When microdebrider tonsillectomy method is used children return to school and their families' return to normal daily life earlier.

As a conclusion, microdebrider tonsillectomy comes forward as a more advantageous method for many aspects in respect to conventional tonsillectomy, as long as it is applied to a well selected group of tonsillar hypertrophy patients.

Competing interests

The authors declare that they have no competing interests.

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