Zagazig University Medical Journal
www.zumj.journals.ekb.eg

Volume 29, Issue 1, January 2023, Page (134-143) Supplement Issue

Manuscript ID ZUMJ-2002-1743 (R2)

DOI **10.21608/zumj.2020.24152.1743**

ORIGINAL ARTICLE:

Microdebrider Intracapsular Tonsillectomy Versus Extra Capsular Tonsillectomy in Children at Zagazig University Hospitals

Yehia Ali Aboushab[1], Samir Sorour Sorour[1], Wael Fayez Nasr[1] and Hyam Ibrahim Elsaied Elsedik*[2]

[1] *Otorhinolaryngology Department, Faculty of Medicine, Zagazig University*

[2] *Faculty of Medicine, Zagazig University*

***Corresponding Author:**
Hyam Ibrahim Elsaied Elsedik
Faculty of Medicine – Zagazig University
E-mail :
laraelgohary2@gmail.com

Submit Date 2020-02-18
Revise Date 2020-04-09
Accept Date 2020-08-06

ABSTRACT

Background: Tonsillectomy is a widespread surgical procedure performed in children. Complete tonsillectomy has always been done in obstructive sleep apnea syndrome due to tonsillar hypertrophy. Several modifications of tonsillectomy procedures have been done along time concerning technique and instrumentation to reduce morbidity and get better outcome. We aimed to make general comparison between extra capsular tonsillectomy (ECT) and microdebrider intra capsular tonsillectomy (MICT) regarding the intraoperative findings (blood loss and intra-operative time) and early postoperative complications (pain, post-operative bleeding, otalgia, days to return to normal diet and post-operative fever).

Methods: This prospectively controlled study carried out on 64 children with chronic hypertrophic tonsillitis at who presented to the Outpatients Clinic of the Otorhinolaryngology Head and Neck Departments, Faculty of Medicine, Zagazig University Hospital during the period from July 2018 to July 2019. all patients were divided into 2 groups; Group I: included 32 patients were operated by extra capsular tonsillectomy (ECT). Group II: included 32 patients were operated by microdebrider intracapsular tonsillectomy (MICT).

Results: There was statistically significant difference between the two studied groups regarding postoperative day's relief of SDB, postoperative otalgia, but there was no statistically significant difference regarding post-operative hemorrhage and fever.

Conclusions: Microdebrider intracapsular tonsillectomy (MICT) is a safe and effective technique of tonsillectomy for children tonsillitis and sleep apnea as it effectively reduce the operative time, less postoperative pain and rapid return to normal diet apart of high intraoperative blood loss..

Keywords: Tonsillectomy; Microdebrider; Extracapsular; Intracapsular

INTRODUCTION

Tonsillectomy is one of commonly performed pediatric otorhinolaryngology surgeries. Adenotonsillectomy is recommended at cases with recurrent tonsillitis, large tonsils and adenoid which may induce sleep disordered breathing (SDB)at which the children presented by symptoms ranged from mild snoring to obstructive sleep apnea (OSA), oral breathing, failure to thrive and behavioral disturbance. The most popular complications of tonsillectomy are post-operative bleeding which represents about 1-10% of patients' postoperative pain, difficulty in eating and drinking and reduction of the immune function. Microdebriderintracapsular tonsillectomy (MICT) is a technique in which microdebrider shaves away most of the tonsils sparing part of the tonsillar tissue and capsule acting as biologic dressing protecting the pharyngeal muscle [1].

Tonsillotomy was a common technique until 1930s when it was replaced by tonsillectomy due to possible regrowth and recurrent infections on the residual tonsillar tissue. In the Late 1980s, tonsillotomy became popular as it has less pain, easy recovery and maintain the immune function especially at small children having sleep disordered breathing (SDB) due to tonsillar hypertrophy. Recently, a new class of mesenchymal stem cells (MSCs) is reported as tonsil derived mesenchymal stem cells (T-MSCs) isolate from the palatine tonsils that can differentiate in to Schwann cell phenotype and promote the peripheral nerve regeneration so the residual tonsillar tissue after tonsillotomy acts as a donor for (MSCs) [2]. Zhang and Wang [3], in a

recent study found that children with SDB have benefited from the less invasive tonsillotomy. Tonsillotomy patients experience less pain, equivalent or easier recovery, better food intake, and maintain the immunological function of the tonsils, while being as effective as tonsillectomy for resolving upper-airway obstructive symptoms for SDB in children.

We aimed to make an overall comparison between extra capsular tonsillectomy (ECT) and microdebrider intra capsular tonsillectomy (MICT) regarding the intraoperative findings as (blood loss and intra-operative time), postoperative follow up regarding (pain, post-operative bleeding, otalgia, days to return to normal diet and post-operative fever.

METHODS

This prospectively controlled study carried out on 64 children with chronic hypertrophic tonsillitis at who presented to the Outpatients Clinic of the Otorhinolaryngology Head and Neck Departments, Faculty of Medicine, Zagazig University Hospital during the period from July 2018 to July 2019.

Inclusion criteria: children more than 3years. Hypertrophied tonsils. Fit for general anesthesia. Children with sleep disordered breathing (SDB).

Exclusion criteria: Children < 3 years old. Atrophic tonsils. Contraindications for general anesthesia. Hypertrophied adenoid causing obstruction. Children with craniofacial anomalies.

Written informed consent was obtained from all childers' parents and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Patients were randomized randomly allocated into two groups, using a computer-generated randomization list each group consist of 32 patients:

Group I: included 32 patients were operated by extra capsular tonsillectomy (ECT).

Group II: included 32 patients were operated by microdebrider intracapsular tonsillectomy (MICT).

All patients were subjected to the following:

Personal history [name, age and sex]. Present history [exclude acute upper respiratory tract infection or acute tonsillitis, snoring and sleep disordered breathing [(SDB]. Past history [number of attacks of tonsillitis, bleeding tendency, previous operations and drug allergy].

General examination [to exclude craniofacial anomalies, general diseases interfere with operation]. ENT examination [with particular to sign of hypertrophied tonsils with grading of the tonsillar hypertrophy according to Brodsky grading system, exclude acute tonsillitis and exclude craniofacial anomalies].

Laboratory routine investigations include: [CBC to exclude anemia, coagulation profile to exclude bleeding tendency, random blood sugar and renal, kidney function tests.]

Plain x-ray on nasopharynx lateral view with opened mouth to exclude large sized adenoid causing obstruction.

Extra capsular tonsillectomy (ECT): Following induction of general anesthesia, the patient is positioned supine on the operating table with the neck slightly extended using a shoulder roll. Select an appropriate length Boyle Davis blade and insert the Gag to retract the tongue and expose the oropharynx. Scissors are used to incise the mucosa of the anterior faucal pillar as shown incision placed too laterally will leave only a small residual anterior pillar and is likely to cause no additional postoperative discomfort. Extend the initial incision and define the lateral border of the tonsil by spreading the blades of the scissors. This process usually commences superiorly and progresses inferiorly. The tonsil dissector is used to strip the pharyngeal muscles fibers laterally and away of the tonsil.

Microdebider intracapsular tonsillectomy (MICT): After general anesthesia using sevoflurane for induction and maintenance, fentanyl 1 μg/kg and paracetamol preparation in the form of perfalgan 15 mg/kg intravenous infusion were given for analgesia. The patient was placed in the Rose position. The the mouth was opened using tonsillar mouth gag, we began with the left tonsil with the microdebrider – set to 3000 rpm in oscillating mode – in the right hand. The microdebrider (shaver) was used to resect the tonsil, moving from the inferior to superior pole; this helped prevent blood from obscuring visualization of the anterior and posterior pillars. Dissection proceeded from a medial to lateral direction until the plane of the pillars was reached. At this point, it was generally helpful to further stabilize and control the anterior pillar to maximize tissue removal and minimize injury to mucosa. A Hurd elevator (Downs Surgical, UK) was particularly helpful in this circumstance, as it could also help to medialize the remaining tonsil tissue, making dissection easier. Dissection was carried down to but not through the capsule of the tonsil. The use of a mirror could facilitate dissection of the superior pole. Care was taken to avoid inadvertent injury to the uvula, which could occur rapidly given the suction associated with the microdebrider. After dissection was completed, hemostasis was achieved using bipolar cauterization of the bleeding points; if bleeding did not stop, then silk suturing was to be performed.

The contralateral tonsil was then dissected in an identical manner. Once the procedure was completed, the pharynx was irrigated with sterile normal saline and the mouth gag was allowed to relax. After approximately 1 min, the mouth gag could be reopened and hemostasis could be confirmed. A suction catheter was then passed under direct vision and the hypopharynx was suctioned free of any blood or irrigation fluid that may cause postextubation laryngospasm. The mouth gag was removed and the patient was turned over to anesthesia personnel for extubation. [4]

Intra-operative assessment of:

Operative time: from insertion of the mouth gag at the patient to the release of it estimated by minutes. Intra-operative blood loss: blood loss is estimated by (weighting the gauzes before and after operation + the amount of blood at the empty suction bottle - the amount of saline used at the irrigation).

Post-operative assessment of:

Assessment of pain by using the numerical pain scale (linear scale with 10 grades from 0- 10 the degree of pain will be marked every morning by parents before taking any analgesia. Post-operative fever. Post-operative otalgia. Days to return to normal diet. Post-operative hemorrhage. Days for improvement of sleep disordered breathing (SDB).

STATISTICAL ANALYSIS

The collected data was entered to and analyzed by computer using Statistical Package of Social Services, version 25 (SPSS). Results were presented by tables and graphs. Quantitative data was presented as mean and standard deviation. Qualitative data was presented as frequencies and proportions. Pearson Chi square test (χ^2) and fisher's exact were used to analyze qualitative independent data. P value of ≤0.05 was taken as significant.

RESULTS

Table (1) showed that there was no statistically significant difference between extracapsular tonsillectomy and the microdebriderintracapsular tonsillectomy groups regarding age and sex. Table (2), showed that there was statistically significant difference between the extra-capsular tonsillectomy and the micro-debrider intra-capsular tonsillectomy groups in operative time, amount of intraoperative blood loss, return to normal feeding, days needs for analgesia postoperatively and Postoperative days relief of SDB (with less intraoperative blood loss, days needed for return to normal feeding, days needs for postoperative analgesia and postoperative days relief in the micro-debrider intra-capsular tonsillectomy group than the extra-capsular tonsillectomy group) . But regarding tonsils size, it was the same in both groups (matched groups). Table (3), showed that there was statistically significant difference between the extra-capsular tonsillectomy and the micro-debrider intra-capsular tonsillectomy groups in postoperative otalgia (with higher occurrence in the extra-capsular tonsillectomy than and the micro-debrider intra-capsular tonsillectomy group 43.8% VS 15.6% respectively). But regarding postoperative fever and hemorrhage, there was no statistically Significant difference. Table (4), showed that there was statistically significant more improvement in otalgia2days, one week and two weeks postoperatively in the micro-debrider intra-capsular tonsillectomythan the extra-capsular tonsillectomy. Table (5), showed that there was statistically significant more improvement in fever 2days, one week and two weeks postoperatively in the micro-debrider intra-capsular tonsillectomy than the extra-capsular tonsillectomy. There was statistically significant more improvement in the pain 2days, one week and two weeks postoperatively in the micro-debrider intra-capsular tonsillectomy than the extra-capsular tonsillectomy. There was statistically significant more improvement in the pain on swallowing 2days, one week and two weeks postoperatively in the micro-debrider intra-capsular tonsillectomy than the extra-capsular tonsillectomy.

Table (1): Comparison between the studied groups in age and sex

Variable	Group I No. (32)		Group II No. (32)		t-test	P
Age (years)						
Mean ± SD	6.9±3.3		7.3±2.1		0.4	0.6
Range	(3-12)		(4-10)			
median	6		7			
Variable	Group I		Group II		test	P
	No (32)	%	No (32)	%	χ^2	
Sex:						
Male	17	53.1	20	62.5	0.5	0.4
Female	15	46.9	12	37.5		

Table (2): Comparison between the studied groups regarding clinical data

Variable	Group I No. (32)	Group II No. (32)	t-test	P
Tonsillectomy (%)				
Mean ± SD	56.3±15.5	56.2±15.5		
Range	(25-75)	(25-75)	0.00	1
Median	50	50		
Operative time	33.9±3.7			
(minutes)	(30-40)	14.4±3.2	22.4	0.001**
Mean±SD	33	(10-20)		
Range		15		
Median				
Amount of blood loss intraoperative (grams)				
Mean ±SD	298.1±88.7	249.3±99.6		
Range	(140-460)	(153-508)	0.9	0.04*
Median	270	214		
Return to normal feeding (days)				
Mean±SD	3.9±0.8	1.7±0.6		
Range	(3-5)	(1-3)		
Median	4	2	12.3	0.001**
Days needs for analgesia postoperative (days)				
Mean±SD	3.6±0.6	1.4±0.5		
Range	(3-5)	(1-2)		0.001**
Median	4	1	14.9	
Postoperative days relief of (SDB)				
Mean±SD	5.3±1.5	3.9±1.3		
Range	(3-8)	(2-6)	3.9	0.001**
Median	5	4		

Table (3): Comparison between studied groups regarding postoperative incidence of otalgia, fever and hemorrhage

Variable	Group I		Group II		test	P
	No (32)	%	No (32)	%	χ^2	
Postoperative otalgia:						
No	18	56.3	27	84.4	6.1	0.01*
Yes	14	43.8	5	15.6		
Postoperative fever:						
No fever	20	62.5	21	65.6		
One time	9	28.1	8	25.0	0.1	0.9
Two times	3	9.4	3	9.4		
Postoperative hemorrhage:	32	100.0	32	100.0	0.0	1
No	0.0	0.00	0.0	0.00		
Yes						

Table (4): Comparing otalgia 2 days, one week and two weeks postoperative between the studied groups

Postoperative otalgia:	2 days No= 32 (%)		One week No=32 (%)		Two week No=32 (%)		test χ^2	P
the extra-capsular tonsillectomy								
No	28	(87.5)	6	(18.8)	24	(75.0)	35.9	0.001*
Yes	4	(12.5)	26	(81.2)	8	(25.0)		
micro-debrider intra-capsulartonsillectomy	18	(58.3)	28	(87.5)				

Postoperative otalgia:	2 days No= 32 (%)	One week No=32 (%)	Two week No=32 (%)	test χ^2	P
No	14 (43.8)	4 (12.5)	32 (100.0)	21.3	0.001*
Yes			0.0 (0.0)		
P-value^	0.002*	0.001**	0.001**		

^ Chi for comparing the two groups.

Table (5): Comparing fever, pain and pain on swallowing 2 days, one week and two weeks postoperative between the studied groups;

Postoperative fever:	2 days No= 32 (%)	One week No=32 (%)	Two weeks No=32 (%)	test χ^2	P
The extra-capsular tonsillectomy					
No	13 (40.6)	17 (53.1)	21 (65.5)		0.1
Yes	19 (59.4)	15 (46.9)	11 (34.4)	4.1	
Micro-debrider intra-capsular tonsillectomy					
No	16 (50.0)	29 (90.6)	32 (100.0)	28	0.001*
Yes	16 (50.0)	3 (9.4)	0.0 (0.0)		
P-value^	0.03*	0.007*	0.001**		
Postoperative pain:					
The extra-capsular tonsillectomy					
No	0.0 (0.00)				81
Mild	21 (65.6)	10 (31.3)	32 (100.0)		
Moderate	11 (34.4)	22 (68.8)	1.0 (0.00)		
		0.0 (0.00)	0.0 (0.00)		
Micro-debrider intra-capsular tonsillectomy					
No	13 (40.6)	32 (100.0)	32 (100.0)		47
Mild	19 (59.4)	0.0 (0.0)	0.0 (0.00)		
P-value^	0.001**	0.004*	0.03*		
Postoperative pain on swallowing:					
The extra-capsular tonsillectomy	0.0 (0.00)	11 (34.4)			
No	32 (100.0)	21 (56.6)			
Yes			32 (100.0)		66.8
			0.0 (0.00)		
Micro-debrider intra-capsular tonsillectomy					
No	10 (31.2)	22 (86.8)	29 (90.6)		66.8
Yes	22 (68.8)	10 (31.2)	3 (9.4)		
P-value^	0.002*	0.004*	0.03*		

^ Chi for comparing the two groups.

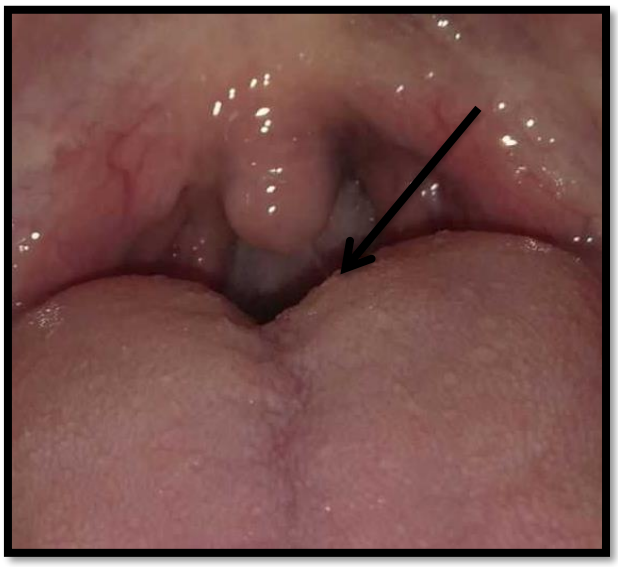

Figure (1): The tonsillar bed 3 months post (ECT)

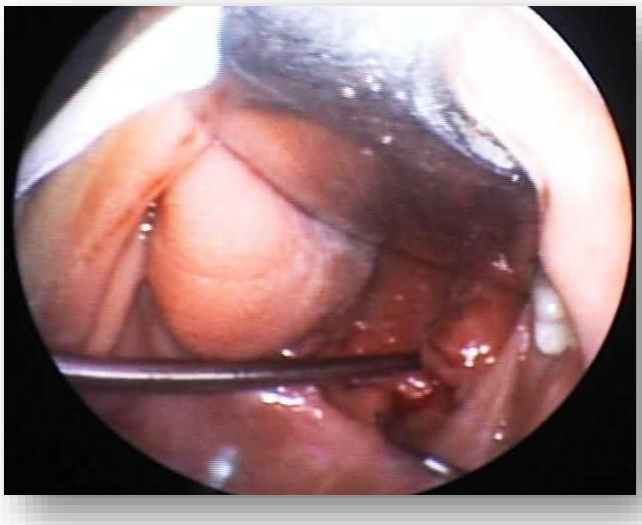

Figure (2): The start of debridement of the tonsillar tissue by microdebrider (a): mouth gag, (b): tongue, (c) microdebrider blade, (d): tonsil

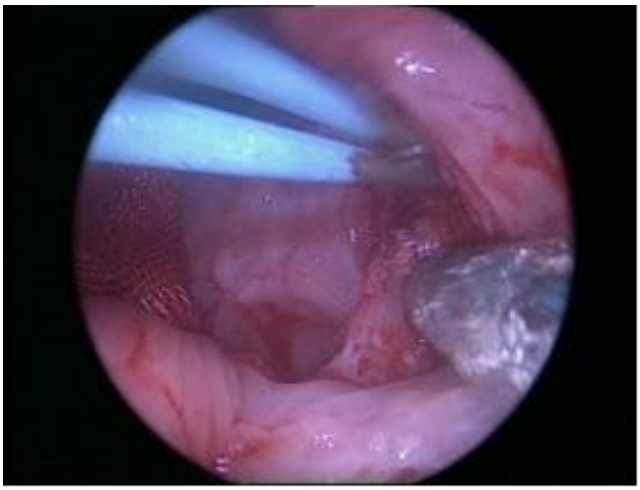

Figure (3): Hemostasis by bipolar

Figure (4): Tonsillar bed post Microdebrider intracapular tonsillectomy (MICT)

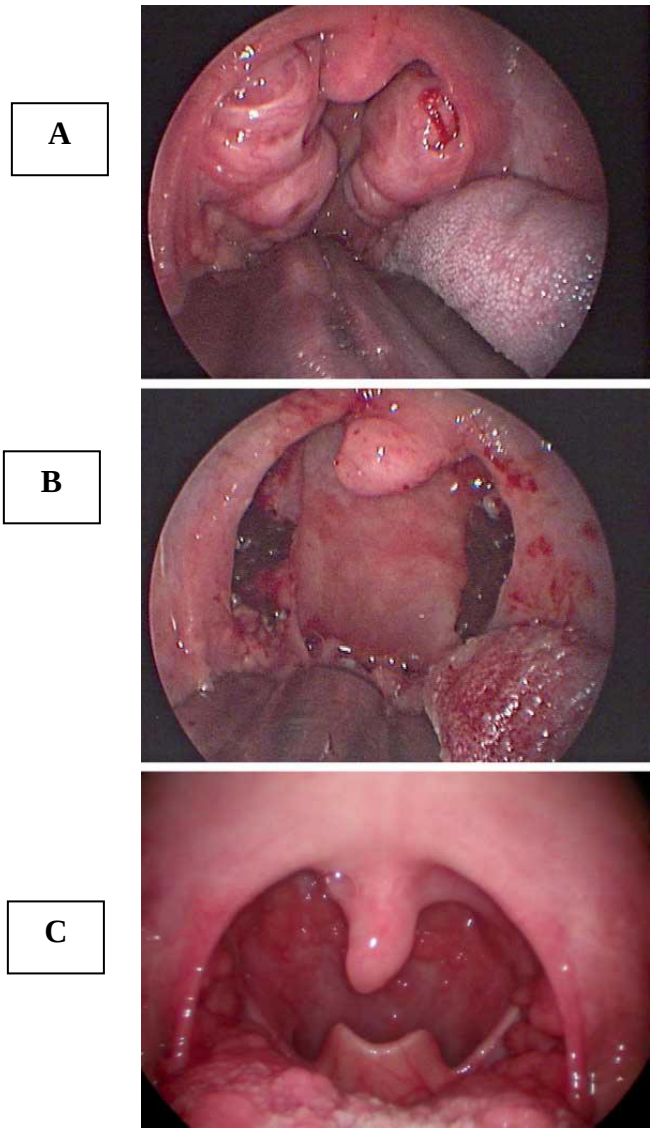

Figure (5): A, Intraoperative view of tonsillar hypertrophy. B, Intraoperative view immediately after intracapsular tonsillectomy. C, Three-week postoperative view through a 30° telescope (angled inferiorly) after intracapsular tonsillectomy. Note the well-preserved tonsillar pillars without visible scarring.

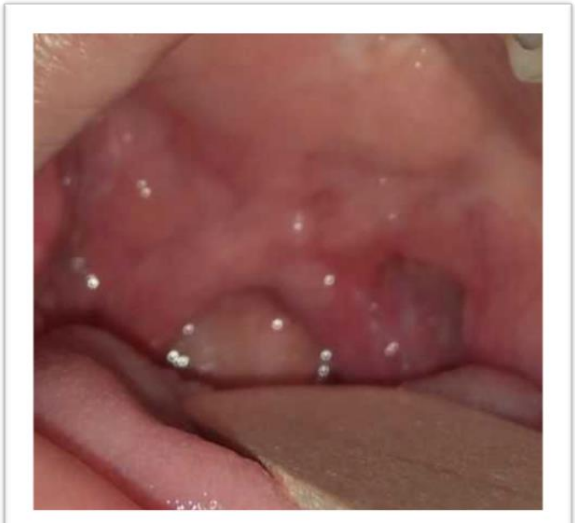

Fig (6): 3 months after Microdebrider intracapsular tonsillectomy (MICT)

DISCUSSION

Extracapsular tonsillectomy means total removal of the tonsillar tissue with the tonsillar capsule. Large vessels around the tonsillar capsule have to be ligated or electrocauterized when performing extracapsular tonsillectomy (ECT) [5].

MICT is a procedure in which the microdebrider shaves away most of the tonsil, leaving a small amount of tonsillar tissue around the tonsillar capsule. The tissue and tonsillar capsule remain as a‘ ‘biologic dressing,’’ which protects the pharyngeal muscles overlying the tonsillar fossa [6].The objective of this study was to compare the two tonsil surgery techniques, considering the short-term effects, including secondary postoperative bleeding, pain-free days, and operation time and quality of life , immune function , and the rate of sleep-disordered breathing (SDB) recurrence following (ICT) versus (ECT) over the longer term.

At our study the age of the extra-capsular tonsillectomy group was (6.9±3.3) ranged from (3 to 12) and (53.1%) were males and the that age of the microdebrider intra-capsular tonsillectomy group was (7.3±2.1) ranged from (4 to 10) and (62.5%) were males. There was no statistical significant difference between the two studied groups regarding the age and sex.

In our study there was statistically significant difference between the extra-capsular tonsillectomy and the microdebrider intra-capsular tonsillectomy groups in operative time ranged at the extracapsular tonsillectomy group from(30-40) minutes with mean value (33.9±3.7) and in intracapsular tonsillectomy group from (10-20) min with mean value(14.4±3.2).

The study results agree with another study compared between microdebrider tonsillectomy, Harmonic scalpel and extracapsular tonsillectomy found that harmonic scalpel tonsillectomy (27.3 ± 3.1 minutes) took longer than microdebrider tonsillectomy (20.3 ± 2.3 minutes) and extra capsular tonsillectomy (21.9 ± 2.8 minutes [7] and also agree with a study compared between electrocautry , coblator and (MICT) the results were the mean surgical time was 21.60 minutes for the electrocautry group, 20.20 minutes for the Coblator group, and 16.14 minutes for the microdebrider group [8]. In this study the amount of blood loss intraoperative in ECT is more than in the MICT agreeing with a study explained that the capsule of the tonsil acted as a protective sheet covering the deeper neurovascular structure, which has made intraoperative bleeding less than in the total tonsillectomy technique [9]. In our study days needed to return to normal feeding in ECT ranged between (3-5) days and in MICT ranged between (1-3) days .There was a statistical significant difference between the two studied groups regarding days to return to normal feeding agree with a study compared between MICT and ECT about return to normal diet it was found that return to normal diet took (5.28 vs. 8.16 days) respectively with statically significant difference between the two studied groups [7].

In our study Days needs for analgesia postoperative in ECT ranged between (3-5) days and in MICT ranged between (1-2) days so there was statistical significant difference between the two studied groups regarding days needs for analgesia, which in agreement with the study of Mixson et al. [7] who study compared microdebrider tonsillectomy(MICT) ,harmonic scalpel and extracapsular tonsillectomy (ECT) according to days needs for analgesia the results were the MICT group had a significantly shorter duration of pain medicine use (3.7 ± 0.5 days) than the ECT (7.0 ± 0.6 days) or harmonic scalpel (6.8

± 0.7 days. Another study showed that the children recorded less pain from the first day after (MICT)onwards , used fewer doses of painkillers and were pain-free 3 days earlier than the children in the (ECT)group [10].According to our study and the previous studies related to post-operative days return to normal diet and days to need analgesia it was found that (MICT) has less postoperative pain than (ECT) as the tissue and tonsillar capsule remain as a 'biologic dressing,'' which protects the pharyngeal muscles with nerves and blood vessels .In this study the both techniques (MICT) and (ECT) relief the symptoms of sleep disordered breathing (SDB) in about (2-6)days in (MICT) and (3-8) days in (ECT) which in agreement with a study proved that both (MICT) and (ECT)were equally effective in curing upper airway obstructive symptoms [11] and agree with another study proved that (MICT) and (ECT) have the same effect in relieving the upper airway obstructive symptoms [12].In this study there was no statistically significant difference. regarding postoperative hemorrhage in (MICT) or in (ECT) group at all the time of follow up after 2days ,one week and two weeks agree with a study on 41 children 3.5–8 years-old were included 21 (MICT)and 20 (ECT) no postoperative bleeding was seen in either group [13]. Another study Results in 150 children who underwent (MICT) were compared with those in 162 children who had standard tonsillectomy (ECT)there were no episodes of immediate postoperative bleeding occurred in either group. Six patients who had the (ECT) and one patient who had the intracapsular procedure(MICT) had delayed hemorrhage requiring hospital readmission [1]. In our study all patients at (ECT) group had post-operative (mild to moderate) pain at first 48 hours but in (MICT) group only 19 of 32 patients had mild pain with significantly difference between the two groups and the pain started to be subside after one to two weeks agree with a study was carried out in Al-Hilla General Teaching Hospital during the period from March 2017 to July 2018. This study included 40 patients between the age of 4–38 years, requiring tonsillectomy for variable indications. Cold steel dissection tonsillectomy on the right tonsils was compared to microdebriderintracapsular tonsillectomy on left tonsil. On postoperative days one to 10, patients notes significantly a whole lot much less pain on the microdebrider intracapsular tonsillectomy side in comparison with the Cold steel dissection tonsillectomy side. By postoperative days 11^{th} to 14^{th}, the distinction among aspects disappeared[14].

In our study there was statistically significant difference between the extra-capsular tonsillectomy and the microdebrider intra-capsular tonsillectomy groups in postoperative otalgia (with higher occurrence in the extra-capsular tonsillectomy than and the microdebrider intra-capsular tonsillectomy group 43.8% VS 15.6% respectively) agree with a study of Pynnonen et al. [14] which included 40 patients between the age of 4–38 years, requiring tonsillectomy for variable indications. Cold steel dissection tonsillectomy on the right tonsils was compared to microdebriderintracapsular tonsillectomy on left tonsil .Twenty-eight patients (70%) mentioned otalgia, and it became always unilateral. For those patients mentioned otalgia, there has been a 100% correlation among the aspect of otalgia and the aspect of Cold steel dissection tonsillectomy. this can be explained as(MICT) leaves a biological membrane above the pharyngeal muscles decreasing the pharyngeal discomfort and otalgia.

At this study otalgia is less in (ICT) than in (ECT) representing about (15.6%vs 43%) respectively this can be explained as(ICT) leaves a biological membrane above the pharyngeal muscles decreasing the pharyngeal discomfort and otalgia.

Osman et al. [15] concluded that Microdebrider intracapsular tonsillectomy is a safe and effective procedure in treating children with chronic tonsillitis and sleep apnea in their study on thirty children with chronic tonsillitis, snoring and sleep apnea due to tonsillar hypertrophy in the Department of Otorhinolaryngology, Faculty of Medicine, Assiut University.

Limitation : The limitation of this study that the sample size was small and the follow up time was considered relatively short period that was not sufficient to compare the procedure efficiently and to evaluate at all the residual tonsil amount or the regrowth or the re infection, fibrosis, the remnant and recurrence of symptoms, A larger group of patients should be studied for a longer period of time to confirm the effects observed in this study

CONCLUSION

Microdebrider intracapsular tonsillectomy (MICT) is a safe and effective technique of tonsillectomy for children tonsillitis and sleep apnea as it effectively reduce the operative time, less postoperative pain and rapid return to normal diet apart of high intraoperative blood loss .

Conflict of Interest: None.

Financial disclosure: None.

REFERENCES

1- Koltai PJ, Solares CA, Koempel JA, Hirose K, Abelson TI, Krakovitz PR et al. Intracapsular Tonsillar Reduction (Partial Tonsillectomy): Reviving A Historical Procedure For Obstructive Sleep Disordered Breathing In Children. Otolaryngol Head Neck Surg. 2003; 129 (5): 532-538.

2- Timms M, Temple R. Coblation Tonsillectomy: A Double Blind Randomized Controlled Study. J Laryngol Otol. 2002; 116 (6): 450-452.

3- Zhang Q, Li D, Wang H. Long term outcome of tonsillar regrowth after partial tonsillectomy in children with obstructive sleep apnea. Auris, nasus, larynx. 2014; 41(3):299–302

4- Gabr SI, Harhash KA, El Fouly MS, Kamel AA, Eldwebes MM. Microdebrider intracapsular tonsillotomy versus conventional extracapsular tonsillectomy. Egypt J of Otolaryng (2014); 30(3): 220

5- Cohen MS, Getz AE, Isaacson G, Gaughan J, Szeremeta W. Intracapsular Vs. Extracapsular Tonsillectomy: A Comparison Of Pain. Laryngoscope 2007; 117 (10): 1855-1858.

6- Derkay CS, Darrow DH, Welch C, Sinacori JT. Tonsillectomy Morbidity And Quality Of Life In Pediatric Patients With Obstructive Tonsils And Adenoid: Microdebrider Vs Electrocautery. Otolaryngol Head Neck Surg. 2006; 134 (1): 114-120.

7- Mixson CM, Weinberger PM, Austin MB. Comparison Of Microdebrider Subcapsular Tonsillectomy To Harmonic Scalpel And Electrocautery Total Tonsillectomy. Am J Otolaryngol. 2007; 28 (1): 13-17.

8- Wilson YL, Merer DM, Moscatello AL. Comparison Of Three Common Tonsillectomy Techniques: A Prospective Randomized, Double Blinded Clinical Study. Laryngoscope 2009; 119: 162-170.

9- Sorin A, Bent JP, April MM, Ward RF**.** Complications Of Microdebrider-Assisted Powered Intracapsular Tonsillectomy And Adenoidectomy. Laryngoscope 2004; 114: 297-300.

10- Ericsson E, Lundeborg I, Hultcrantz E. Child Behavior And Quality Of Life Before And After Tonsillotomy Versus Tonsillectomy. Int J Pediatr Otorhinolaryngol.2009; 73 (9): 1254-1262.

11- Vicini C, Eesa M, Hendawy E, Pari M, D'agostino G, Alghamdi S. Powered Intracapsular Tonsillotomy Vs. Conventional Extracapsular Tonsillectomy For Pediatric Osa: A Retrospective Study About Efficacy, Complications And Quality Of Life. Int J Pediatr Otorhinolaryngol 2015; 79: 1106-1110.

12- Cantarella G, Viglione S, Forti S, Minetti A, Pignataro L. Comparing Postoperative Quality Of Life In Children After Microdebrider Intracapsular Tonsillotomy And Tonsillectomy. Auris Nasus Larynx. 2012; 39 (4): 407-10.

13- Hultcrantz E, Linder A, Markström A. Tonsillectomy Or Tonsillotomy?—A Randomized Study Comparing Postoperative Pain And Long-Term Effects. Int J Pediatr Otorhinolaryngol. 1999; 51 (3): 171-176.

14- Pynnonen M, Brinkmeier JV, Thorne MC, Chong LY, Burton MJ. Coblation versus other surgical techniques for tonsillectomy. Cochrane Database Syst Rev 2017; 2017(8): CD004619.

15- Osman M, Tony MF, El-Hakim A, Ali R. Microdebrider Intracapsular Tonsillectomy and Traditional Extracapsular Dissection Tonsillectomy in Children: A Comparative Study. Egypt J Neck Surg Otorhinol (EJNSO) 2019; 5(2): 1-8.

To Cite:

Aboushab,Y., Sorour, S., Nasr, W., Elsedik, H. Microdebrider Intracapsular Tonsillectomy Versus Extra Capsular Tonsillectomy In Children At Zagazig University Hospitals. *Zagazig University Medical Journal*, 2023; (134-143): -.doi: 10.21608/zumj.2020.24152.1743.