



Original article

**Comparative study Between intracapsular microdebrider tonsillectomy and extracapsular conventional surgical tonsillectomy**

**Mohamed Sherif Ahmed Abd Elmonem<sup>a</sup>, Ashraf Mahmoud Khaled<sup>b</sup>, Mostafa Mohamed Hashim<sup>c</sup>, and Rabie Sayed Youssef<sup>d</sup>**

<sup>a</sup> Assistant professor of Otorhinolaryngology, Faculty of medicine-Beni-Suef University

<sup>b</sup> Professor of Otorhinolaryngology, Faculty of medicine – Beni-Suef University

<sup>c</sup> (MB.B.Ch) Police Academy Hospital

<sup>d</sup> Lecturer of Otorhinolaryngology, Faculty of medicine - Beni-Suef University

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**Corresponding Author:**

Rabie Sayed Youssef

rabea.gaber@med.bsu.edu.eg

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**Abstract**

**Aim and objectives:** Evaluation of the efficacy of intracapsular microdebrider tonsillectomy in comparison to extracapsular conventional surgical tonsillectomy regarding timing, postoperative pain, amount of blood loss, tonsillar fossa healing and complications. **Methods:** Controlled, prospective, and comparative study was done on 25 patients (14 female and 11 male) aged from 4-12 years old. Those patients received intracapsular microdebrider tonsillectomy on the left side and conventional extracapsular surgical tonsillectomy on the right side. **Results:** Intracapsular microdebrider tonsillectomy had a significant less pain post tonsillectomy, there was a great

sides. On our study we did the two techniques on the same person, and this helped us to know the difference between the two techniques in pain on the same body mass index, while we found that no statistically difference between the two techniques in timing, volume of blood loss during operation, wound healing, and complications **Conclusions:** Intracapsular microdebrider tonsillectomy was comfortable, safe, and effective procedure, we motivate other surgeons to add to our experience with microdebrider intracapsular tonsillectomy.

difference between the two

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## **1. Introduction:**

The most common operation done for children is tonsillectomy. In 2006, it was reported that more than 500,000 operations were done in America on children younger than fifteen years. 25% of those are between five to seven years but the highest peak appear in the six years of life [1]. Tonsillectomy has received a great of interest for several years, with different grades of publicity over the last decades. Tonsillectomy can be done by dissection method so-called extracapsular tonsillectomy. Significant pain and frequent bleeding that were considered as postoperative problems of this technique led to a recent technique called ‘intra capsular tonsillectomy’ so as to decrease these drawbacks [2].

In the last twenty years, to reduce morbidity and accelerate recovery time, there was a great interest and work for renewing surgical instruments for tonsillectomy ranging from “cold steel” tonsillectomy, electrocautery techniques, harmonic scalpel Coblation, bipolar scissors, plasma knife, CO2 laser and microdebrider intracapsular tonsillectomy (MIT) [3].

Total tonsillectomy was known in the early 20th century in America. Total tonsillectomy was effective and the procedure of choice for tonsillectomy. Owing to the increasing of morbidity rate and complications ranging from post-tonsillectomy bleeding, dehydration, hospital stay for observation, control of pain, and rehydration, up to return to the operating theater to control postoperative hemorrhage, so intracapsular tonsillotomy was developed

[4]. Using microdebrider had started in rhinology for sinus operation in 1997; [6] showed that use of microdebrider in adenoidectomy. Two papers appeared in 2002 and 2003 that show advantages of using microdebrider in removing tonsillar substances in patients with obstructive sleep apnea. The main importance for this operation is keeping the capsule of the tonsil with the adjacent muscles and its nerves and vasculature. Microdebrider is used to get rid of up to 99% of the tonsillar substances in a controlled process with preservation of the capsule and its two pillars [5]. Preservation of the capsule of the tonsil save the adjacent muscles from injury intraoperatively and from postoperative secondary infection, and so we can reduce the pain related to muscular inflammation [6].

## **2. Patients and Methods:**

It was a prospective study that was done in our university hospital by the same otorhinolaryngologist on 25 patients who were indicated for tonsillectomy, Informed consent was taken from all parents after obtaining ethical approval from the local institutional review board (IRB).

### **2.1 Inclusion criteria:**

1. Patients aged between 3 and 25 years.
2. Recurrent and/or chronic tonsillitis will be included.
3. Patients with tonsillar hypertrophy that have symptoms of obstructive sleep troubles such as persistent snoring associated with apnea or not.

### **2.2 Exclusion criteria:**

1. Patients aged below 3 and above 25 years.
2. Patients who have acute peritonsillar abscess or tumors.
3. Patients with craniofacial abnormality or Down's syndrome or rheumatoid arthritis.
4. Patients with bleeding tendency or who administer anticoagulants.
5. Patients with immune deficiency.
6. Pregnancy.

### **2.3 Preoperative assessment:**

1. Full history was taken.
2. Complete Otorhinolaryngeal examination.
3. Routine laboratory investigations including coagulation profile, ESR, complete blood picture, blood glucose level, renal and liver profile.

### **2.4 Surgical technique:**

After general anesthesia was achieved, putting the patient in the Rose position, then mouth was opened by a Boyle-Davis gag and suspended by Draffin pods. If adenoidectomy was indicated, it was performed before tonsillectomy by using adenoidectomy curette.

- **Left tonsil**

The STORZ microdebrider was used with a straight blade for intracapsular tonsillectomy. We started with the left one and the shaver set at three thousand revolutions per minute in oscillating mode. The shaver was used to remove the tonsillar tissues, going from the lower to the upper pole; Dissection was done from a medial surface to the lateral limit till the plane of the pillars was achieved. At this point we use A Hurd elevator to stabilize and control the anterior pillar to medialize the tonsillar

tissues and increase tissue removal and minimize mucosal injury and the dissection become easier. Dissection was done away from the capsule of the tonsil. Take care and avoid uvular injury. After completion of dissection, hemostasis was done using bipolar cauterization of the points of bleeding.

- **Right tonsil**

Conventional extracapsular tonsillectomy was done for the right tonsil. The anterior pillar was opened using sickle dissector at the upper pole. Identify the peritonsillar plane and the tonsillar tissues was dissected down to the lower pole which was clamped and ligated using a silk thread and the tonsil was cut with scissors. Hemostasis was done by using silk suturing of posterior pillar with tonsillar bed and anterior pillar in upper pole and lower pole and between them Figure (1).



**Figure (1):** Right tonsillar bed after hemostasis using silk sutures and the left fossa using bipolar.

#### **Post-operative care and follow up:**

Patients were kept at the hospital for one day, and then discharged home. Continuous follow up and postoperative instructions told for the parents before discharge. Post-operative visits were done at the outpatient clinic after one week, two weeks, three weeks, and six months. All children take paracetamol for one week after surgery and was used every 8 hours, administered orally. All patients received antibiotics for one week postoperatively (Amoxicillin, Clavulanic acid) administered orally.

#### **2.6 Assessment Parameters:**

A- Operative time: -It was measured in minutes.

#### **- Left tonsil:**

We estimated operative time of left tonsil from the beginning of applying the microdebrider to left tonsil till the end of hemostasis by bipolar.

#### **- Right tonsil:**

We estimated the operative time from the beginning of applying the scissor to the right tonsil till the end of hemostasis by silk sutures.

#### **B- Intraoperative blood loss:**

loss of blood intraoperatively was measured as the total volume of blood in ml in the suction jar after subtracting the amount of blood loss from adenoidectomy. We didn't

use any cotton or gauze in tonsillectomy or hemostasis on both tonsils.

**- Left tonsil:**

We estimated blood of left tonsil as total amount of blood loss in ml in the suction canister from the beginning of applying microdebrider blade to the left tonsil till the end of hemostasis by bipolar after left tonsillectomy.

**- Right tonsil:**

We estimated blood loss of right tonsil as total amount of blood loss in ml in the suction canister from the beginning of applying the sickle dissector to right tonsil till the end of hemostasis by applying silk sutures after right tonsillectomy. The amount of blood lost from adenoidectomy

and left tonsillectomy was subtracted from the measured tonsillectomy blood lost.

**C- Postoperative pain:**

Pain postoperatively was assessed using Wong-Baker Faces Pain Rating Scale Figure (2). a result of ten is “maximal pain”, A result of zero means “no Pain”. Post operative pain was noticed after 2 hours postoperative before eating. We asked patient and his relative which side of the pharynx hurts a lot and asked them to choose which face of the chart resembles each side. There was a great difference between the two sides. On our study we did the two techniques on the same person, and this helped us to know the difference between the two techniques in pain on the same body mass index.

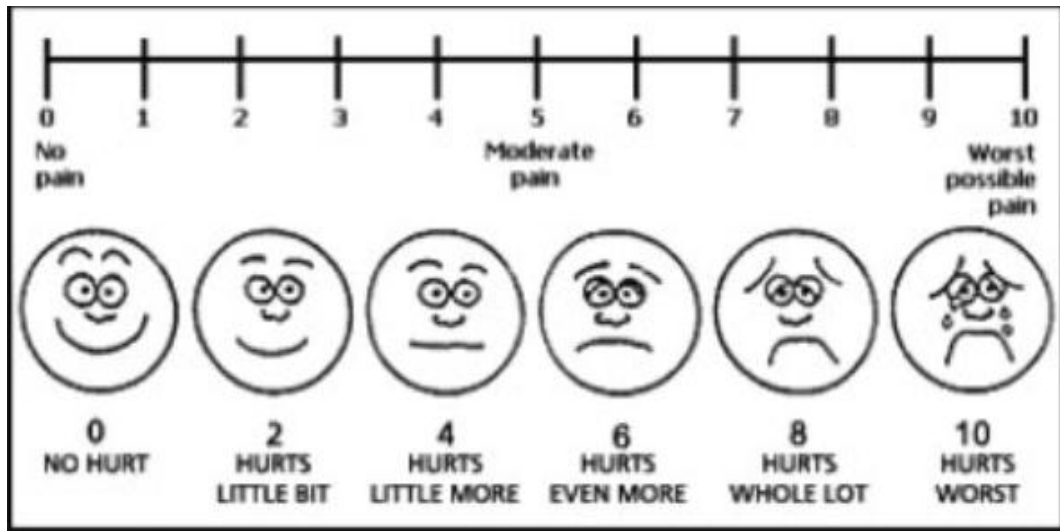


Figure (2): Face Pain Scale (Wong et al., 1988).

## II- Wound healing:

This was noticed during the follow-up after one week, two weeks, three weeks and one month postoperative. A description of the tonsillar bed was documented, including the whitish membrane formation and the areas that had completely lined by normal pink mucosa. The percentage of normal mucosal creep as compared to the whole bed was documented and used as a representative of wound healing.

## III- Complications:

Post tonsillectomy haemorrhage, inflammation and regrowth were recorded

### 2.7 Statistical methodology:

The following data analysis was carried out using an IBM computer using SPSS, a statistical tool for social science. - The mean, SD, and range of quantitative values.

Paired Wilcoxon Signed Ranks Test used in comparison of quantitative variables

- Description of qualitative variables as number and percentage.

$P < 0.05$  is considered significant.  $P$  value  $< 0.001$  was highly significant.

## 3. Results:

The operative data assessed includes age, time of operation, and intraoperative loss of blood. The postoperative complaints assessed involve pain postoperatively, healing of wound, and complications.

### I- Demographic data:

Out of the 25 patients there were 11males (44%) and 14 females (56%) their age from 4 to 12 years with 7.6 years is the mean age **Table (1), (2).**

Age	N	Mean	SD	Minimum	Median	Maximum
Year	25	7.6	2.5	4	7	12

**Table (1):** Description of research subjects' age.

Gender	N	%
Male	11	44.0
Female	14	56.0
Total	25	100.0

**Table (2):** Gender allocation of research subjects.

## II- Operative time:

The mean of the operative time was 12.2 minutes in the right conventional extracapsular surgical tonsillectomy (CECST) as compared to 11.2 minutes to the left microdebrider intracapsular tonsillectomy (MDICT) **Table (3).**

Time (min)	Number	Mean	SD	Minimum	Median	Maximum	P value
CECST	25	12.2	2.3	6	12	15	0.168
MDICT	25	11.2	3.0	7	10	18	

**Table (3):** Comparison between both groups regarding time of operation.

## III- Intraoperative blood loss:

The mean amount for blood loss in right CECST was 68 cc, as compared to 66 cc in left MDICT

**Table (4).**

Blood Loss (ml)	N	Mean	SD	Minimum	Median	Maximum	P value
CECST	25	68.0	33.5	25	50	150	0.974
MDICT	25	66.0	42.0	25	50	200	

**Table (4):** Comparison between both groups regarding blood loss.



**IV- Postoperative pain:**

The mean score of Faces Pain Scale for the right CECST after two hours post tonsillectomy was 6.5 while the mean Face Pain Scale score for left MDICT after two hours post tonsillectomy was 4.2 Table (5).

2-hrs post-operative pain (Face Pain Scale)	N	Mean	SD	Minimum	Median	Maximum	P value
CECST	25	6.5	1.9	2	8	8	< 0.001*
MDICT	25	4.2	1.9	0	4	6	

**Table (5):** Comparison between both groups regarding 2-hrs post-operative pain.

*P value < 0.001 "Highly Significant".*

**V- Wound healing:**

We found no differences in wound healing between the two sides. Both on the seventh postoperative day, or after two weeks and after three weeks.

**VI- Complications:**

No intra or post operative complications as post tonsillectomy bleeding (reactionary or secondary) or tonsillar regrowth were encountered on both sides in all cases.

**4. Discussion:**

The current study was designed to compare the commonly used conventional dissection extracapsular complete

tonsillectomy and the microdebrider intracapsular partial tonsillectomy. We compared most surgical aspects such as operative time, blood loss during surgery, post tonsillectomy pain, wound healing post tonsillectomy and any complications as post tonsillectomy bleeding.

By presenting our results and comparing it with those reported in literature, we intend to enlighten the exact features of this technique. [8]; [9] compared microdebrider and conventional tonsillectomy and they reported no difference statistically in the timing of operation. However, the two-paper used bipolar diathermy for cold tonsillectomy.

[10]; [11] was comparing various methods for tonsillectomy they proved that microdebrider partial tonsillectomy had significant shorter time compared to other techniques. In our study, we estimated operative time of left tonsil from the beginning of applying the microdebrider to left tonsil till the end of hemostasis by bipolar while the right tonsil's operative time estimated from the beginning of applying the sickle dissector to right tonsil till the end of hemostasis by silk sutures. We found no significant difference between the operative times of the two methods. The mean result for the time in MDICT was 11.2 minutes while in CECST was 12.2 minutes.

Regarding blood loss during surgery [12]; [10]; [9] showed excessive blood loss when using the microdebrider. While [13]; [8] proved that there was no statistically significant difference in loss of blood between the two techniques. In our study, we found no significant difference between the two methods. The mean amount for the blood loss in left MDICT was 66.0 cc while it was 68.0 cc in right CECST.

[14] found that MDICT results were less pain postoperatively compared with bipolar or monopolar extracapsular tonsillectomy in a paired, randomized, double-blinded, control study on 25 children

aged 5-15 years.

[8]; [9] compared MDICT to total tonsillectomy using electrocautery and found that children who had done MDICT felt significant less pain postoperatively both statistically and clinically. [15] in their prospective clinical trial to assess variation in pain postoperatively in children had intracapsular tonsillectomy versus extracapsular tonsillectomy using bipolar scissors in either an intracapsular or extracapsular methods found that intracapsular tonsillectomy had a less pain than extracapsular tonsillectomy and both was with the bipolar scissors.

[16] found that MDICT had significantly less pain postoperative than extracapsular tonsillectomy. Almost of the researchers found that microdebrider intracapsular tonsillectomy had less post-operative pain than extracapsular tonsillectomy but [12] saw that there was no difference in post operative pain from the monopolar electrocautery tonsillectomy. In our study, There was a highly significant difference in post-operative pain between the two techniques. MDICT showed less pain post operatively than CECST. The mean Faces Pain Scale score for left MDICT was 4.2 while the mean Face Pain Scale score for right CECST was 6.5.

In our study, we measured wound

healing by the percentage of normal mucosal tissues covering the tonsillar bed on the seventh day, two weeks, three weeks and one month postoperatively. We found no significant difference between MDICT and CECST.

Complication of any surgery is one of the most issues that be considered to favor one technique over the other techniques. Post-operative bleeding and regrowth of tonsillar tissue are the most undesirable complications of tonsillectomy. Reviewing the literature many studies talked about the incidence of post-operative hemorrhage by using microdebrider. [5] on their series of 278 patients that underwent MDICT Self-limited bleeding was established in only two patients (0.7%). [4] found that the incidence of secondary bleeding in intracapsular tonsillectomy is significantly lower than that associated with the CECST. [17] found that the incidence of post tonsillectomy hemorrhage was nearly 3 times higher in the total tonsillectomy group (3.1%) compared with (1.1%) in the partial tonsillectomy. [16] found that microdebrider intracapsular tonsillectomy have less postoperative bleeding than extracapsular tonsillectomy. On the other hand, [13]; [8]; [9] and [11] found no significant difference in postoperative bleeding in both methods.

One of the major concerns after

partial tonsillectomy is the risk of tonsillar regrowth and recurrence of infection at the residual tonsillar tissues. Reviewing the literature, many studies talked about the incidence of regrowth after partial removal of the tonsil. [5] on their study of 278 patients, tonsil regrowth with snoring occurred in nine patients (3.2%). [4] in their series over 870 children that had MDICT at three different medical centers found that regrowth rate was only 0.46% showing very low incidence of tonsillar regrowth.

[17] in their study over 166 patients comparing intracapsular tonsillectomy (IT) and traditional extracapsular tonsillectomy (TT) in treating postoperative recurrent Aden tonsillitis or recurrent pharyngitis. 117 patients of them were done (TT) and 49 received (IT). 17 (TT) patients and 8 (IT) patients were treated at least once postoperatively for recurrent pharyngitis or tonsillitis. there was no statistically significant difference between the IT and TT groups in postoperative infection rates.

[18] in their retrospective analysis of 636 pediatric patients underwent MDICT only a set of 33 (5.1%) patients who had clinical evidence of regrowth out of the group that show regrowth, 5 (0.7%) patients compliant with recurrent upper airway obstruction and then had a complete tonsillectomy. On the other hand, other

researchers found no statistical difference. [13] in their study over 243 were done partial tonsillectomy and 107 children were done total tonsillectomy, there were no significant differences in immediate or delayed complications between the two groups. [9] studied 143 patients and found that no recurrent symptoms were noticed among MDICT group after nearly two years follow-up. [19] in their retrospective study to assess the residual of the tonsillar tissues 10–14 years post-tonsillotomy found that no significant statistically difference was found between the total tonsillectomy and partial tonsillectomy groups.

In our study, there was no postoperative hemorrhage nor regrowth or recurrence of symptoms or any other complications in any case till six months follow up in either left MDICT sides or right CECST sides.

### **5. Conclusion:**

Our data and statistical analysis showed that MDICT was a safe, and effective procedure for tonsillectomy with less postoperative pain than CECST. We motivate other surgeons to add to our experience with microdebrider intracapsular tonsillectomy.

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