

A comparative study of coblation versus conventional tonsillectomy.

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Abstract

Objective: To compare the efficacy of coblation and conventional tonsillectomy in the same patient. To compare morbidity and complications associated with these procedures by each method in the same patient.

Materials and Methods: 50 patients aged 3 to 30 years with chronic tonsillitis who underwent tonsillectomy surgery from march 2016 to march 2017 in Coimbatore medical College and Government hospital were included in the study, after obtaining the ethical committee clearance.. Chronic tonsillitis patients with adenoid hypertrophy and serous otitis media were excluded by diagnostic nasal endoscopy, imaging and impedance audiogram. Chronic tonsillitis patients identified as candidates for tonsillectomy were selected randomly and one tonsil was removed using coblation and the other by conventional dissection method. In this study, half of the patients had their right tonsil removed by coblation and the left tonsil by conventional dissection method. The other half of the patients had the left tonsil removed by coblation and the right by conventional dissection method. All patients were examined regularly after surgery on first, second and seventh post operative days to assess the post operative morbidity and efficacy of both conventional and coblation methods.

Results: The duration of surgery in coblation was compared with conventional method. It was 11.8 minutes in conventional and 16.4 minutes in coblation. The intraoperative blood loss was compared in both methods. In coblation method it was 18.74 ml and in conventional it was 43.44ml so obviously 20-25 ml of intraoperative blood loss was minimized in coblation method. The post operative pain was measured using VAS scale was compared in both methods on 1st, 2nd and 7th post operative days. For coblation the mean post operative pain scores was 3.92, 3.64 and 2.74 respectively whereas in conventional method it was 7.42, 6.20 and 3.52. so about 60-70% patients had lesser pain in coblation side compared to the conventional side. The post operative tonsillar fossa healing was estimated by the amount of slough covered in the tonsillar fossa and it was compared on 1st, 2nd and 7th post operative days. In coblation side mean area of slough covered was 80%, 74% and 4.5% and on conventional side it was 40%, 47% and 18%. So slough formation is more in coblation side compared to conventional side so the healing was delayed.

Conclusion: Coblation tonsillectomy is relatively easy technique to perform providing a near bloodless field and minimal surrounding tissue damage. The operative time required to perform coblation tonsillectomy was more than the conventional technique. The longer time did not cause more intraoperative blood loss and post operative pain. The intraoperative blood loss was significantly less on coblation side than on the dissection side. Most importantly, postoperative pain scores were significantly lower on the coblation side on the first, second and seventh post operative days. It helped the patients to resume their normal activities early. Healing was slightly delayed on the coblation side.

Keywords: Coblation, VAS Scale, tonsillectomy, tonsillar fossa, conventional technique

I. Introduction

Tonsillectomy, despite less performed surgery nowadays, still is a very common surgical procedure. There are various modalities to perform surgery (diathermy, laser, cryosurgery and coblation). Among these, dissection and snare method is commonly done by ENT surgeons. Other modalities are not used regularly considering the cost of the equipment. With the arrival of coblator, results of coblation tonsillectomy has been encouraging from many studies. Unlike most operative procedures, which are closed primarily, tonsillectomy produces an open wound that heals by secondary intention. The major postoperative morbidity problems are pain and hemorrhage. The pain is the result of disruption of mucosa and glossopharyngeal nerve fibre irritation followed by inflammation and spasm of the pharyngeal muscles that leads to ischemia and protracted cycle of pain; it does not completely subside until the muscle becomes covered by mucosa 14-21 days after surgery. The postoperative secondary hemorrhage is due to secondary infection of the tonsillar fossa resulting in disruption of vessels and bleeding.

The various methods for tonsillectomy are dissection, guillotine, cryosurgery, monopolar and bipolar diathermy dissection, suction diathermy dissection, bipolar scissor dissection, ultrasonicremoval, radiofrequency surgery and laser surgery.

Therefore any novel technique introduced should have the following advantages of

- 1) Decrease in the operating time,
- 2) Reduction in the intraoperative and postoperative blood loss,
- 3) Reduction in postoperative morbidity.

Coblation is a new technique that was started in 1997 and involves passing a radiofrequency bipolar electric current through a medium of normal saline, resulting in a plasma field of highly ionized particles, which in turn break down intercellular bonds and thus melt tissue at around 70C (in comparison with electrocautery which cuts tissue at 400C) there are two different techniques for coblation tonsillectomy

- 1) Subtotal , intracapsular ablation, in this technique some tonsil tissue may be left behind,
- 2) Total, subcapsular dissection of tonsils, in which the entire tonsil is removed by dissecting between the tonsillar capsule and the surrounding pharyngeal muscle. In concordance with other studies which state that subtotal tonsillectomy not be the best technique to use in chronic tonsillitis because tonsillar tissue is left behind and can result in recurrent infections. The subcapsular technique was adopted in this study to evaluate and compare the efficacy of coblation and conventional technique. Both the methods were carried out in a single patient so that the individual patient factors were nullified and each patient becomes their own control.

II. Materials And Methods

50 patients aged 3 to 30 years with chronic tonsillitis who underwent tonsillectomy surgery from march 2016 to march 2017 in Coimbatore medical College and Government hospital were included in the study, after obtaining the ethical committee clearance.

Inclusion criteria

Chronic tonsillitis patients above the age of 3 years.

Exclusion criteria

1. Assymetrical and unilateral enlarged tonsil
2. Children with chronic tonsillitis
3. Patients below the age of 3 years
4. 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 the study were examined and investigated by the following methods.

1. Clinical examination
2. Pure tone audiometry (in selective cases for exclusion criteria)
3. Impedence audiometry (in selective cases for exclusion criteria)
4. X ray skull soft tissue lateral view (in selective cases for exclusion criteria)
5. Diagnostic nasal endoscopy (in selective cases for exclusion criteria)
6. Routine blood investigations (complete blood count, renal function tests)
7. Chest X-ray, ECG

All patients who were planned for tonsillectomy were assessed for general anaesthesia. After complete work up, patients were randomly selected to have one tonsil removed using coblation and the other using conventional dissection and snare method. Through this study, half of the patients had their right tonsil removed with coblation and left tonsil by dissection. The other half of the patients had their left tonsil removed with coblation and right tonsil by dissection. Thus, patients became their own controls in terms of postoperative pain, wound healing and bleeding. Coblation surgeries was done by Evac 70 coblation wands using 6 or 7 setting. Time needed to perform surgery on each side, blood loss during surgery, post operative pain , post operative hemorrhage and extent of wound healing after surgery were recorded. Time taken from incision to attaining hemostasis was taken as duration of surgery. Intraoperative blood loss was measured by using separate collecting chambers for each method. In coblation method blood loss was calculated after deducting the amount of saline used from total collection.

Postoperative pain was assessed on first, second and seventh postoperative day. The pain was assessed using visual analog scale (0-10) which consists of a line usually 10 cm long. The ends are labeled as the extremes (‘no pain’ and ‘pain as bad as it could be’) and the rest of the line is blank. The patient is asked to put a mark on the line indicating their pain intensity. The distance between that mark and the origin is measured to obtain the patient’s score. Patients were enquired about the side of their maximum pain on first, second and seventh postoperative day. Even if the difference was very small, the patients were asked to choose the less painful side. The area of slough in each tonsillar fossa was assessed by direct visual examination. The extent of healing within the tonsillar fossa is estimated by recording the percentage of the fossa that had remucosalized. The episodes of postoperative bleeding from the tonsillar fossa were documented including the side and day on which it occurred and the interventions required to stop it.

III. Results

This study comprising of 50 patients was conducted in the department of otorhinolaryngology, Coimbatore medical college hospital. Chronic tonsillitis patients with adenoid hypertrophy and serous otitis media were excluded by diagnostic nasal endoscopy, imaging and impedance audiogram. Chronic tonsillitis patients identified as candidates for tonsillectomy were selected randomly and one tonsil was removed using coblation and the other by conventional dissection method. In this study, half of the patients had their right tonsil removed by coblation and the left tonsil by conventional dissection method. The other half of the patients had the left tonsil removed by coblation and the right by conventional dissection method. All patients were examined regularly after surgery on first, second and seventh post operative days to assess the post operative morbidity and efficacy of both conventional and coblation methods. Out of 50 patients, 4 patients who did not come for follow up were excluded from the study. The rest of the patients, 46 in number, were regularly followed up, the results were compared and analysed using chi square testing

Table no 1. Comparison of duration of surgery in minutes

Surgery	Coblation	Conventional	T Value	P Value
Duration (Min)	16.4	11.8	9.286	>0.05

The mean duration is measured from giving incision over the tonsil upto achieving complete hemostasis. For coblation the mean duration was 16 minutes and 4 seconds and for conventional tonsillectomy mean duration was 11 minutes and 8 seconds thus it took an average of 4 minutes and 6 seconds to perform coblation procedure compared to conventional technique and this difference is no statistical significance T value is 9.286 (p value >0.05)

Table no 2. Comparison of intraoperative blood loss in milli litres

Surgery	Coblation	Conventional	T Value	P Value
Iop Blood Loss MI	18.74	43.44	-14.247	0.001

The amount of blood lost approximately in coblation method is 19ml and the amount lost in conventional is 43ml. The difference was (t value -14.247 p value (0.001)) statistically significant.

Table no 3. Comparison of post operative pain on first, second and seventh Post Operative Days

Postoperative Day Pain Scale	Coblation	Conventional	T Value	P Value
1 st Pod	4	8	-16.528	0.001
2 nd Pod	4	6	-14.392	0.001
7 th Pod	3	4	-3.11	0.002

Sixty to seventy percent of patients said that the side they underwent coblation was less painful overall than the other side on which conventional was used. Other 30 % said that conventional side was less painful and this was statistically significant. Pain was measured by VAS scale. Under this scale the mean pain averaged over 7 days was 3.44 with coblation and 6 for conventional method.

Table no 14. Comparison of tonsillar fossa healing on first, second and seventh post operative days

Postoperative Healing	Day	Coblation (%)	Conventional(%)	Chi Square	P Value
1 st Pod		81	40	35.17	0.001
2 nd Pod		77.2	47.1	19.10	0.001
7 th Pod		48.5	18.9	20.05	0.001

Each tonsillar fossa was assessed for healing in terms of percentage of tonsillar fossa that was covered with slough. Slough formation was early in coblation side and remained for long duration of time. The percentage of slough formation in tonsillar fossa was 80%, 74% and 45% respectively on 1st, 2nd and 7th post operative days whereas in conventional method it was 40%, 47% and 17%

Post Operative Bleeding

There was no case of reactionary or secondary hemorrhage in both coblation and conventional method.

Summary

In our study the predominant age group was found to be 16-20 years. There was no significant difference in the incidence among age distribution and gender and it does not seem to significantly affect the study outcome.

The duration of surgery in coblation was compared with conventional method. It was 11.8 minutes in conventional and 16.4 minutes in coblation. The intraoperative blood loss was compared in both methods. In coblation method it was 18.74 ml and in conventional it was 43.44ml so obviously 20-25 ml of intraoperative blood loss was minimized in coblation method. The post operative pain was measured using VAS scale was compared in both methods on 1st, 2nd and 7th post operative days. For coblation the mean post operative pain scores were 3.92, 3.64 and 2.74 respectively whereas in conventional method it was 7.42, 6.20 and 3.52. So about 60-70% patients had lesser pain in coblation side compared to the conventional side. The post operative tonsillar fossa healing was estimated by the amount of slough covered in the tonsillar fossa and it was compared on 1st, 2nd and 7th post operative days. In coblation side mean area of slough covered was 80%, 74% and 45% and on conventional side it was 40%, 47% and 18%. So slough formation is more in coblation side compared to conventional side so the healing was delayed. There was no primary or secondary hemorrhage in our study. These results were analysed and compared using chi square testing and it was found to be statistically significant.

Conclusion

This study was conducted in the department of otorhinolaryngology, Coimbatore medical college hospital to compare the efficacy of coblation and conventional tonsillectomy in the same patient. This study comprised of 50 patients with chronic tonsillitis who were above 3 years without adenoid hypertrophy. In half of the patients, right side tonsil was removed by coblation method and left tonsil was removed by conventional method. In the other half, the left tonsil was removed by coblation and the right was removed by conventional method. The patients were examined regularly on first, second and seventh postoperative days. From our study we reach the following conclusions.

1. Coblation tonsillectomy is a relatively easy technique to perform providing a near bloodless field and minimal surrounding tissue damage.
2. The operative time required to perform coblation tonsillectomy was more than the conventional technique. The longer time did not cause more intraoperative blood loss and post operative pain.
3. The intraoperative blood loss was significantly less on the coblation side than on the dissection side.
4. Most importantly, postoperative pain scores were significantly lower on the coblation side on the first, second and seventh post operative days. It helped the patients to resume their normal activities early.
5. Healing was slightly delayed on the coblation side.

To conclude, coblation tonsillectomy is easy to perform and it is safer with significant advantages in terms of decrease in intraoperative blood loss and postoperative morbidity. But the only deterring factor in the regular usage of coblation is the cost factor which has to be overcome.

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A comparative study of coblation versus conventional tonsillectomy.

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Master Chart

S N o	Name	IP NO	Age	Sex	DS in		IOP blood loss		Post operative pain VAS scale						Tonsillar healing % fossa					P O B L	
					C	C	C	C	C			CO			C			CO			
					O	O	O	O	1 st	2 nd	7 th	1 st	2 nd	7 th	1 st	2 nd	7 th	1 st	2 nd		7 th
1	Vijayakumar	6116	27	M	10	14	15	50	8	6	4	4	4	3	30	50	10	75	90	55	-
2	Kowsalya	68978	16	F	15	18	55	20	7	8	3	3	3	2	35	45	20	70	85	50	-
3	Deepika	70015	18	F	12	15	40	20	9	6	3	5	4	5	35	50	15	85	90	45	-
4	Soundariya	65452	4	F	15	20	45	15	8	7	4	4	4	2	40	55	20	80	90	50	-
5	Dorin	66950	19	M	10	16	50	20	7	7	2	3	3	2	45	45	25	75	90	55	-
6	Praveenkumar	70032	26	M	15	18	55	20	9	8	4	4	2	3	30	40	15	75	90	45	-
7	Md.hasim	70075	5	M	15	20	50	15	8	6	3	2	2	2	35	50	15	80	85	35	-
8	Vidhya	70975	17	F	10	15	52	18	8	7	4	4	4	2	45	55	20	85	80	35	-
9	Karthikeyan	71001	22	M	15	14	55	28	7	7	-	4	4	-	45	50	-	75	85	-	-
10	Md.Ajmal	67042	20	M	10	20	45	20	9	8	3	3	6	2	35	45	15	80	80	40	-
11	Venkatesh	68634	25	M	15	18	45	15	8	6	2	5	5	2	35	40	15	75	85	45	-
12	Meharaj	71645	28	M	8	16	50	18	7	8	4	5	4	2	30	35	15	75	90	48	-
13	Tamil	68691	20	M	7	15	55	15	7	7	4	4	4	2	35	40	10	80	85	40	-
14	Sujitha	68692	23	F	10	17	50	15	6	7	3	3	3	3	40	40	25	85	85	50	-
15	Masika	71688	18	F	15	16	40	15	6	6	4	5	4	2	40	50	25	90	80	10	-
16	Sugapriya	70252	28	F	8	15	50	20	8	5	4	4	3	2	45	50	15	95	80	50	-
17	Aseenabegam	70299	19	F	12	16	50	20	5	6	-	4	2	-	45	50	-	90	80	-	-
18	Ravikumar	71864	17	M	15	18	50	20	8	6	4	3	4	3	45	50	10	95	90	50	-
19	Mahalakshmi	72647	7	F	10	20	55	25	9	5	3	3	3	2	30	40	20	80	85	55	-
20	Girija	71870	13	F	8	14	40	25	8	5	4	3	4	2	35	45	30	85	80	50	-
21	Novfol	71934	15	M	15	20	45	35	7	6	5	4	3	3	40	50	20	70	90	55	-
22	Gayathri	73292	23	F	7	18	40	30	7	5	6	4	2	3	45	50	30	75	85	55	-
23	Santhya	73503	15	F	10	18	50	30	5	5	4	3	4	4	55	50	30	80	80	45	-
24	Sasikumar	73553	15	M	10	15	55	25	7	6	4	5	4	5	50	45	25	75	90	55	-
25	AronEbinesan	73555	27	M	10	16	45	20	9	5	4	4	3	4	50	50	25	75	80	50	-
26	Ramya	45567	13	F	8	17	40	15	7	6	4	3	3	3	55	50	10	80	10	55	-
27	Hemalatha	47081	24	F	10	18	30	11	7	5	3	6	3	3	40	45	15	85	90	52	-
28	Dharun	48575	8	M	11	13	35	14	8	4	4	5	3	3	30	50	10	75	90	50	-
29	Affis	62317	19	M	9	16	40	15	9	5	4	4	4	2	35	40	15	90	60	45	-
30	Thasin	62313	25	M	11	18	40	11	7	6	4	2	4	3	55	50	15	95	10	50	-
31	Md.ashim	51868	28	M	10	14	40	12	8	6	4	3	4	3	35	55	10	85	60	50	-
32	Rinsy	53357	29	F	12	15	35	15	6	6	4	5	3	4	45	55	10	75	60	50	-
33	Thavanesh	53373	15	M	12	20	35	15	8	6	5	5	3	3	40	50	10	70	50	50	-
34	Anjali	53377	20	F	13	18	35	10	5	5	4	3	3	3	35	45	15	80	50	50	-
35	Meena	54688	23	F	9	18	35	13	9	6	-	5	4	-	30	40	-	85	55	-	-
36	Dhayasree	54687	10	F	10	16	30	15	7	6	4	4	4	3	30	35	15	75	35	50	-
37	Jothiprabha	64684	18	F	9	20	40	14	8	6	4	4	4	3	55	50	15	80	35	50	-
38	Oviyasree	65222	24	F	10	18	45	11	8	6	4	3	3	3	50	50	15	85	45	50	-
39	Rizwara	65276	9	F	11	18	55	15	5	6	4	3	4	3	55	50	10	90	80	50	-
40	Mythili	66722	19	F	10	15	35	18	9	6	4	5	4	5	30	50	10	95	60	45	-
41	Ramyadevi	66782	21	F	10	18	35	18	7	6	4	3	4	5	35	50	10	75	55	50	-
42	Ragukumar	54708	30	M	8	14	30	20	8	6	4	4	4	5	45	40	20	70	45	50	-

A comparative study of coblation versus conventional tonsillectomy.

43	Keerthana	56235	20	F	9	13	30	20	8	6	4	3	5	4	35	40	10	80	70	50	-
44	Shiny	57869	15	F	15	15	45	18	9	6	-	4	4	-	30	50	-	75	80	-	-
45	Janani	57903	23	F	12	16	40	15	5	8	5	5	5	2	30	55	25	75	70	55	-
46	Brindha	68358	13	F	18	15	50	20	6	7	4	5	4	3	35	50	30	80	80	50	-
47	Salman	68351	29	M	15	13	15	18	7	6	3	4	4	2	40	45	30	80	90	55	-
48	Soorya	61080	24	M	11	15	60	15	7	6	4	5	3	5	35	50	20	85	10 0	50	-
49	Jeevitha	61111	20	F	10	12	60	20	8	8	3	3	4	2	45	45	40	70	90	55	-
50	Haseem	61095	30	M	9	13	55	15	8	8	4	5	4	3	45	50	50	75	80	50	-