

PEAK PlasmaBlade and coblation adenotonsillectomy: Report of 2 cases and literature review

PEAK PlasmaBlade ve koblasyon adenotyonsillektomisi: iki olgu raporu ve literatürün gözden geçirilmesi

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ABSTRACT

Adenotonsillectomy is one of the most frequently performed surgeries by otorhinolaryngologists worldwide. Coblation and PEAK surgery systems are new techniques of surgery that revolutionize the way surgery is performed today. We report our experience with two patients being treated with the combined techniques of adenotonsillectomy using both coblation and PEAK PlasmaBlade technologies.

Keywords: Adenotonsillectomy, coblation, PEAK PlasmaBlade

ÖZ

Dünya ölçeğinde adenotonsillektomi KBB uzmanlarınca en sık uygulanan ameliyatlardan biridir. Koblasyon ve PEAK cerrahi sistemleri bugünlerde uygulanan cerrahilerde devrim yaratan yeni bir tekniktir. Hem koblasyon hem de PEAK PlasmaBlade teknoloji-si kombinasyonu ile gerçekleştirilen adenotonsillektomi ile tedavi edilmiş iki hastaya ilişkin deneyimlerimizi bildiriyoruz.

Anahtar kelimeler: Adenotonsillektomi, koblasyon, PEAK PlasmaBlade

INTRODUCTION

Adenotonsillectomy is one of the most routinely performed surgeries by otorhinolaryngologists worldwide. The usual indication ranged from recurrent and chronic tonsillitis to obstructive sleep apnea caused by bilateral adenotonsillar hypertrophy¹. For more than a century, traditional dissection tonsillectomy has remained the gold standard for tonsil removal². This traditional technique leaves the wound open to secondary healing, thus causes pain and bleeding as two major postoperative complications. The ideal method of adenotonsillectomy in getting the best outcome continues to be investigated.

Characteristics of an ideal adenotonsillectomy technique would include ease of performance and intraoperative hemostasis as well as minimization of

postoperative pain and bleeding complications³. Adenotonsillectomy are being performed using cold dissection, guillotine technique, laser, bipolar and monopolar cautery, harmonic scalpel, PEAK (pulsed electron avalanche knife) PlasmaBlade and coblation. We report our use of PEAK PlasmaBlade and coblation technique in two children.

CASE REPORT

Two children aged 6, and 8 years underwent adenotonsillectomy using both coblation and PEAK PlasmaBlade techniques. The patients underwent coblation tonsillectomy on the right side while PEAK PlasmaBlade tonsillectomy was done on the left side. For adenoidectomy, only PEAK plasma technique was used. The procedure for both techniques was almost similar to conventional surgery except for the usage

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Table 1. Intraoperative blood loss and duration of surgery (right tonsillectomy done by coblation while left tonsillectomy was done by PEAK plasma blade).

	Age/Sex	Presenting symptoms and duration	Intraoperative blood loss	Duration of procedure
Patient 1	6/Female	Recurrent sore throat with snoring and nasal block for 3 years	<50 ml (both sides) + adenoidectomy	29 minutes
Patient 2	8/Male	Loud snoring for 3 years	<50 ml (both sides) + adenoidectomy	37 minutes

of specialized instruments. Both patients were intubated per orally. For coblation tonsillectomy, EVAC 70 hand piece (Smith & Nephew) was used and the right tonsil was dissected from upper pole to lower pole with power setting for cutting at 7W and coagulation at 3W. PEAK PlasmaBlade surgery system consists of PEAK PlasmaBlade dissection device and the PULSAR II Generator (Medtronic). The PEAK PlasmaBlade device was used for dissecting the left tonsil from upper pole to lower pole with power setting for cutting at 1W and coagulation at 4W. For adenoidectomy, PEAK plasma surgery system was used and adenoid was removed by dissecting from upper part to lower part of adenoid with power setting for cutting at 1W and coagulation at 8W.

Perioperative blood loss was estimated to be less than 50 ml for both techniques intraoperatively (Table 1). The median operation time was 7.5 minutes for the right(coblation) and 17 minutes for the left tonsillectomies (PEAK plasma). Median operation time for adenoidectomy was 3 minutes for both cases.

The median VAS (Visual Analogue Scale) pain score on the first day was 5/10 and subsequently reduced to 2/10 over a week (Figure 1). Postoperatively there was no request for analgesics from both patients. Both patients were discharged well on the first postoperative day without any complications. They were able to consume soft diet prior to discharge. During our follow-up period, there were no major or minor complications noted for both coblation and PEAK plasma techniques. The median time to return to normal diet for both children was about 7.5 days. Oropharyngeal examination at postoperative 1. week demonstrated only minimal slough tissue of both tonsillar fossa mainly at inferior part of tonsillar

fossa for both patients. Otherwise there was no traces of fresh blood or clots seen.

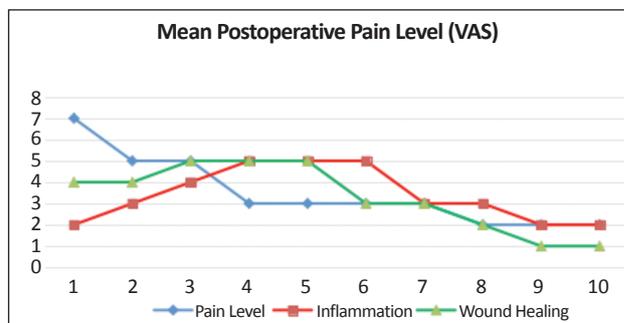


Figure 1. Post operation pain, inflammation period and wound healing.

DISCUSSION

Result of a survey had showed that 16% of practicing pediatric otolaryngologists in US favour the use of coblation for tonsillectomy³. Reduced intraoperative time and blood loss in coblation tonsillectomy has been shown as compared to cold dissection tonsillectomy⁴. Coblation technology uses less energy to cut soft tissue resulting in cooler temperature during surgical excision⁵. The use of coblation for tonsillectomy may gain more support with the availability of better devices and with more trained surgeons.

The PEAK PlasmaBlade is a unique soft tissue dissection instrument that uses less energy during cutting of tissue as compared to traditional cautery method. Thus, it operates at lower temperatures which result in less postoperative pain. Peak PlasmaBlade approach has made a significant difference in that it decreased thermal injury profile which avoids inflammatory response and helps in rapid wound healing⁶. PEAK PlasmaBlade has an average operating temperature of 40-170°C when used during surgery.

The zone of thermal injury in PEAK PlasmaBlade incision (0.6 cm) was significantly smaller when compared to electrosurgical cut or coagulation incisions (4 cm)⁶. Thus, PEAK PlasmaBlade can be used nearby critical structures with lesser risk of vascular injury. In contrast, the average operating temperature for coblation technique was 40-70°C. As for coblation technique, the surgical ablation of the tissues is performed without inducing additional collateral tissue necrosis which could be a reason for its popular use in the field of otolaryngology.

When comparing coblation and traditional techniques, surgeons detected hemorrhage with tissue damage in 1% of the patients, and early postoperative recovery for coblation technique⁷. In another study, coblation tonsillectomy had shown a drastic decrease in postoperative pain comparing with conventional technique^{8,9}. As for PEAK PlasmaBlade versus conventional surgery, one study showed significant reduction in thermal injury and improved wound strength and histology with better visual assessment of scars⁶. It has been shown that PEAK PlasmaBlade reduces level of inflammation, thus leading to good epithelization resulting in improved healing and cosmesis¹⁰⁻¹².

An online survey among members of American Society of Pediatric Otolaryngology showed a changing trend towards using monopolar cautery and coblation for pediatric adenotonsillectomy¹³. However, it has been shown that there is a tendency for less pain and decreased operating time in coblation group as compared to monopolar cautery¹⁴. Furthermore, the use of monopolar cautery has been shown to have higher risk of haemorrhage especially with the use of increased power¹⁵.

In paediatric adenotonsillectomy, postoperative pain should be minimized so as to encourage children to switch to oral intake as soon as possible. Both coblation and PEAK PlasmaBlade had been shown to achieve this objective¹⁶⁻¹⁸. To further minimize postoperative pain and prevent postoperative haemorrhage, coblation intracapsular tonsillectomy has

been advocated. There has been limited evidence to determine that intracapsular tonsillectomy is better than extracapsular tonsillectomy. Duarte et al.¹⁹ found both hemorrhage and pain relief much better in the intracapsular coblation technique as compared to extracapsular technique. However, another study by Reusser et al.²⁰ contradicted this finding. Therefore, further studies are required to determine the benefits of performing intracapsular tonsillectomy as compared to extracapsular tonsillectomy.

In conclusion, we found that there were no differences in intraoperative blood loss, postoperative pain, and time needed to regain normal diet and daily activity for both techniques. Coblation technology has lesser operating time than PEAK PlasmaBlade technique which could be due to our surgeon's familiarity with it. There were also no postoperative hemorrhages in both technologies.

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