



# Tonsillectomy and adenoidectomy with autobipolar and argon plasma coagulation

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## Abstract

We review a modified electrocautery for tonsillectomy and adenoidectomy using an autobipolar coagulation (AB) and argon plasma coagulation (APC). As electrocauteric techniques, AB and APC have many benefits because of their accurate and effective hemostasis. A significant difference in operating time and in intraoperative blood loss occurred regardless of the ages of the operators. Postoperative pain is a well-known problem of electrocautery, however, AB and APC can easily reduce it in combination with the conventional method. In conclusion, AB and APC offer new possibilities for electrocautery with significant reduced blood loss and surgical time, good cost performance and relatively less postoperative pain.

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*Keywords:* Electrocautery; Conventional method; Postoperative pain

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## 1. Introduction

Tonsillectomy and adenoidectomy are some of the most commonly performed operations. Now, a wide variety of surgical techniques for tonsillectomy and adenoidectomy are available, including electrocautery [1]. Among many safe and effective techniques, electrocautery is the most common innovative technique since the early 1990s. Our objective is, from the experiences of almost 900 cases of electrocautery in Japan, to review our latest techniques and show a new concept of

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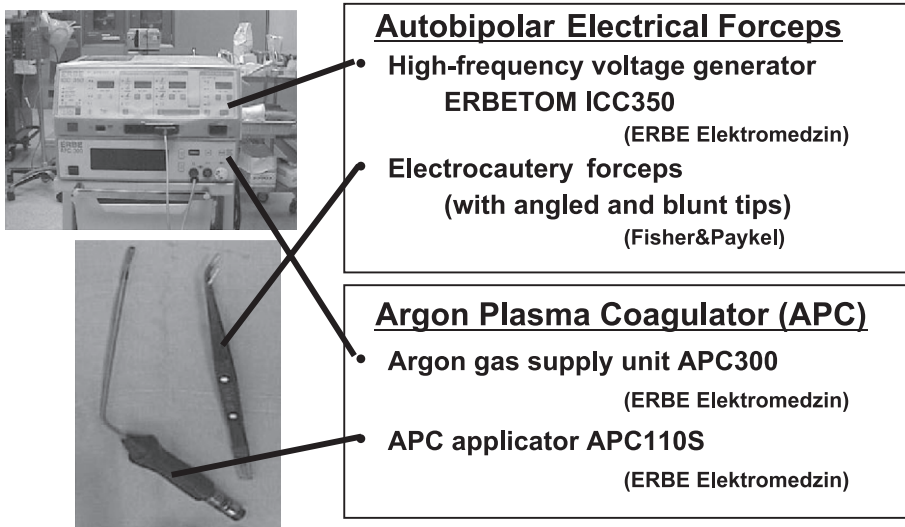


Fig. 1. Our devices and settings.

electrocautery with the combination of autobipolar coagulation (AB) and argon plasma coagulation (APC).

## 2. Material and methods

AB and APC have many benefits due to their accurate and effective hemostasis. AB provides a pinpoint hemostasis without overcurrent, whereas APC makes a broad hemostasis with limited penetration depth of the coagulation zone [2]. Our devices and settings are as shown in Fig. 1. A high-frequency voltage generator controls AB and APC. For electrocautery, we use angled and blunted forceps. APC is used in a spray mode with a rigid tube applicator.

## 3. Patients

Eight hundred eighty-nine electrocautery cases of adenotonsillectomy in combination with AB and APC have been performed since 1997. As representatives to this review, we randomly selected a 4-year-old boy for tonsillectomy and a 5-year-old boy for adenoidectomy. No complications occurred during the 1-week hospitalization.

## 4. Operative technique of tonsillectomy

The operation was performed under general anesthesia. The surgical position is the Rose position. In preoperative preparation, the mouth gag is opened maximally to expose

the inferior pole, and then packing it with gauze protects the airway. After an injection of 0.5% lidocaine with 1:200,000 epinephrine to reduce bleeding, grasp the superior and inferior pole by the curved clamp. Operation starts by incision at the superior pole. Incision by curved knife proceeds downward to both the anterior and posterior pillar. To avoid adhesion of both, the pillar incision line is relatively longer. Capsule and mucosa should be separated adequately from the fossa by the back portion of the knife. This is the important step to prepare a proper surgical plain. Hemorrhage at this time must be coagulated by pinpoint cauterization. To respect the surgical plain, each hemorrhage is immediately coagulated during all phases of the surgery. Like a conventional maneuver, the tonsil is dissected by autobipolar forceps without cauterization. Cauterization is used only to the visible vessels or hemorrhage to reduce postoperative pain. Surgeons should avoid unnecessary cauterization to minimize the cauterized area. When such a vessel ruptures, creating a pool of blood, and obscures the surgical plain, dissection must be stopped, and careful and delicate coagulation is required until the plain is visible. At this time, blind cauterization must be avoided. Dissection proceeds to the inferior pole via the middle region. Tonsillar separation is done by the same maneuver at the upper portion without snare. In many cases, additional coagulation is easy or not necessary. Pinpoint hemorrhage is cauterized by AB and oozing is cauterized by APC.

## **5. Technique of adenoidectomy**

Preparations are almost the same as for tonsillectomy. First of all, we evaluate the size of the adenoid by inspection with a mirror. After the removal of the adenoid tissue by a sweep of a sharp curette, the nasopharynx is packed tightly for at least 5 min. For a speedy operation, the packing compression should be checked by mirror to decrease the amount of hemorrhages. If mirror inspection after the first removal of packing finds any residue of adenoid tissue, the sweep of a sharp curette is repeated and the nasopharynx is packed again. When hemorrhages relatively decrease by gauze compression, hemorrhages that can be reached are cauterized by autobipolar forceps under direct vision with a mirror (Video clip 1). Oozing or unreachable hemorrhages are coagulated by APC inserted via the nose (Video clip 2). For good visualization, an assistant helps to retract the palate and suction blood as shown. After a final inspection to ensure there are no more hemorrhages, the operation concludes.

## **6. Discussion**

Since 1997 (the year of innovation of electrocautery in my hospital), complications related to adenotonsillectomy have obviously been reduced regardless of the levels of surgical expertise, including that of junior surgeons. The average amount of hemorrhage per operation is about 1 ml. Severe postoperative hemorrhage has not occurred in these 2 years. However, postoperative pain is well known as the critical weak point of electrocautery, and awareness of the sense of conventional maneuver during all surgery is very helpful to reduce it.

The high points of this operation are as follows. (1) Confirm AB function using extracted organ and adenoid tissues, for example. Dysfunction of the bipolar is critical especially at the step of incision. (2) Wipe the tips of the autobipolar forceps during the entire surgery. The tips of the forceps should be clean for accurate AB. Dull function may cause unnecessary thermal damages. (3) Frequently thread an applicator with water injection to avoid APC dysfunction from choking. Coagulation choking happens relatively often during operations. (4) Place the foot units of AB and APC at regular positions to avoid accidental injury by the misleading of them.

## **7. Conclusion**

Electrosurgery with AB and APC has many benefits for tonsillectomy and adenoidectomy. On the other hand, careful preparations and a sense of conventional method are very important for safe and speedy operations.

## **References**

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