Comparison of Pain after Radiofrequency Tonsillectomy Compared with Conventional Tonsillectomy: A Pilot Study

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Tonsillectomy results in a severe sore throat, especially in the first few days, until the exposed and inflamed muscle becomes covered with regenerated mucosa. There are a variety of techniques of tonsillectomy including monopolar and bipolar diathermy, blunt dissection, and most recently radiofrequency tonsil ablation and coblation. The objective of the present study was to assess the postoperative pharyngeal or ear pain of radiofrequency tonsillectomy and compared with traditional blunt dissection tonsillectomy with loop ligation hemostasis.

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Tonsillectomy is one of the common procedures in Ear Nose and Throat Surgery. The postoperative pain and hemorrhage are the main causes of morbidity in tonsillectomy. Pain is the result of disruption of mucosa and glossopharyngeal and/or vagal nerve fibers followed by inflammation and spasm of the pharyngeal muscles that lead to ischemia and a protracted cycle of pain. It does not completely subside until the muscle becomes covered with mucosa, i.e. 14 to 21 days after surgery[1]. There is still controversy over which is the optimal technique of tonsillectomy regarding the one that produces the lowest morbidity[2]. Temperature-controlled radiofrequency tonsil coblation was developed recently in order to decrease major morbidity of this procedure. The bipolar ENTec Coblator Plasma Surgery System (ArthroCare Cooperation, Sunnyvale, CA) functions with a voltage range of 96 to 312 voltage root-mean-square value (Vrms) at 100 kHz. The molecular disintegration achieved by gentle heating of the tissue that breaks molecular bonds with improved precision and a low temperature control of 60°C to 100°C, with minimal thermal damage to the surrounding tissue while simultaneously coagulating blood vessels. The ENTec Coblator Plasma Surgery System has a Food and Drug Administration approval for ablation and coagulation of soft tissue in ear nose and throat surgery. One of the suggested applications is for the entire removal of the tonsil (tonsillectomy) with bipolar radiofrequency equipment[3]. This differs from coblation (cold+ablation) of the tonsils or coblation tonsillotomy, which leaves the tonsillar capsule intact and radiofrequency ablation that uses the probe to create small channels in the tonsil with dissipation of ionize energy to surrounding tissue, with subsequent tissue death days or weeks later that leads to shrinkage and volume reduction[1,4]. Blunt dissection with ligation is the common technique used for tonsillectomy at our hospital. This prospective study was designed to compare the postoperative pain of blunt dissection and radiofrequency tonsillectomy.

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Material and Method

A prospective, randomized, single-blinded, controlled clinical study was conducted at the Depart-

ment of Otolaryngology, King Chulalongkorn Memorial Hospital, from November 2002 to October 2003. Twenty patients were recruited into the present study. All subjects were diagnosed with chronic tonsillitis and admitted for elective bilateral tonsillectomy. Exclusion criteria were: asymmetrical tonsillar hypertrophy, a history of peritonsillar abscess, having adenotonsillectomy or other concurrent operations and underlying medical problems such as abnormal coagulability, hypertension or diabetes mellitus. Written informed consent was obtained from each subject prior to their recruitment.

The surgery was all performed under general anesthesia by the first two authors. The side of tonsil was randomly selected for performing coblation tonsillectomy in the operating room. The tonsil was entirely removed with radiofrequency technique using bipolar ENTec Coblator Plasma Surgery System, 4.5 Plasma scalpel with suction (ArthroCare Cooperation, Sunnyvale, CA) for tonsillectomy on one side and blunt dissection and loop ligation to stop bleeding on the other tonsil. The patients did not know which technique was used on both sides before they completed the study. The patients stayed in the hospital for at least 24 hours post-operatively. All patients received amoxicillin syrup 500mg three times a day for 7 days except in the cases of penicillin hypersensitivity where erythromycin syrup 500mg four times per day for 7 days were prescribed. They also received paracetamol syrup as needed to mitigate postoperative pain. In the postoperative day, every subject was asked to score the severity of their pharyngeal or ear pain on both right and left sides. The pain score was recorded as a score of 0-5 (0 = there was no pain; 1 = slight pain; 2 = pain; 3 = moderate pain; 4 = severe pain; and 5 = intractable pain). On discharge, the patients were given a pain score record chart to record the pain score once a day in the evening for one week.

The postoperative pharyngeal or ear pain score on the radiofrequency side was compared with the blunt dissection and ligation side. Wilcoxon signed ranks test was used to test the null hypothesis that there was no significant difference of pain score between two sides at each day for a week. A statistical p-value < 0.05 was taken as significance.

Results

Twenty patients between the age of 13 to 51 years (mean age = 29.9 years) entered the present study. They were 10 males and 10 females. The tonsillectomy using radiofrequency was performed on the right side of the throat in 12 patients, and the left in 8 patients. The pain scores of each patient were completely recorded and were sent to the authors. The postoperative pharyngeal or ear pain score on the radiofrequency side was compared with the blunt dissection and ligation side. The results of the mean values of pain scores of each day postoperation are shown in Fig. 1. Each day, there were no significance differences of postoperative pain scores between two sides for one week.

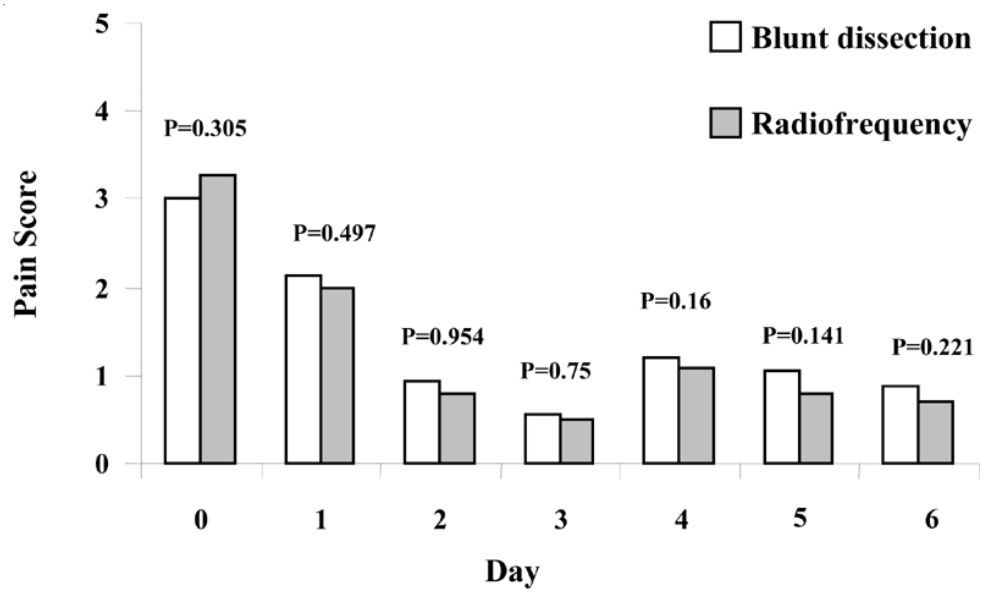

Fig. 1 Mean pain scores by postoperative day

Discussion

There are several techniques of tonsillectomy. The commonly used techniques at King Chulalongkorn Memorial Hospital are electrodissection and blunt dissection with ligations. However, some surgeons believe that diathermy causes more postoperative pain than ligations. There were some studies that prove this belief[5-8]. However, this superiority is not shown in all studies. Tay conducted a study that compared electrodissection and cold techniques in the same patient undergoing tonsillectomy (different sides). No significant differences in postoperative pain between the two methods were observed in children[9]. The postoperative pharyngeal pain is caused from the disruption that occurs with the exposure of the underlying muscle fibers and nerve endings of the glossopharyngeal and the vagus nerve that supplies this region. Postoperatively, exposed to the outside elements, these tissues become inflamed which can lead to spasm. Inflamed constrictor muscles are an intense source of pain because every swallow causes movement of these muscles. It would seem logical that any advancement in surgical technique would need to address the issue of damage and exposure of these structures[10].

The recently surgical technique that was introduced to the marketplace for lesser post tonsillectomy pain and rapid recovery is radiofrequency tonsillotomy. Radiofrequency is a surgical tool that was used to create of an ionized vapor or plasma level resulting in cellular disintegration at a low temperature (60°C to 100°C)[3]. The technique of tonsil ablation or tonsillotomy leaves a cuff of tissue that may protect the underlying tissue from oral secretions and thereby decrease resultant inflammation. There was a study that compared the outcome of the method of tonsillotomy (partial intracapsular tonsillectomy) with radiofrequency technique with regular blunt dissection tonsillectomies in children[10]. The recorded pain scores showed significantly less pain in the tonsillotomy group. The concept of subtotal intracapsular tonsil reduction that avoids injury to the constrictor muscles as opposed to more classic methods of tonsillectomy and the advantages that include early elimination of pain and early resumption of normal diet and normal activity levels were also shown in the study of Friedman et al[4]. However, concerns regarding tonsil regrowth using tonsil ablation technique remains unanswered especially in chronic tonsillitis patients. The authors prospectively investigated the use of bipolar ENTec Coblator Plasma Surgery System with a standard blunt dissection for total tonsil removal by dissecting within the capsular plane. We could not show any difference in the postoperative pain in any day for one week. The authors concluded, therefore, that the radiofrequency technique was not superior to blunt dissection technique for total removal of tonsil regarding postoperative pain. Furthermore, the high cost of operation for the use of radiofrequency technique must be considered. However, the radiofrequency technique should be reserved for subtotal tonsil removal that the more advantages such as less postoperative pain and rapid recovery were shown in earlier studies.

Conclusion

Tonsillectomy performed with the plasma scapel of the Coblator Plasma Surgery System or blunt dissection for total removal of tonsil did not show any differences in postoperative pain scores within one week after the procedure.

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การศึกษาเปรียบเทียบความเจ็บปวดหลังผ่าตัดทอนซิลโดยวิธี blunt dissection และวิธีการผ่าตัดโดยใช้ radiofrequency

สุพินดา แสงพานิชย์, วีระชัย คีรีกาญจนะรงค์, ภูริปัณย์ อร่ามวัฒนพงศ์, ภาคภูมิ สุปิยพันธุ์

ได้ทำการศึกษาเปรียบเทียบค่าความเจ็บปวดของคอ 2 ด้านในผู้ป่วยที่ได้รับการผ่าตัดทอนซิล ทั้งหมด 20 คน โดยทอนซิลข้างหนึ่งผู้ป่วยจะได้รับการผ่าตัดโดยวิธีดั้งเดิมคือ blunt dissection with loop ligation และอีกข้างหนึ่งจะได้รับการผ่าตัดโดยวิธี radiofrequency tonsillectomy โดยใช้ harmonic scapel ผลการศึกษาพบว่าไม่มีความแตกต่างของค่าความเจ็บปวดของคอหลังการผ่าตัดระหว่างการผ่าตัดทั้งสองวิธีอย่างมีนัยสำคัญทางสถิติ โดยเปรียบเทียบค่าความเจ็บปวดเป็นเวลาทั้งหมดเจ็ดวันหลังผ่าตัด