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ORIGINAL ARTICLE

Assessment of postoperative pain scores in thermal welding and conventional tonsillectomy techniques: A randomized control study

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KEYWORDS

Postoperative pain;
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Abstract *Objectives:* To assess postoperative pain of the thermal welding system tonsillectomy compared to the conventional tonsillectomy.

Design: 342 Patients aged from 8 through 39 years were enrolled in a randomized prospective controlled study. Extracapsular tonsillectomy with thermal welding system and conventional system was performed randomly in each patient. Patients with chronic tonsillitis were included. Patients undergoing adenoidectomy, suspected or confirmed tonsillar malignancy or any other procedure together with tonsillectomy were excluded from this study. Postoperative pain was measured by means of Faces Pain Scale and Numerical Pain Score for each patient in three occasions (6–8 h post operative, 24 h and 6 days later during the first postoperative visit) for each side.

Results: There was a statistically significant difference between the pain scores of both procedures, in all three occasions ($P > 0.001$). Patients treated with Thermal welding had the least postoperative pain score regardless of the occasion. Patients treated with the conventional technique had a significantly higher postoperative pain score in all three occasions.

Conclusions: Thermal welding tonsillectomy is superior to the conventional technique, with less postoperative pain scores, compared to the conventional technique.

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1. Introduction

Tonsillectomy is a 3000 year old procedure. It is derived from the word *tonsa*, (meaning "oar" in Latin) which means removal in ancient practice.[1,2] Operations have been performed on the tonsil from the earliest times. The first mention of tonsillectomy refers to Hindu medicine about 1000 years B.C. Celsus[3](25 B.C.–50 A.D.), a Roman aristocrat, who lived about the time of J. Christ, described a method of complete removal

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of the tonsil (tonsillectomy) as distinct from partial removal.[2] Galeni[4] (A.D. 121–201) was apparently the first writer to advocate the use of a snare for amputating the tonsil.[2] In modern literature ''Cold'' dissection has been reported first on The Lancet in 1909.[3] It is defined as the removal of the tonsil including its capsule by dissecting the peritonsillar space between the tonsil capsule and the muscular wall.

Tonsillectomy is the most common surgical procedure in the routine practice of any otolaryngologist.[5,6] However, it is one of the most controversial surgeries of all times. Indications for surgery include recurrent throat infections and sleep-disordered breathing, both of which can substantially affect child health status and quality of life.[6,7] The marked advances in anesthesia, post operative care and surgical techniques over the last 100 years have led to a significant reduction in the post operative morbidity related to this procedure. Moreover, tonsillectomy remains the standard of care for treating chronic tonsillitis.

According to the American Academy of otolaryngology and head and neck surgery clinical guidelines[3] ''tonsillectomy is more cost-effective treatment than prolonged repeated medical therapy for recurrent tonsillitis over several years''. The continuing controversy on which technique is the ''ideal'' one has been long discussed in the literature; nonetheless, the conventional dissection is still considered the standard technique with which to compare the effectiveness, safety and cost of any new technique. In this era of evolving scientific discoveries, we will continue to witness many methods, which will prove their efficacy in reducing tonsillectomy related patient's morbidity.

Different techniques for tonsillectomy have been proposed including, blunt dissection, harmonic ultrasonic scalpel, coblator, laser or radiofrequency excision, and tonsilloplasty.[8–10] Others, however, have used thermal welding system (TWS).[11–14]

2. Aim

The purpose of this study was to assess postoperative pain of the thermal welding system tonsillectomy compared with the conventional tonsillectomy. The null hypothesis was that variation between techniques would have no influence on patients' postoperative pain.

3. Materials and methods

A prospective, randomized double blind controlled trial of 342 patients aged from 8 to 39 years who presented to our clinic between January 2007 and July 2011 was conducted. The age selection was to improve the data credibility and accuracy. The study protocol was approved by the Institutional Research Board of the King Abdulaziz University, Jeddah, Saudi Arabia, and a database was created at that time to record prospective patients. Inclusion criteria were history of chronic recurrent tonsillitis; defined as, recurrent throat infection of 7 or more attacks in the past year or 5 or more attacks per year in the last 2 years or 3 or more attacks per year for 3 years despite adequate medical therapy. Patients with history of peritonsillar abscess, suspected or confirmed tonsillar malignancy, and patients with enlarged adenoids were excluded. Pediatric and adult population with coexisting morbidities; congenital malformations, diabetes, and hematologic disorders were also excluded. Enrolled patients were admitted (per appointment) to the surgical daycare where, they were medically assessed by an anesthesia staff and an attending otolaryngologist.

Patients and/or caregivers were informed that they would be blinded to the side of each technique, and a written consent was obtained from all patients (above 18 years) and patients' caregivers (18 years or less) explaining the two types of procedures used prior to the surgery. At daycare, all patients received an intravenous weight adjusted prophylactic loading dose of Augmentin® (penicillin and calvulanic acid). Patients with penicillin allergy were given erythromycin, which was also adjusted per weight. All patients also received a single intra operative dose of intravenous Dexamethasone 0.5 mg/kg, with a maximum dose of 8 mg. Induction started with intravenous Propofol for adult 2.5 mg/kg, Rocuronium bromide 0.8 mg/kg and an analgesia with intravenous Fentanyl citrate 3 Mg/kg, followed by Nitrous oxide and Sevoflurance as maintenance. Ondansetron hydrochloride dihydrate 4 mg/kg was also given as an antiemetic.

All cases were performed under general anesthesia. Patients were placed in Rose's position. Using David's gag retractor, the tonsils were exposed and the site of each technique was selected randomly by the first author in the operating room, and was recorded on the patient's chart for future reference. The operative notes were concealed from the second author to insure a double-blinded method. Thermal welding uses the simultaneous application of heat and pressure to cut and coagulate tissue. Unlike diathermy, no electric current passes through the tissue. At the tip of the cautery forceps, a low voltage current activates a heating element. Tissue that is grasped using the forceps is vaporized at temperatures of 300–400 °C, while the vessels are sealed by a combination of heat (60–100 °C) and the clamping pressure of the forceps. In our technique, the tonsil was grasped and retracted toward the midline with Dennis Brown forceps. An anterior pillar mucosal incision was then made superiorly and coagulated with Thermal Welding Bayonet Ultra slim Forceps using the ''1'' and ''8'' coagulation and dissection settings of the power supply unit respectively. Using the same forceps, dissection of the peritonsillar tissue was performed, and hemostasis was achieved by coagulating the tonsillar vessels in the same setting.

The conventional technique was also initiated by an anterior pillar mucosal incision overlying the superior pole of the tonsil as the tonsil was grasped and retracted toward the midline with Dennis Brown forceps. The dissection proceeded along the tonsillar fossa in the peri-tonsillar plane keeping as close to the tonsil capsule as possible. Hemostasis was achieved by the application of pressure packs, and persistent bleeding was controlled by bipolar diathermy coagulation of the oozing vessels. One senior surgeon did all the operations to eliminate surgeon dependent bias.

A single dose of weight adjusted IV or oral Paracetamol was given to all patients in the recovery room. In order to increase the accuracy of the postoperative pain assessment, the second author (who was blinded to the site of each procedure) interviewed all patients 6–8 h after the procedure, and pain score was recorded for each side before discharge. Postoperative pharyngeal pain scores were recorded for each side on three occasions for each patient; upon discharge (6–8 h post operative, 24 h and 6 days later during the first postoperative