



CHAPTER II

LITERATURE REVIEW

"Tonsillectomy" AND "vessel sealing system" are terms for searching in "Pubmed" and "Scopus" database. There were only a small number of studies about vessel sealing system tonsillectomy (Jan2008).

Prokopakis EP. et al (2005) reported case series of tonsillectomy with the use of vessel sealing system in 83 children [19]. There was no measurable bleeding during surgery in all cases. Limited peritonsillar edema was noticed in 18 children. Mean operative time was 16 minutes. No postoperative hemorrhage or other complications occurred.

This was a descriptive study demonstrating benefits in terms of short operative time and no intraoperative blood loss without significant complications. However this study did not have control group.

Lachanas VA. et al (2005) reported a randomized controlled trial of vessel sealing system tonsillectomy (VSST) versus cold knife tonsillectomy (CKT) procedure on 200 consecutive adult patients [18]. The VSST and CKT groups consisted of 108 and 92 individuals, respectively. In the VSST group, there was no measurable intraoperative bleeding, whereas mean bleeding for CKT group was 125 (range, 45–432) milliliters. The mean operative time was 15 +/-1.43 minutes for the VSST group and 21 +/- 1.09 minutes for the CKT group ($p < 0.01$). All patients were discharged the day after surgery. The same analgesic regime was used in all patients; it included 1,000 mg paracetamol orally every 8 hours until the second postoperative day. Patients were interviewed by phone on postoperative days 1, 3, 5, 7, 10, and 14. On all days contacted, the patients were asked about postoperative pain using a visual analogue scale (range, 0–10, 0=no pain, 10=intolerable pain). The patients as well as the investigator were blinded to the tonsillectomy technique. The overall mean pain score for the VSST group was 3.63, whereas for the CKT group it was 5.09 ($p < 0.01$). Postoperative hemorrhage occurred in two subjects of the VSST group and two subjects

of the CKT group. In 21 subjects of the VSST group, limited peritonsillar edema was noticed. No other complication occurred in both groups.

There is no reference in the article as to the method used for randomization of patients to either group or surgeon. This is important to disclose, because bias might be introduced if the two surgeons used only one of the two techniques compared with using both techniques assigned randomly.

A comment in the discussion might have clarified the reasons, especially because one case of cold knife tonsillectomy had a blood loss of more than 400 milliliters. Why was this? Perhaps this case alone might skew the results. It can be seen that the authors were very practiced in the use of the vessel sealing system. Indeed, it could be inferred that they routinely used this method for tonsillectomy in preference to the cold knife method. If this is so, could it not also significantly bias the comparison of the two techniques? A surgeon using a well-practiced and regularly performed technique is less likely to encounter complications than when performing the same procedure using a senescent technique at which one is out of practice.

In this study, the method for the vessel sealing system was described in great detail in the report, but the traditional cold knife method used for comparison was not detailed. Did both involved surgeons perform their cold knife dissections in exactly the same manner? For example, did they use ties or snares for the inferior pole, and what method of hemostasis was used? This could affect the operative time.

The average operative time of 21 +/- 1.09 minutes for CKT seems too short for general ENT surgeons to perform. Hemostasis by cautery after removal of tonsils usually takes at least 10-15 minutes in order to prevent postoperative bleeding. With the average intraoperative blood loss in CKT group of 125 milliliters, it might indicate that CKT caused some bleeding during the procedure. Operative time in this study might be measured until the ending time of tonsils removal which is not reasonable.

The difference of mean operative time between both techniques was about 6 minutes (out of 20 minutes) less in the VSST group in comparison with CKT group. It is statistically significant but it may not be clinical significant. If at least 10 minutes of the total operative time of 20 minutes (50% of total time) can be saved, it will reduce the risk

of anesthesia and the cost of operating room. In general, 10 minutes (or 5 minutes per each side) are more appropriate clinical significant level.

Postoperative pain using a visual analogue scale (VAS) is subjective outcome and might not be well comparable among subjects. Self-paired comparison (left side versus right side) is better to show the difference.

Lachanas VA. et al (2007) reported an updated prospective study on 161 adult the for comparison of vessel sealing system (VSST), harmonic scalpel (HST), and cold knife tonsillectomy (CKT) [20]. Patients were randomized to VSST, HST, or CKT groups (n=50, 43, and 37, respectively). Intraoperative bleeding, operative time, postoperative pain, and complication rates were assessed. There is also no reference in the article as to the method used for randomization of patients to each group or surgeon. This is important to disclose, because bias might be introduced.

Tonsillectomy in the CKT group was fully described in this paper. Intraoperative blood loss was estimated by measuring the amount in the suction bottle and by weighing the cottonoid pledgets before and after each procedure. In this study, operative time was measured from the anterior pillar incision until removal of both tonsils, including hemostasis when necessary. In general, operative time should be ended at the time of complete hemostasis, not at the time of removal of tonsil.

The lowest intraoperative bleeding was in the VSST group, whereas bleeding in the HST group was significantly lower than that in the CKT group. In the VSST group, there was no measurable bleeding during surgery in any of the cases. The mean (+/- SD) of intraoperative bleeding for the HST and CKT groups was 5 (+/- 2.77) and 73 (+/- 20.11) milliliters, respectively.

The mean (+/- SD) of operative time for the VSST, HST, and CKT group was 15.54 (+/- 1.47), 14.84 (+/- 1.38), and 21 (+/- 1.10) minutes, respectively. The overall mean (+/- SD) pain score for the VSST, HST, and CKT group was 3.72 (+/- 1.37), 3.64 (+/- 1.32), and 6.03 (+/- 0.88), respectively. Operative time and postoperative pain were significantly lower in the VSST and HST groups. One primary hemorrhage occurred in the HST group, and one occurred in the CKT group. Secondary hemorrhage occurred in patients in the VSST, HST, and CKT groups (n=1, 2, and 1, respectively).

VSST and HST were found comparable results regarding intraoperative blood loss, operative time, postoperative pain and hemorrhage. Compared with CKT, both were associated with less intraoperative blood loss, operative time and postoperative pain.

All of the three studies came from the same group of ENT surgeons. Reproducibility is also an issue of interest.

Lister MT et al (2006) reported a randomized, double-blind, paired-control study of postoperative pain from microdebrider tonsillotomy (MT) compared with electrosurgical tonsillectomy (ET) [10]. Twelve male (48%) and thirteen female (52%) children aged 5 to 15 years, with obstructive tonsillar hyperplasia were randomized to have one tonsil removed by MT and the other by ET. Parents and children were blinded to the side of MT and ET. Children rated the pain 0 to 5 by side using the Faces Pain Scale-Revised [21]. Blinded data collection was via telephone daily for 2 weeks by a study nurse. Main outcome was postoperative pain as recorded by Faces Pain Scale-Revised. Results: Twenty-two children (88%) had tonsillectomy and adenoidectomy, while 3 children (12%) had tonsillectomy alone. On postoperative days 1 to 9, children reported significantly less pain on the MT side compared with the ET side (paired t test; $p < 0.01$). By postoperative days 10 to 14, the difference between sides disappeared. There was no post-tonsillectomy bleeding among the 25 children. From this study, comparison of post-tonsillectomy pain could be done by paired-control study. Patients including children (age over 5) are able to discriminate pain from either side of tonsillectomy. Data collection via daily telephone interview by masked assessor may be a good technique to prevent recall bias and missing data. However paired t test used in this study may not be an appropriate statistical analysis because the FPS-R scores are ordinal data. Nonparametric test is more appropriate in this setting.

Newman CJ. et al (2005) studied a comparison of pain scales in Thai children [22]. Three commonly used pain scales (Visual Analogue Scale or VAS, Wong-Baker Faces Pain Scale or WBFPS, and Faces Pain Scale Revised or FPS-R) were administered to 122 Thai children, of whom half were HIV infected, in order to assess their validity. The VAS was presented vertically, the top of the scale representing extreme or unbearable pain and the bottom of the scale representing no pain. The scale

was 10 centimeters high, and the level of pain was subsequently converted into a discrete numerical score graded 0 to 10 by measuring the distance in centimeter from the lower extremity of the scale. The WBFPS3 and the FPS-R, on which the child pointed out which face corresponded the best to its present degree of pain. These scales represent six faces with increasing degrees of pain from left to right. Each face was attributed a score from 0 to 10 as indicated on the scales. Analyses of subgroups showed all scores were significantly correlated in both sexes and in children with and without HIV. On analysis by age, there was moderate to good correlation ($r = 0.64-0.84$) of all scores in the younger (aged 4-7) and older (aged 8-11) age groups. Correlation between the VAS and WBFPS was low in 4 year old children ($r = 0.38, p = 0.07$). The highest coefficients in all subgroups were those correlating the two face pain scales. These scales presented moderate to good correlation and moderate agreement, sufficient for valid use in Thai children. In general, children had more difficulty understanding the use of the VAS than that of WBFPS and FPS-R.