Original Article

Comparison of Ultrasonic Dissector versus Conventional Surgery in Thyroidectomy

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Objective: To compare the results of ultrasonic dissector or conventional-surgery in terms of shorter operative time, hospital study and average drain output and to evaluate the incidence of postoperative complications.

Methods: A prospective randomized trial was conducted at surgical Unit-II of Services Hospital, Lahore. Duration of study was two years. After approval from ethical committee 100 patients with thyroid disease were included. These patients were divided in Ultrasonic Dissector (UD) group & Conventional Surgery (CS) group (50 each). In UD group patients were under went thyroidectomy with use of harmonic scalpel while in CS group patients were operated with suture ligations of vessels along with use of monopolar or bipolar cautery. All the data was collected on self designed proforma & SPSS 20 version was used for data analysis.

Results: The mean age of patients was 30 ±17 with dominant female gender. In UD group the mean operative time was 50.4 ± 7.41 minutes which was significantly lower than in CS group which was 88.6±3.89 min. Drain output was 23.9±15 ml & 33.7 ±30.2 ml in UD and CS group respectively with p- value of 0.024. P-Value was significant (<0.000) for hospital stay. Most common complication was parathyroid injury (12% cases in UD group & 16.0% in CS group). Hematoma & seroma formation was noted in 12% in each group.

Conclusions: We concluded that the use of Ultrasonic Dissector significantly decreases operative time compare to Conventional Surgery techniques. It is also safer in terms of reducing the incidence of postoperative complications.

Keywords: ultrasonic dissector, conventional surgery and thyroidectomy.

Introduction

Almost a century ago Kocher described the procedure for thyroidectomy.[1] Thyroid is one of the most vascular glands in the body with relatively little and difficult operative field.[2] Meticulous hemostasis during surgery is always a key factor for a successful outcome. In conventional-surgery (CS) of thyroidectomy the techniques used for hemostasis are suture ligation or clipping of vessels. These both techniques are effective but time consuming.[3]

The use of Ultrasonic Dissector (UD) was introduced two decade ago. UD can cut the tissues and seal vessels simultaneously. Other advantages of UD over CS include; least thermal injury to the adjacent tissues, avoidance of electrical energy transmission between the two poles & avoids neuromuscular stimulation. [4] The various studies which have been carried out in European centers concluded that use of UD saves operative time. Post operative complications such as transient hypocalcaemia and recurrent laryngeal nerve injury are relatively uncommon but similar with both techniques.[5] However very few studies have been conducted in Pakistan. The purpose of this study was to compare the CS with UD and to see which technique is safer & time saving for thyroidectomy.

Methods

A prospective randomized control study was conducted at surgical Unit-II of Services Hospital, Lahore. Duration of study was two years from March 2008 to February 2010. After approval from ethical committee 100 patients with Goitre were included. These patients were divided in UD group & CS group (50 each). Patient with recurrent Goitre, malignancy & having any co-morbid features e.g; cardiac disease and Para-thyroid disease were excluded from the study. All patients were operated under general anesthesia. These patients were Euthyroid with or without medical treatment at the time of anesthesia induction & subsequent surgery. In UD group patients under went thyroidectomy with use of harmonic scalpel while in CS group patients were operated with suture ligations of vessels along with use of monopolar or bipolar cautery. All the data was collected on self designed proforma & SPSS 20 version was used for data analysis. Variable like age,

operative time, hospital stay, drainage was presented in mean and SD. Postoperative complications including hematoma / seroma formation, infection & neck stiffness was presented in percentages. P value less than 0.005 was considered significant.

Results

One hundred patients were enrolled in this study. The mean age was 30 ±17 years with dominant female gender. In UD group the mean operative time was 50.4 ± 7.41 minutes which was significantly lower than CS group (88.6±3.89 minutes). During post operative time drain output was 23.9±15 ml and 33.7 ±30.2 ml in UD and CS groups respectively (p- value 0.024). Hospital stay in UD group was 2.60±1.06 days while 5.44±2.08 days in CS group (P-Value <0.000). **(Table-1)** Post operative parathyroid complication was noted in 12% cases in group UD & 16.0% in CS group. Hematoma / seroma formation was noted in 12% patients in each group. The rate of infection was 4 % and 12 % in UD and CS groups respectively. Neck stiffness was seen in only 3 patients in UD group as compared to 7 patients in CS group. **(Table -2)**

Table-1: Comparison of two groups (operative time, drainage & hospital stay)

	UD Group	CS Group	P-value
Operative time (min)	50.4±7.41	88.6±3.89	0.00
Draom age (ml)	23.9±1.5	33.7±30.2	0.024
Hospital stay (days)	2.60±1.06	5.44±2.08	0.00

Table-2: Details of complications in both groups.

	UD Group	CS Group
Post-operative parathyroid complications	12	16
Hematoma, seroma formation	12	12
Infection	04	12
Leck stifness	03	17

Discussion

The modern surgery for thyroidectomy is developed on the basis of technique introduced by Kochar and Bleroth in the nineteenth century.[1] The focus of all the developments in basic technique was the safety by facilitating the dissection of tissues and ensuring the effective hemostasis. Traditionally dissection has been a combination of sharp and blunt dissection and people tried suture ligation or metal clips with monopolar or bipolar cautery & recently ultrasonic energy for control of hemostasis.[6] Although ultrasonic dissector was initially developed for use in laparoscopic procedures; it is well suited to thyroid surgery.[3] Its ability to simultaneously dissect and secure hemostasis ensures a clean, dry surgical field, despite the highly vascular nature of the thyroid gland. This facilitates easy identification of important local anatomy including the recurrent and superior laryngeal nerves, and the parathyroid glands. According to literature UD has benefits over other haemostatic devices in shortening the operative time and decreasing the blood loss, as compared to the conventional techniques.[7]

We found in this study the mean operative time was significantly lower in UD group (50.4±7.41 min) as compared to CS group (88.6±3.89 min). Thyroidectomy with ultrasonic dissector & conventional methods was compared by shemen in 2002, they operated in 50 minute with ultrasonic dissector while mean operative with conventional method was 80 min, these results were comparable with our study.[8] However much longer operative time was reported by Voutilainen and Haglund with both techniques i.e. (99min with UD and 134 min with conventional technique).[9] According our results drain output was 23.9±15 ml & 33.7 ±30.2 ml in UD & CS group respectively (p- value 0.024). Similar study by Grasso E, et al. showed that post operative oozing was less in UD group as compared to conventional techniques group i.e. (45±27 vs. 54±51 ml).[10] Akshaya et al showed that amount of post operative drain out was higher in both group however it was more with conventional (98.1±19.7 and 123.5±21.7 ml).[11] We found total hospital stay in UD Group was 2.60±1.06 days while it was 5.44±2.08 in CS Group (P-Value <0.000). Akshaya et al found longer hospital stay in both group, 4.6±0.8 days in Ultrasonic Dissector group and 5.8±0.8 days with conventional method.[11] Nadim khan & colleagues' findings were comparable with present study. They reported mean hospital stay 3.1+0.65 days after thyroidectomy with ultrasonic dissector .[12]

According to our results post operative hematoma / seroma formation was noted in 12% in each group. The rate of infection was 4 % and 12 % in UD and CS groups respectively. Literature showed both UD and Conventional methods have variable complications rate after thyroidectomy. Abdulameer Muhsin Aldaraji, Jeong JJ et al and Pardal-Refoyo JL reported hematoma /seroma formation in 9.52%, 2.7% and 5.13% cases respectively with conventional method.

While after UD use they found hematoma and seroma formation in 5%, 8.5% & 0.74% case respectively. [13, 14, 15] According to Yao et al, The utilization of Ultracision permits a more accurate dissection and a statistically significant reduction of intraoperative blood loss compared to the patients operated with conventional vessel ligation in thyroidectomy, no advantage in patients operated with Ligasure.[16]

Conclusion

On the basis of current study results we are able to conclude that not only the use of UD significantly decreases operative time compare to CS techniques with ties, clips, and/or electrocautery but it is also safer in terms of reducing the incidence of postoperative complications.

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