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Original Investigation

The approach of general surgeons to the use of vessel sealing device in thyroid surgery

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ABSTRACT

Objective: Vascular sealing devices (VSD) can be safely used in thyroid surgery. The purpose of this survey was to investigate general surgeons' approach to the use of VSD in thyroid surgery in Turkey.

Material and Methods: A questionnaire containing 10 items was prepared and announced via the Dialogue in Endocrinology Society website. The results were then analyzed.

Results: Fifty surgeons (65.8%) stated that they always use VSD, 20 (26.3%) stated that they sometimes use these devices and six (7.9%) declared that they never use VSD. Thirty-six surgeons (47.4%) reported that they use ligation all the time, and 42 (55.3%) stated that upper pole vessels should be ligated at least once. Twenty two point four percent of the responders stated that they faced a complication, which they thought was related to VSD.

Conclusion: The vast majority of surgeons routinely uses VSD and accepts it as a safe tool. However, the observed complication rate was very high.

Key Words: Thyroidectomy, vessel sealing device, complications

INTRODUCTION

Thyroid surgery was not routinely performed until the end of the 19th century due to high bleeding rates. Theodore Kocher standardized vascular control in thyroid surgery at the end of the 19th century, and achieved a significant reduction in mortality (1). Identification and preservation of the recurrent laryngeal nerve and parathyroid glands during thyroid surgery are both imperative (2). Vascular structures should be controlled diligently in order to protect these structures, and avoid damage to surrounding structures.

Vascular sealing devices (VSD) that have been introduced in the two thousands coagulate vascular structures. The coagulated vascular structures can be safely transected without requirement for further ligation. Although the current VSDs are not suitable for major arteries and veins, they are able to coagulate all vascular structures encountered during thyroid surgery. They are especially shown to provide significant reduction in operative time in thyroid surgery (1-5). Even though there is an increase in cost, some authors have reported that the increased cost is balanced with the shortening of operation time (6). In addition, VSD facilitates endoscopic thyroid operations significantly.

There are publications on the application of VSD during thyroid surgery from Turkey (5, 7-11). However, the trend of general surgeons in our country in using VSD during thyroid surgery is not known. This survey aimed to investigate general surgeons' approach to VSD in thyroid surgery in our country.

MATERIAL AND METHODS

A questionnaire consisting of 10 questions was prepared for this study (Appendix 1). This questionnaire was prepared and published on the internet site tr.surveymonkey.com. A general announcement was made through the Society of Dialogue in Endocrinology's website, and general surgeons were asked to participate in the survey. The surgeons were asked if they used VSD, their opinions on VSD, how they approached upper pole vascular structures, and if they encountered complications related to VSD. The data obtained in a period of two months were evaluated.

Statistical Analysis

The data were analyzed by using Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) 18.0 program. Inter-group evaluations were done by chi-square test. $p<0.05$ was considered statistically significant. For correlation analysis, $p<0.05$ was considered significant. The correlation coefficient 0.000 to 0.299 was accepted as weak correlation, 0.300 to 0.499 as low correlation, 0.500 to 0.699 as moderate correlation, 0.700 to 0.899 as strong correlation, and 0.900 to 1.000 as very strong correlation.

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RESULTS

Seventy-six general surgeons filled-in the survey. 43% of surveyed surgeons have been practicing general surgery for over 15 years (Table 1). 40% of surgeons surveyed were performing more than five thyroidectomies in a month (Table 2). Fifty surgeons reported that they (65.8%) always used VSDs, 20 (26.3%) that they sometimes used them, and six (7.9%) did not use VSDs at all. There was no correlation between expertise duration and the use of VSD (p=0.123), however, VSD utilization rate was higher among surgeons who performed more monthly thyroidectomies (p=0.001).

Seventy-four surgeons (97.4%) thought that VSD facilitated thyroidectomy. 67 surgeons (88.2%) thought that it can cause nerve damage, and 47 (61.8%) that VSD is a safe instrument. Reliance on its safety was higher among those who always used VSD than the remaining (p=0.009).

With regard to post-operative bleeding, 47 surgeons (61.8%) stated the rate of bleeding will not change, and 25 surgeons (32.9%) indicated that it will decrease bleeding. When surgeons were asked whether they completed the procedure without any ligation or not, 36 (47.4%) stated that they never complete the operation only by VSD, and only 6 (7.9%) reported that they did not use any ligature during the operation (Table 3). There was a positive weak correlation between expertise duration and completion of operation without ligation (correlation coefficient=0.247), and a positive low correlation between the number of monthly thyroidectomies and completion of operation without ligation (correlation coefficient=0.409).

With regard to how they approached upper pole vascular structures, 42 (55.8%) surgeons stated these structures should be ligated at least once, and 23 (30.3%) indicated that it is possible to proceed without ligation (Table 4). There was no correlation between expertise duration or the number of monthly thyroidectomies and completion of operation without ligation (p=0.547 and p=0.179).

There was no difference between surgeons who encountered complications related to VSD and those who did not in terms of VSD reliability, effect on the nerve, effect on post-operative bleeding, status of ligation use during operation and approach to the artery.

Finally, surgeons were asked if they encountered any complication associated with VSD. Of the respondents, 17 (22.4%) reported that they encountered complications that they thought to be associated with VSD.

DISCUSSION

It has been shown that vessel sealing devices can be safely used in open and endoscopic procedures in many specialties besides thyroid surgery (1-4, 12). Since hemostasis is one of the most important steps of thyroid operations, and it is a time consuming process, the use of VSD has gained wide acceptance in thyroid surgery.

It was identified that the vast majority of participants used VSD routinely in thyroid surgery. This is an indication that the VSD is being widely used in our country.

The finding that there was no correlation between expertise duration and the use of VSD suggests that surgeons who were trained in the era before the introduction of VSD adopted active use of VSD. It was observed that surgeons who performed less than two thyroidectomies a month used VSD less. It can be assumed that they did not use VSD because they did not have enough experience. From a different point of view, the observation that surgeons who perform more thyroid surgeries use VSD more frequently can be accepted as an indication that surgeons experienced in thyroid surgery do trust VSD.

The evaluation of surgeon opinion on VSD showed that majority of them thought that VSD facilitates operations, and nearly 2/3 found VSD reliable. However, contrary to the reliability rate, most surgeons thought that VSD may result in nerve damage. It is reported that while VSDs coagulate vascular structures up to 7 mm, they may have a thermal effect on the surrounding area of 2-3 mm (13). This is especially important while working in the recurrent laryngeal nerve area. In light of this information, concerns in terms of nerve damage seem to be justified.

Table 1. Expertise duration of surgeons

Expertise (years)	n	%
0-5	20	26.3
6-10	11	14.5
11-15	12	15.8
>15	33	43.4

Table 2. Monthly thyroidectomy procedures

Monthly thyroidectomy number	n	%
0-2	18	23.7
3-5	28	36.8
6-10	21	27.6
>10	9	11.8

Table 3. Rates of completion of surgery without ligation

Completion of surgery without ligation	n	%
Always	6	7.9
Mostly	22	28.9
Sometimes	12	15.8
Never	36	47.4

Table 4. Surgeon opinion on upper pole vascular control

Upper pole vascular control	n	%
Ligation can be avoided	23	30,3
Should be ligated at least once	42	55,3
Should be ligated at least twice	11	14,5

Nevertheless, it is difficult to explain why surgeons think that VSD is reliable and that it can lead to nerve damage both at the same time. This finding can be interpreted as the surgeon thinking that VSD will allow for a safe surgery without nerve damage if carefully used.

According to our survey, 2/3rd of surgeons thought that post-operative bleeding rate will not change, and 1/3 thought it will reduce post-operative bleeding. Although bleeding with VSD application has been reported in the literature, many studies showed that it was not different than the bleeding rates associated with classical methods (4, 12). In our survey, nearly half of the surgeons always used ligation during the operation, while 1/3rd completed the operation without routine ligation. Although it was not statistically significant, it was observed that surgeons with a longer expertise used ligation less as compared to those with shorter expertise. In conclusion, more than half of the surgeons who participated in the survey stated that upper pole vessels should be ligated at least once, and less than one third thought that upper pole vascular structures can be transected with VSD only, without further ligation.

When surgeons were asked whether they encountered any complication related to VSD, a complication rate of 22% was reported. The rate in this study was higher as compared to the rate of complications associated with VSD in the literature (4, 6). The approach to upper pole arteries by surgeons who encountered complications were not different from other surgeons, suggesting that the complications were related to nerve damage.

There are some limitations to the study. The number of surgeons surveyed in this study is very small, causing a decrease in power of the study. Because the survey was announced through an endocrine surgery association, surgeons who are not interested in endocrine surgery may not be aware of this survey. In this case, the results reflect surgeons dealing with endocrine surgery. As seen in the survey, more than 1/3rd of participating surgeons stated that they performed more than 6 thyroidectomies in a month. This may result in revealing an incorrect general trend. The survey did not include a question on the nature of complications; therefore, it is not known whether these complications were related to bleeding or nerve damage.

CONCLUSION

In our country, it is observed that many surgeons use VSD in thyroid surgery. The majority of surgeons reported that VSD is a reliable tool; nevertheless, they also stated that the upper pole artery should be ligated at least once. Due to the high number of surgeons that faced with a complication associated with vascular sealing devices, efforts in this regard is expected to be useful in pointing out these complications. Although surveys' level of evidence is low, they are important in determining the overall trend.

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Appendix -1. Survey questions

1. For how long have you been a general surgeon?

A) 0-5
B) 6-10
C) 11-15
D) >15

2. How many thyroidectomies do you perform in a month?

A) 0-2
B) 3-5
C) 6-10
D) >10

3. Do you use vessel sealing devices (VSD) during thyroidectomy?

A) Always
B) Sometimes
C) Never

4. Do you think VSD facilitates surgery?

A) 0-2
B) 3-5
C) 6-10
D) >10

5. Do you think VSD enables a safer procedure?

A) Yes
B) No

6. Do you think that VSD may cause nerve injury near the RLN?

A) Yes
B) No

7. What effect do you think VSD has on postoperative bleeding risk?

A) Decreased risk
B) Does not effect
C) Increased risk

8. Do you complete the operation without using ligation?

A) Always
B) Most of the time
C) Sometimes
D) Never

9. How should the main arteries be approached?

A) May be transected with VSD only, without ligation
B) Should be ligated at least once
C) Should be ligated at least twice

10. Did you encounter any complications that you related with utilization of this instrument?

A) Yes
B) No