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OUTCOMES OF WOUND STATUS IN ELECTRODISSECTION VERSUS SCALPEL/SCISSORS DISSECTION IN FLAP ELEVATION IN HEMITHYROIDECTOMY

ABSTRACT

Objective:

The objective of this study was to compare the effects of electrodissection and scalpel or scissors dissection (cold dissection) during the flap elevation on wound status in hemithyroidectomy.

Materials and methods:

Forty patients undergoing hemithyroidectomy for various pathologies were selected from outpatient department and were randomly assigned to either electrodissection(group A) or scissors/scalpel(cold) dissection (group B) for subplatysmal flap elevation during hemithyroidectomy. Wound was assessed from first postoperative day (1st POD) to sixth postoperative (6th POD) for wound inflammation and flap edema.

Results:

40 patients that were included in the study with 20 patients in each group. There was no case of infection in either group. There were two cases of flap edema in group A (electrodissection)

Conclusion:

Electrodissection is as convenient as scalpel/scissors (cold dissection) for subplatysmal flap elevation during hemithyroidectomy and not associated with increased rate of wound infection, flap oedema or post operative pain.

Keywords: Cold dissection, Electrodissection, Flap elevation, Hemithyroidectomy, Scalpel/scissors dissection

INTRODUCTION

Thyroid surgery is one of the common surgeries performed in the head and neck region for various pathologies.[1] With the general development in the surgical techniques and instrumentation and the improvements in antisepsis and anaesthetic techniques, morbidity of thyroid surgery has been reduced.[2] Electrocautery has been widely used by general surgeons to create abdominal and thoracic incisions and cutaneous flaps. Although increasing clinical evidences demonstrate that the use of electrocautery is as safe as the use of scalpel and does not have an increased risk of wound complications, the fear of delayed wound healing and the risk of infection is continued. The results of the electrocautery have been conflicting.[3] Conventionally a scalpel has been used to make a surgical incision and dissection of the flaps, however, since its introduction in the early part of the 20th century, electrosurgery has been widely used as an alternative tool for creating an incision and flaps. Two different surgical effects can be achieved with electrosurgery namely cutting and coagulating. In the cutting mode, a continuous current is used to rapidly produce extreme heat causing the intracellular water to boil and the cells to explode into steam(vapourization). By moving the electrode quickly, more cells vapourize and the tissue is divided with minimal devitalized or charred tissue left along the margin of the cut surface. Thermal damage is minimized because the heat evaporates in the steam and is not conducted through the cut tissues which could dry out the adjacent cells. In the coagulating mode, short bursts of electrical current with a pause between each burst are applied. As a result, the heat produced in the cells is not intense enough to evaporate intracellular water, and desiccation occurs instead. The coagulating mode results in a greater degree of thermal damage and necrosis of adjacent tissues.[4]

Data from animal studies have consistently shown that the surgical wound created with electrosurgery (especially coagulation current) has more extensive tissue necrosis and inflammatory response and a significant reduction in the tensile strength of the healing wounds.[5] In addition, the use of electrosurgery is associated with increased adhesion formation between the incision and abdominal viscera due to an outflowing of fibrin onto the more traumatized animal tissue. Despite the discouraging data from animal studies, human data have provided a contradictory view. A 10-year prospective observational study of 62,939 surgical wounds has suggested that infection rates of clean wounds were the same between patients whose incisions were made with electrosurgery and those made with the scalpel.[6]

In the surgical procedure of hemithyroidectomy, after marking the skin the surgeon gives collar incision by scalpel which is deep through skin and platysma. It is followed by subplatysmal flap elevation which is carried out either using scalpel/scissors (cold dissection) or electrosurgery (electrodissection).[1] In our center, surgeons use either electrodissection or cold dissection during the elevation of subplatysmal flap according to their convenience and this study may help to find out if wound complications can be attributed to the dissection type and thus can modify the surgical technique accordingly which will be beneficial to the patient.

MATERIALS AND METHODS

It was a prospective, longitudinal, randomized study conducted in Ganesh Man Singh Memorial Academy of ENT and HNS, Tribhuvan University Teaching Hospital, Institute of Medicine, Maharajgunj, Kathmandu, Nepal for a period of 22 months starting from 1st Oct, 2008 to 31st July, 2010.

The patients who presented to the outpatient department with thyroid swelling were initially evaluated by history and clinical examination and the patients were advised for fine needle aspiration cytology(FNAC), ultrasonography(USG) of the neck focusing on the thyroid gland and thyroid function test(TFT). Patients of more than 12 years of age of both genders planned for hemithyroidectomy for any surgical pathology were included in the study and were admitted one day prior to the surgery in the ward. The investigations required for fitness of general anaesthesia were sent as per guidelines of Department of Anaesthesia, Tribhuvan University Teaching Hospital. Patients' particulars were noted in the performa designed for this study. Prophylactic antibiotic with combination of oral Ampicillin and Cloxacillin 1gm was started one day prior to the day of surgery. All the surgeries were performed by the senior surgeons. Horizontal skin incision was marked two fingers above the suprasternal notch followed by infiltration of local anaesthesia. The patients went simple randomization by a lottery method just prior to the incision and the dissection for subplatysmal flap elevation was performed by the technique(electrocautery or scissors/scalpel dissection) whichever appeared in the lottery.

Blood loss was calculated by counting the special gauze pieces of dimensions of 35cmx30 cm which were soaked in normal saline and squeezed. Gauzes which were completely soaked with blood were equivalent to 7 ml and which were partially soaked were equivalent to 3.5 ml. Blood loss in the drain was calculated by the formula; Blood loss=total drain –volume of(normal saline +povidone iodine).Negative suction drain (romovac) of size 14 was placed through a separate incision. Wound closure was done in three layers. Muscle and subcutaneous ladyers were closed with vicryl 3-0 and skin was closed with ethilon 5-0. Aseptic dressing was applied and bandaged. Total duration of surgery was noted from trolley to trolley time.

In the post operative period patients received combined capsule of Ampicillin and Cloxacillin one gm every eight hour for seven days after surgery. Patients were observed in the ward from first POD to sixth POD with daily dressing of the wound site and measuring the drain volume.

Wound was assessed for; flap edema and wound inflammation (Grade 1-erythema, induration and pain, Grade2-same as grade-1 and serous fluid, Grade3-the presence of contaminated/ inflammatory fluid in less than half wound, Grade4- the presence of contaminated/ inflammatory fluid in more than half wound)

In addition to the above parameters, the wound was also assessed for haematoma, seroma and wound gaping and other complications like recurrent laryngeal nerve palsy/paresis and features of hypocalcemia were also noted .

The negative suction drain was removed once the volume of the drain was less than 25 ml and the sutures were removed on the sixth POD and patient was sent home. All the details were noted in the performa which was specially designed for this study.

RESULTS

There were a total of 43 cases that were planned hemithyroidectomy during the study period but three cases were excluded. Two of the excluded cases underwent subtotal thyroidectomy as the

thyroid nodules were extending to the other lobe which was detected in the operating table and one case could not be included because the drain got extruded by itself while shifting the patient from the recovery room to the ward. In this study, female outnumbered the male population, 36 females and four male patients. The minimum age of the patient was 17 years and the oldest patient in the study was 63 years old. The mean age was 37.1 years.

Out of 40 cases that underwent hemithyroidectomy, three cases were malignant (papillary carcinoma) and the rest were benign. The most common indication for hemithyroidectomy was for colloid goiter in both the groups (Fig. I).

Effects of elecrodissection and scissors/scalpel

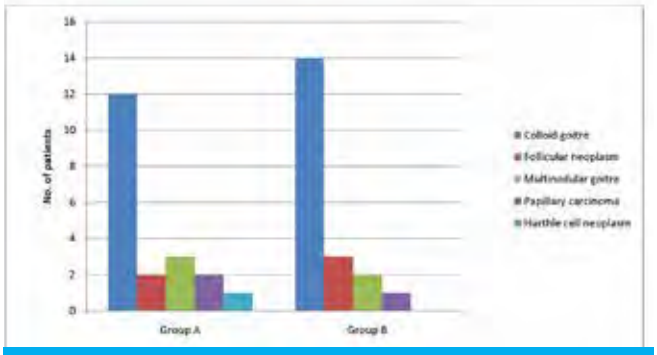

Figure I : Indication of Surgery in two groups

dissection (cold dissection) in the wound status: Two parameters under study were flap oedema and wound inflammation. There was no case of wound inflammation in either group. There were two cases of flap oedema in group A (electrodissection) but there was no case of flap oedema in group B (cold dissection). However, this was not statistically significant. (p value: 0.143). Both cases of flap oedema developed on the second post operative day(POD), one of which subsided on the fifth POD and the other case subsided during the follow up at two weeks observed in the out patient clinic .Both the patients were discharged on sixth POD and hospital stay was not prolonged (Table 1).

Table 1: Wound status in two groups

Wound status	Group A	Group B	Total
Wound inflammation	0	0	0
Flap oedema	2	0	2

Other parameter that was observed was amount of blood loss during surgery and there was no significant difference between the two groups. In group A, the average blood loss was 119 ml and in group B it was 113.3 ml. The average duration of surgery was 85.1 minutes and 85.6 minutes in group A and group B respectively. There was a case of dermatitis which appeared on second POD in the area of application of povidone iodine which subsided on the day of discharge. There were two cases of recurrent nerve paresis on the side of hemithyroidectomy in group B which persisted from first POD to sixth POD.

DISCUSSION

The main objective of this study was to compare the effects of electrodissection or cold dissection on the flap elevation in hemithyroidectomy on postoperative wound complications that included four grades of wound inflammation and flap oedema. Thyroid surgery is a common surgery performed in the head and region. In a retrospective study carried by D.K. Baskota et al. in the Department of ENT Head and Neck Surgery, Tribhuvan University Teaching Hospital (TUTH), Nepal. hemithyroidectomy was the most common surgery(63 out of 103) among the thyroid surgeries performed from 2002 to 2005.[7]

Clean surgery is almost always elective and is performed under sterile conditions, hemithyroidectomy is an elective surgery performed for various benign and malignant pathology. Surgical site infections risk is minimal and usually originates from contaminants of the operating theatre environment, the surgical team or, most commonly, skin flora.[8] Surgical site infection rates in clean surgery should be 2% or less, depending upon other clinical variables.[10] In our study the patients received antibiotics one day prior to surgery which is a routine protocol for all the patients undergoing surgery in the unit of head and neck surgery whereas in the study of Umut Barbaros et al. the patients did not receive antibiotic considering elective thyroidectomy as clean surgery. There was a total of 43 cases that were selected for the study however, only 40 cases were included. Our sample size was relatively small owing to the fact that only hemithyroidectomy was included for the uniformity of the surgery. Out of 40 patients 36 were females and 4 were males therefore female/male ratio was 9:1 whereas it was 6.2/1 (n-206/33) in the study of Umut Barbaros et al. and it was as high as 10.4:1 in the study of Baskota et al.[7] In our study, the overall mean age of the patient was 37.1 years. The age range varies in different studies and the mean age is above 30 years in many studies. Colloid goiter was the most common indication for hemithyroidectomy in our study.

There was no single wound infection in our study. Other literature also show that infection rate in clean surgery is less than 2%. The

incidence of wound infection is less than 1% of all thyroidectomy. Wound infection was seen in three (2.4%) cases out of 124 patients in an study of LJ Fon[9] the rate of infection is as low as 1.2% [10] and not seen in the study of Lee HS et al.[12] In the study by Umut Barbaros et al.[7] the infection rate was 2.9% ie. 7 patients out of 239 patients. This is higher compared to the thyroidectomy series in the literature ,However, the majority of patients classified to have wound infection in their study had grade 1 wound infection (cellulitis). There were 2 cases of flap oedema in Group A(Electrodissection) in our study, however it was not statistically significant.

In our study, there were forty recurrent laryngeal nerves at risk out of which two patients had RLN paresis. However, as the patients had only one week of follow up in the ward, these findings are only of 1 week post operative period. Transient recurrent laryngeal nerve palsy were noted 0.8%[11] ,2.4%[10] and permanent recurrent laryngeal nerve palsy rates were 0.4%.[11] In our study, there were no cases of hypocalcaemia in the immediate one week period after the surgery. Majority of drain were removed on second POD in both the groups and all the drain were removed after third POD. Similarly in study by Celso et al [13] there was no statistically significant difference in the number of days before removing drains (GA -3.2 days; LA 3.1 days). In the study by Prichard et al [14] there was no significant difference in drain or with no drain. The total mean amount of drain in Group A was 71.0 ml while in Group B was 92.6 ml which was statistically significant difference between the mean amount of drain between the two groups. This study possessed potential limitations such as small sample size and several surgeons performing the surgery. We could have recorded separately the blood loss during the flap elevation for each procedure to see the difference.

CONCLUSION

This study has shown that there is no statistical difference on wound status in electrodissection and scalpel /scissors dissection (cold dissection) in flap elevation in hemithyroidectomy. There was no wound infection in 40 cases of hemithyroidectomies. There were 2 cases of flap oedema in electrodissection however, it was not statistically significant.

Similar studies with larger sample size would be more representative. There have been concerns that electrodissection might be associated with more pain so including other study parameters such as pain would further clarify the effects of electrodissection.

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