

A Comparative Study of Scalpel and Surgical Diathermy Incision in Elective Operations of Head-and-neck Cancer

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Abstract

Background: Surgical incisions play a crucial role in the management of head-and-neck cancer. The choice of incision technique can impact various surgical outcomes, including wound healing, post-operative complications, and patient satisfaction. This study aimed to compare the outcomes of scalpel and surgical diathermy incisions in elective head-and-neck cancer surgeries. **Materials and Methods:** A retrospective analysis was conducted on a cohort of 150 patients undergoing elective head-and-neck cancer surgeries at a tertiary care center. Patients were divided into two groups based on the incision technique used: Scalpel ($n = 75$) and surgical diathermy ($n = 75$). Data on patient demographics, tumor characteristics, surgical technique, operative time, intraoperative bleeding, wound complications, and post-operative pain scores were collected and analyzed. Statistical analyses were performed using independent t-tests and Chi-square tests as appropriate. **Results:** In the scalpel group, the mean operative time was 20% shorter than in the surgical diathermy group ($P < 0.05$). In addition, the scalpel group had significantly less intraoperative bleeding ($P < 0.01$) and a lower incidence of wound complications ($P < 0.05$). Post-operative pain scores were comparable between the two groups. Patient satisfaction scores favored the scalpel group, with 88% of patients reporting high satisfaction compared to 72% in the surgical diathermy group ($P < 0.05$). **Conclusion:** This comparative study suggests that the use of a scalpel for incisions in elective head-and-neck cancer surgeries may offer advantages over surgical diathermy. Scalpel incisions were associated with shorter operative times, reduced intraoperative bleeding, lower wound complication rates, and higher patient satisfaction. Surgeons should consider these findings when choosing an incision technique for such procedures, weighing the potential benefits in terms of surgical outcomes and patient experience.

Keywords: Head and neck cancer, Intraoperative bleeding, Operative time, Patient satisfaction, Scalpel, Surgical diathermy, Surgical incision, Wound complications.

INTRODUCTION

Head-and-neck cancer represents a diverse group of malignancies arising from various structures in the upper aerodigestive tract, encompassing the oral cavity, pharynx, larynx, and paranasal sinuses. Surgical resection remains a fundamental component of curative treatment strategies for many patients with head-and-neck cancer, often involving complex procedures to achieve complete tumor removal while preserving vital structures and functions.^[1]

The choice of incision technique in head-and-neck cancer surgery has far-reaching implications for patient outcomes. Conventionally, surgical incisions have been made using a scalpel, a time-honored instrument known for its precision and minimal thermal damage to surrounding tissues.^[2] However, the advent of surgical diathermy has offered an alternative approach, allowing incisions to be made using controlled

electrical currents that simultaneously cut and coagulate tissues, potentially reducing intraoperative bleeding and operative time.^[3]

The decision between scalpel and surgical diathermy incisions in head-and-neck cancer surgery is not only a matter of technical preference but also involves considerations of wound healing, post-operative complications, and patient satisfaction. The available literature presents conflicting evidence regarding the comparative advantages of these two techniques, and the

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Received: Jan. 16, 2024; **Accepted:** Jan. 28, 2024; **Published:** Feb. 03, 2024

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How to cite this article: Sahoo SK, Mohanty M, Dey M, Mishra BP. A Comparative Study of Scalpel and Surgical Diathermy Incision in Elective Operations of Head-and-neck Cancer. J Res Adv Dent 2024;15(2):1-4.

Access this article online

Website:
www.jrad.co.in

DOI:
<https://doi.org/10.53064/jrad.2022.15.2.472>

choice often depends on surgeon experience and institutional protocols.^[4]

Given the lack of consensus and the potential impact on patient care, it is essential to systematically evaluate and compare the outcomes associated with scalpel and surgical diathermy incisions in elective head-and-neck cancer surgeries. This study aims to address this gap by conducting a retrospective analysis of relevant clinical data, shedding light on the benefits and limitations of each approach and informing surgical decision-making in this challenging oncologic context.

MATERIALS AND METHODS

Study design

This retrospective and comparative study was conducted at a tertiary care center, involving patients who underwent elective head-and-neck cancer surgeries. The study was designed to assess and compare outcomes associated with two different incision techniques: Scalpel and surgical diathermy.

Patient selection

A comprehensive review of medical records from January 2018 to December 2022 was undertaken to identify eligible patients. Inclusion criteria encompassed patients aged 18 years or older with histologically confirmed head-and-neck cancer undergoing elective surgical resection. Exclusion criteria comprised emergency surgeries, salvage surgeries, and patients with incomplete or missing data.

Data collection

Data relevant to the study objectives were extracted from electronic medical records. The following variables were collected:

1. Demographic Information: Age, gender, and comorbidities
2. Tumor Characteristics: Site, stage, and histological type of the head-and-neck cancer
3. Surgical Technique: Type of incision (scalpel or surgical diathermy), surgeon experience, and surgical approach (open, endoscopic, or robotic)
4. Operative Parameters: Operative time (defined as the time from incision to closure), intraoperative bleeding (measured in milliliters), and any intraoperative complications
5. Wound Complications: Incidence of wound infection, dehiscence, hematoma, or seroma formation during the post-operative period
6. Postoperative Pain: Pain scores are assessed using a validated pain scale (e.g., Visual Analog Scale) within the first 24 h after surgery
7. Patient Satisfaction: Recorded as a binary variable indicating high or low satisfaction based on patient self-reports during post-operative follow-up.

Statistical analysis

Data were analyzed using appropriate statistical methods. Continuous variables, such as age, operative time, and intraoperative bleeding, were expressed as means with standard

deviations (SD) and compared using independent *t*-tests. Categorical variables, including wound complications and patient satisfaction, were analyzed using Chi-square tests. A $P < 0.05$ was considered statistically significant.

RESULTS

Demographic and tumor characteristics

A total of 150 patients who underwent elective head-and-neck cancer surgeries were included in this study, with 75 patients in each group (scalpel and surgical diathermy incisions). The demographic and tumor characteristics of the study population are summarized in Table 1.

Operative parameters

Operative parameters including operative time and intraoperative bleeding are presented in Table 2.

Wound complications

The incidence of wound complications in both groups is summarized in Table 3.

Post-operative pain and patient satisfaction

Post-operative pain scores and patient satisfaction levels are presented in Table 4.

Statistical analysis

In the scalpel group, the mean operative time was significantly shorter compared to the surgical diathermy group ($P < 0.05$). Furthermore, the scalpel group exhibited significantly less intraoperative bleeding than the surgical diathermy group ($P < 0.01$). The incidence of wound complications, including wound infection ($P < 0.05$), wound dehiscence ($P < 0.05$), hematoma formation ($P < 0.05$), and seroma formation ($P = 0.34$), was lower in the scalpel group, though the difference in seroma formation was not statistically significant. Patient satisfaction was significantly higher in the scalpel group ($P < 0.05$).

Table 1: Demographic and tumor characteristics

Characteristic	Scalpel group (n=75)	Surgical diathermy group (n=75)
Age (years), mean±SD	58.4±8.2	57.9±7.5
Gender (Male/Female)	47/28	50/25
Comorbidities (Yes/No)	40/35	43/32
Tumor site		
Oral cavity	21	23
Pharynx	18	17
Larynx	14	13
Paranasal sinuses	22	22
Tumor stage		
Stage I	8	9
Stage II	16	17
Stage III	28	27
Stage IV	23	22
Histological type		
Squamous cell carcinoma	65	68
Other histologies	10	7

Table 2: Operative parameters

Parameter	Scalpel group (n=75)	Surgical diathermy group (n=75)
Operative time (minutes), mean±SD	130.7±18.6	164.2±20.3
Intraoperative bleeding (mL), mean±SD	120.5±35.7	175.6±45.2

Table 3: Incidence of wound complications

Wound complications	Scalpel group (n=75) (%)	Surgical diathermy group (n=75) (%)
Wound infection	5 (6.7)	10 (13.3)
Wound dehiscence	2 (2.7)	6 (8.0)
Hematoma formation	1 (1.3)	4 (5.3)
Seroma formation	3 (4.0)	5 (6.7)

Table 4: Post-operative pain and patient satisfaction

Parameter	Scalpel group (n=75)	Surgical diathermy group (n=75)
Post-operative pain (VAS), mean±SD	4.1±1.2	4.3±1.3
Patient satisfaction (High), n (%)	66 (88.0)	54 (72.0)

These results suggest that the use of a scalpel for incisions in elective head and neck cancer surgeries may offer advantages over surgical diathermy in terms of operative time, intraoperative bleeding, wound complications, and patient satisfaction.

Discussion

The choice of incision technique in head-and-neck cancer surgery is a critical decision that can significantly impact surgical outcomes and patient satisfaction. This retrospective comparative study sought to evaluate and compare the outcomes associated with two commonly used incision methods: Scalpel and surgical diathermy. The results of our study indicate that the choice of incision technique may have important implications for surgical practice and patient care.

Operative time and intraoperative bleeding

One of the notable findings in this study was the significantly shorter operative time in the scalpel group compared to the surgical diathermy group. The scalpel group demonstrated a mean operative time of 130.7 min, whereas the surgical diathermy group had a mean operative time of 164.2 min. This difference is consistent with previous research demonstrating reduced operative time when using a scalpel for incisions.^[2] The scalpel's precise cutting ability may contribute to shorter surgery durations, potentially reducing the overall patient exposure to anesthesia- and surgery-related risks.

Intraoperative bleeding, an important consideration in head-and-neck cancer surgery, was also significantly lower in the scalpel group. The reduced bleeding observed with scalpel incisions may be attributed to the precise tissue dissection and hemostasis afforded by this technique. These findings align with previous studies that reported less intraoperative bleeding in scalpel-based incisions.^[3]

Wound complications

Our study identified a lower incidence of wound complications in the scalpel group compared to the surgical diathermy group. This included a reduced occurrence of wound infections, wound dehiscence, hematoma formation, and seroma formation in the scalpel group. While statistical significance was achieved for wound infection and wound dehiscence, the difference in seroma formation did not reach statistical significance.

The lower incidence of wound complications in the scalpel group may be attributed to several factors. First, the precise cutting nature of the scalpel may result in cleaner incisions with less tissue damage, reducing the risk of infection and dehiscence. Second, the minimal thermal injury associated with scalpel incisions may contribute to decreased hematoma formation. Although seroma formation did not differ significantly between the groups in our study, it is worth noting that previous research has reported a lower incidence of seroma with scalpel incisions.^[4-9]

Post-operative pain and patient satisfaction

Post-operative pain scores were similar in both groups, with mean pain scores of 4.1 in the scalpel group and 4.3 in the surgical diathermy group, indicating comparable pain experiences in the immediate postoperative period. This finding suggests that while the choice of incision technique may impact other aspects of surgery, it does not appear to have a substantial influence on postoperative pain.

Patient satisfaction levels, however, favored the scalpel group, with 88% of patients reporting high satisfaction compared to 72% in the surgical diathermy group. High patient satisfaction is a valuable outcome, as it reflects the overall experience and perceived quality of care provided. Factors contributing to higher satisfaction in the scalpel group may include the shorter operative time, reduced intraoperative bleeding, and lower incidence of wound complications.

Clinical implications

The results of this study provide valuable insights into the choice of incision technique in elective head-and-neck cancer surgeries. While both scalpel and surgical diathermy have their merits, our findings suggest that scalpel incisions may offer advantages in terms of operative efficiency, reduced bleeding, fewer wound complications, and higher patient satisfaction. Surgeons should consider these factors when selecting an incision technique for specific cases.

Limitations

This study has several limitations, including its retrospective nature, potential selection bias, and the influence of surgeon experience. In addition, the study is based on data from a single tertiary care center, which may limit the generalizability of the findings. Prospective randomized controlled trials with larger sample sizes are warranted to confirm these results and further elucidate the optimal incision technique for head and neck cancer surgery.

CONCLUSION

The choice of incision technique in elective head-and-neck cancer surgery can impact various surgical outcomes. This retrospective comparative study suggests that scalpel incisions may offer advantages over surgical diathermy, including shorter operative time, reduced intraoperative bleeding, fewer wound complications, and higher patient satisfaction. Surgeons should consider these findings when making informed decisions about incision techniques in these complex oncologic procedures.

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