Internasional Journal of Integrative Sciences (IJIS)
Vol.5, No.1, 2026: 207-220

General Anesthesia for Wide Excision + Flap Procedure

Haur Syakira Radra[1*], Raissa Amanda Helsah[2], Dicky Noviar[3]
Universitas Malikussaleh Rumah Sakit Umum Cut Meutia
Corresponding Author: Haur Syakira Radra haur.200610069@mhs.unimal.ac.id

A R T I C L E I N F O

Keywords: Malignant Peripheral Nerve Sheath Tumor, General Anesthesia, Laryngeal Mask Airway

Received : 1 November 2025
Revised : 25 December 2025
Accepted: 14 January 2026

A B S T R A C T

Malignant peripheral nerve sheath tumor (MPNST) is a rare and aggressive soft tissue malignancy with a high risk of local recurrence, requiring wide excision with adequate margins followed by reconstructive procedures. Anesthesia management in head and neck oncologic surgery presents specific challenges related to airway control and hemodynamic stability. This article reports the anesthetic management of a 57-year-old male patient diagnosed with a malignant peripheral nerve sheath tumor in the right parietal region who underwent wide excision and flap reconstruction under general anesthesia using a laryngeal mask airway (LMA). Pre-anesthetic evaluation classified the patient as ASA physical status II with no significant systemic comorbidities. Anesthesia was induced with propofol and fentanyl, and airway management was achieved successfully using an LMA. Intraoperative monitoring demonstrated stable hemodynamic parameters and adequate oxygenation throughout the procedure. Postoperative recovery was uneventful, with good pain control and no airway-related complications. This case demonstrates that general anesthesia with LMA can be a safe and effective airway management option for selected head tumor surgeries with low aspiration risk and moderate operative duration

INTRODUCTION

Wide excision is a surgical procedure aimed at removing the entire tumor tissue along with a margin of healthy tissue around it to prevent local recurrence. This procedure is the main standard management for various types of solid tumors, including malignant peripheral nerve sheath tumor (MPNST), which is a malignant neoplasm originating from peripheral nerve tissue, Schwann cells, or mesenchymal tissue associated with nerves(1).

MPNST is classified as a rare tumor with an incidence of approximately 0.001% of the general population, but it has a poor prognosis and a high rate of local recurrence, reaching 40–60% (2). This tumor often occurs in the extremities and trunk, but it can also appear in the head and neck region. Due to its infiltrative and aggressive nature, the main management is wide surgical excision with tumor-free margins, accompanied by tissue reconstruction procedures such as flaps or skin grafts to cover post-excision defects (3).

In head and neck oncologic surgery, one of the main challenges for the anesthesia team is maintaining hemodynamic stability, airway control, and effective perioperative pain management. In this regard, general anesthesia is often the preferred choice because it provides optimal muscle relaxation, good ventilation control, and comfort for both the patient and the operator(4).

One of the tools commonly used in general anesthesia is the Laryngeal Mask Airway (LMA). The LMA is a supraglottic airway device that provides effective ventilation without the need for endotracheal intubation. Its advantages include easier insertion, minimal airway trauma, and rapid recovery. The use of an LMA is suitable for procedures with a low risk of aspiration and moderate duration, such as head tumor surgeries that do not involve the oral cavity(5). This case report discusses the application of general anesthesia with LMA in a patient with a malignant peripheral nerve sheath tumor in the parietal region undergoing wide excision and flap procedure, covering aspects of pre-anesthesia evaluation, intraoperative management, and postoperative care, with an emphasis on patient safety principles and hemodynamic stability.

Case Review

1. Patient Identity

Name	: Tn. R
Gender	: Laki-laki
Age	: 57 Tahun
Address	: Bener Meriah, Aceh Tengah
Religion	: Islam
Ethnicity	: Aceh
Medical Record No.	:12.07.37
Admission Date	: 8 Oktober 2025
Date of Examination and Procedure	: 9 Oktober 2025

2. Anamnesis

Chief Complaint

A lump on the right side of the head.

Additional Complaints

The lump feels itchy and throbbing, and over time the lump enlarges and makes it difficult to sleep because it is bothersome.

History of Present Illness

The patient came to the Oncology Clinic at RSU Cut Meutia with a complaint of a lump on the right side of the head for 8 months before being admitted to the hospital. The lump was accompanied by itching and throbbing, gradually increasing in size, and the patient complained of difficulty sleeping due to the disturbing lump; pain was denied. The patient stated that initially the lump appeared only about 3 cm, then it grew to approximately 10 cm. The patient said they had sought treatment at a nearby community health center, but there was no significant improvement. The patient reported no complaints of nausea, vomiting, or decreased appetite, and urination and bowel movements were within normal limits.

Past Medical History

Asthma (-), Hypertension (-), Diabetes Mellitus (-), Drug Allergy (-)

Family Medical History

The patient stated that no family members have experienced similar complaints.

Medication History

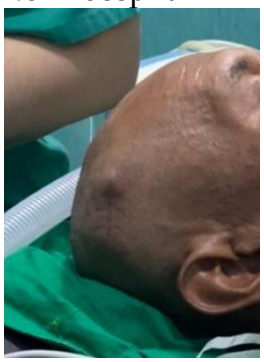
The patient says they have visited a community health center and were given an ointment for their head, but there was no significant improvement.

The patient is a farmer and falls into the middle-income economic category, with medical expenses covered by BPJS.

3. Vital Signs

General Condition	: Appears moderately ill
Consciousness	: Compos mentis (E4M6V5)
Blood Pressure	: 125/70 mmHg
Pulse Rate	: 80 bpm
Respiratory Rate	: 19 breaths/min
Body Temperature	: 36.8^{o}C
SpO2	: 99%
VAS Score	: 6
Weight	: 65 kg
Height	: 170 cm

Table 1. General Status

1.	**Head**	
	Head	Normocephali  There is a mass in the right parietal region with a diameter of 10 round in shape, solid, well-defined borders, fixed, and the same the skin. No edema or ulceration is observed.
	Hair	Black hair color, not easily pulled out, evenly distributed
	Face	Symmetrical, no deformity, no edema
	Eye	Conjunctiva anemic (-/-), sclera icteric (-/-), eyes sunken (-/-), e edema (-/-), eye movements normal, pupils round and isocoric (2mm/2mm), direct and indirect light reflexes (+/+)
	Ear	Normal form (eutrophilia), otorrhea (-/-), secretion (-/-), blood (-
	Nose	Secretions (-/-), blood (-/-), nasal septum deviation (-/-), normal of smell, nostril breathing (-)
3.	**Neck**	
	Inspection	The thyroid gland is not enlarged, the trachea is midline (+), lymph node enlargement (-)
	Palpation	Thyroid gland enlargement (-), lymph node enlargement (-), jugular vein distension (-)
	Auscultation	Noise (-)
4.	**Thorax**	
	Lung	
	Inspection	Normal chest shape, symmetrical chest movement on the right and left during static and dynamic phases (+/+), no chest retraction (-), no mass lump (-)
	Palpation	No lumps or masses, right and left lung fremitus symmetrical, no tenderness on palpation of the chest wall
	Percussion	Resonant on both lung fields
	Auscultation	Vesicular (+/+), Rhonchi (-/-), Wheezing (-/-)
	Heart	
	Inspection	The cardiac impulse is not visible at the left midclavicular line
	Palpation	Ictus cordis teraba di ICS V linea midclavicula sinistra

	Percussion	The upper border of the heart along the left parasternal line at the level of the 2nd intercostal space; the right border of the heart along the right parasternal line at the level of the 5th intercostal space; the left border of the heart two fingerbreadths medial from the midclavicular line at the level of the 5th intercostal space, the waist border at the level of the left parasternal line at the 3rd intercostal space.
	Auscultation	Heart sounds I-II normal, regular rhythm, no heart murmurs, no gallop
5.	**Abdomen**	
	Inspection	Distension (-), skin color changes (-), mass (-)
	Palpation	Soft (+), muscular defense (-), tenderness (-), tenderness (-), no palpable mass.
	Liver	No palpable enlargement of the liver
	Spleen	No palpable enlargement of the spleen
	Kidney	Ballotement (-), percussion pain (-/-)
	Percussion	Shifting dullness (-), tympany on the abdominal area (-)
	Auscultation	Increased intestinal peristalsis (-)
6.	**Genitalia**	No examination was performed
7.	**Extremity**	
	Superior	Inspection: cyanosis (-/-), muscle atrophy (-/-), deformities (-/-), edema (-/-), clubbing of fingers (-/-), petechiae (-/-) Palpation: acral warm (+/+), arm edema (-/-), capillary refill time <2 seconds, pain (-/-)
	Inferior	Inspection: cyanosis (-/-), muscle atrophy (-/-), deformities (-/-), edema (-/-), gangrene (-/-), petechiae (-/-) Palpation: acral warm (+/+), limb edema (-/-), capillary refill time <2 seconds

Supporting Examinations

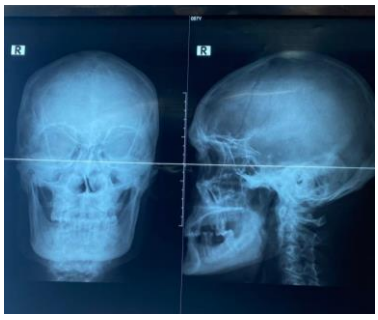


Figure 1. X-ray Examination

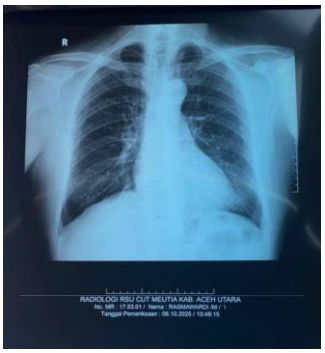


Figure 2. X-ray Examination

Results of Complete Blood Count, Clinical Chemistry, Infectious Immunology laboratory tests on October 6, 2025

Table 2. Routine Hematology

Type of Examination	Result	Reference Value	Unit	Description
Hemoglobin (HGB)	15.9	13.2 - 18.0	g/dL	-
Hematokrit (HCT)	48.2	40 - 54	%	-
Leukosit (WBC)	8.8	4.0 - 10.0	$10^3/\mu L$	-
Trombosit (PLT)	253	150 - 440	$10^3/\mu L$	-
Eritrosit (RBC)	5.52	4.4 - 5.9	$10^6/\mu L$	-
MCV	87.3	79.0 - 99.0	fL	-
MCH	28.8	27 - 31	pg	-
MCHC	33.0	32 - 36	g/dL	-
RDW-CV	10.7*	11.5 - 16.0	%	Low
Freezing				
Coagulation Time (CT)	9.15	9-15	Minute	
Bleeding				
Bleeding Period (BT)	2.00	1-3	Minute	
Blood Type				
Blood Type	B			

Clinical Chemistry

Table 3. Liver Function

Examination	Result	Reference Value	Unit
SGOT / AST	22	< 50	U/L

Table 4. Kidney Function

Examination	Result	Reference Value	Unit
Urea	27	< 50	mg/dL
Kreatinin	1.13*	0.50 - 1.10	mg/dL

Table 5. Diabetes

Examination	Result	Reference Value	Unit
Random Blood Glucose	104	< 200	mg/dL

Table 6. Infectious Immunology

Examination	Result	Reference Value
HbsAg	Negative	Negative
VDRL	Non-Reactive	Non-Reactive
Anti HIV	Non-Reactive	Non-Reactive

Resume

A 57-year-old male patient came to the Oncology Clinic at Cut Meutia General Hospital with a complaint of a lump on the right side of his head that had been present for 8 months before hospital admission. The lump felt itchy and pulsating, and gradually increased in size, eventually interfering with the patient's sleep. Initially, the lump measured about 3 cm, then enlarged to approximately 10 cm. The patient denied any pain, and it was not accompanied by nausea, vomiting, or loss of appetite. Urination and defecation were within normal limits.

The patient had previously sought treatment at a community health center and was given ointment, but there was no significant improvement. There is no history of systemic diseases such as hypertension, diabetes, or asthma. A family history of similar complaints is denied. The patient works as a farmer, has a middle-income level, and the treatment costs are covered by BPJS.

Vital signs are within normal limits (BP 125/70 mmHg, HR 80 bpm, RR 19/min, Temp 36.8°C, SpO_2 99%). A VAS score of 7 indicates moderate pain. On physical examination, a mass was found in the right parietal region measuring approximately 10 cm in diameter, round in shape, firm, well-defined borders, fixed, and the same color as the skin without ulceration or edema. Other systemic examinations were within normal limits.

The results of routine blood laboratory tests and clinical chemistry showed values still within normal limits, with a slight increase in creatinine levels (1.13 mg/dL). Liver function and random glucose were normal, and infectious immunology results (HBsAg, VDRL, Anti-HIV) were negative.

Working Diagnosis

Malignant peripheral nerve sheath tumor

Physical Status Classification According to ASA

ASA 2 (Patients with mild systemic disease without functional limitations)

Surgical Plan

Wide excision + flap

Anesthesia Plan

General anesthesia with Laryngeal Mask Airway (LMA)

Anesthesia Report

- Anesthesiology specialist: Dr. Anna Millizia, Sp.An
- Surgical specialist: Dr. Adi Rizka, Sp.B(K)Onk
- Preoperative diagnosis: Malignant peripheral nerve sheath tumor
- Type of surgery:
  - Wide tumor excision including removal of the temporalis muscle
  - 9x5 cm defect closed with a split-thickness graft from the skin of the right clavicle region
  - Dressing
- **Type of anesthesia: General – LMA**
- **Duration of surgery: 10:45–12:00**
- **Duration of anesthesia: 10:30–12:30**

1. Pre-Anesthesia Preparation

In the care room, the patient was consulted with Dr. Anna Millizia, Sp.An for approval to undergo the surgical procedure. After obtaining consent, the patient was prepared for the Wide excision procedure. Information was also provided to the patient's family regarding the anesthesia procedure that will be carried out.

Informed consent:

Aims to inform the patient's family that a medical procedure involving general anesthesia with the use of a Laryngeal Mask Airway (LMA) will be performed. The procedure, possible outcomes, and the risks that may arise during and after the procedure are also explained.

b. Additional Medications

1. Ondansetron 4 mg/2 ml, given to prevent postoperative nausea and vomiting.
2. Ketorolac 30 mg every 6 hours for pain relief.
3. Tramadol 50–100 mg, administered as additional postoperative analgesic or as needed during the procedure.

c. Tools and Drugs for Anesthesia Induction

• Induction: Propofol
• Analgesic: Fentanyl
• Airway Device: Laryngeal Mask Airway (LMA)
• Support Equipment: Anesthesia mask, breathing circuit, oxygen, complete vital signs monitor.

d. Fluid Therapy During Surgery (Intraoperative)

1. Maintenance (M)

M = 2 cc/kg/hr × 65 kg = 130 cc/hr

During surgery, the patient is given a basal fluid of 130 cc per hour.

2. Surgical Stress (SS)

SS = 8 cc/kg/hr × 65 kg = 520 cc/hr

3. Fasting Replacement (FR)

FR = M × fasting duration = 130 cc/hr × 6 hours = 780 cc

4. Total fluid given in the first hour

Total first hour = M + ½ FR + SS

½ FR = 0.5 × 780 = 390 cc

Total = 130 + 390 + 520 = 1,040 cc

3 Intra-operative

Thursday, October 9, 2025 at 10:45 AM WIB

Airway: Clear

Breathing: RR 21 times/min

Circulation: HR 88 bpm

Disability: GCS (E4V6M5 = 15)

Consciousness: Compos mentis

ASA: II

a. The patient is brought into the operating room and placed on the operating table in the supine position. A blood pressure cuff, oximeter, and other monitoring devices (ECG and capnography) are applied.

b. Assess the general condition and perform an initial vital signs examination or pre-induction assessment:

Consciousness: compos mentis

Pulse: 88 beats/min

Respiratory rate: 20 breaths/min

SpO_2: 99%

Blood pressure: 120/80 mmHg

c. The patient was given preoxygenation with 100% O_2 for approximately 3 minutes via a face mask.

d. General anesthesia induction is performed using intravenous propofol until the patient loses consciousness, then fentanyl is administered as an analgesic.

e. Once the patient is unconscious and protective reflexes are lost, an appropriately sized LMA (Laryngeal Mask Airway) is inserted according to the patient's body weight. The position and ventilation function are checked (bilateral breath sounds heard, chest symmetrical, no air leakage).

f. O_2 is administered with controlled ventilation using an anesthesia circuit. Anesthesia is maintained with O_2 and intravenous medications as required for the surgery.

g. During the operation, vital signs should be monitored periodically (blood pressure, pulse rate, oxygen saturation, and respiration).

h. Additional medication during anesthesia:

1. Ondansetron to prevent postoperative nausea and vomiting.
2. Ketorolac 30mg every 6 hours for pain relief.

3. Tramadol is given as an additional analgesic during or towards the end of the procedure.

Table 7. Anesthesia Monitoring:

Time	TD (mmHg)	HR (x/Minute)	SpO_2 (%)	Desctiption
10.45	170/90	100	100	Anesthesia procedure begins: - Induction with propofol
11.00	130/79	90	100	Controlled condition
11.15	130/85	84	100	Controlled condition
11.30	130/70	82	100	Controlled condition - Inj ondansetron 4 mg - Inj ketorolac 30 mg
11.45	120/80	80	100	Controlled condition
12.00	120/65	78	100	Controlled condition
12.15	125/80	80	100	Controlled condition
12.30	120/75	80	100	Controlled condition

4. Postoperative

The patient entered the recovery room at 12:45. An assessment of the level of consciousness was performed, and the patient was found to be fully alert. Vital signs were also checked, revealing a blood pressure of 123/82 mmHg, a pulse of 77 beats per minute, a respiratory rate of 18 breaths per minute, a temperature of 36.8°C, and an oxygen saturation of 99%. The patient was returned to the ward at 12:30 with an Aldrete Score of 9.

5. Post-Operative Instructions

- Monitor vital signs
- IV fluid therapy RL 20 drops/min
- Other therapy according to the attending surgeon's plan

Table 8. **Follow Up Pasien**

Treatment Day	SOAP	Therapy
09-10-2025	S/ The patient still feels post-operative pain. O/ BP: 118/80 mmHg HR: 82 bpm RR: 18 breaths/min SpO_2: 97% A/ Malignant peripheral nerve sheath tumor post wide excision + flap	IVFD RL 20 drops/hour Injection Ceftriaxone 1 g/12 hours Injection Ketorolac 30 mg/8 hours Injection Ranitidine 50 mg/8 hours

LITERATURE REVIEW

Malignant peripheral nerve sheath tumor (MPNST) is a rare and aggressive soft tissue malignancy originating from peripheral nerve structures, characterized by infiltrative growth and high rates of local recurrence. Wide surgical excision with tumor-free margins is the primary treatment modality and plays a crucial role in improving local disease control and patient prognosis. In head and neck regions, wide excision often results in significant tissue defects that require reconstructive procedures such as flap or skin graft reconstruction to restore anatomical integrity and function. These complex oncologic surgeries present specific challenges for anesthetic management, particularly in maintaining airway security, hemodynamic stability, and adequate perioperative analgesia.

General anesthesia is the preferred anesthetic technique for head and neck oncologic surgeries due to its ability to provide optimal hypnosis, analgesia, and ventilation control. Airway management is a key component of anesthetic safety, and the laryngeal mask airway (LMA) has emerged as an effective alternative to endotracheal intubation in selected patients with low aspiration risk and moderate surgical duration. The use of LMA has been shown to reduce airway trauma, minimize hemodynamic responses during induction and emergence, and facilitate faster postoperative recovery. Combined with appropriate anesthetic agents, multimodal analgesia, and adherence to Enhanced Recovery After Surgery (ERAS) principles, general anesthesia with LMA can be safely applied in wide excision and reconstructive procedures for head and neck tumors.

METHODS

Problem Solving Methods

RESULTS AND DISCUSSION

A 57-year-old male patient with a diagnosis of malignant peripheral nerve sheath tumor in the right parietal region underwent a wide excision and flap procedure under general anesthesia with LMA. Based on the pre-anesthesia evaluation results, the patient was classified as ASA II, which means he has mild systemic disease without functional limitation (6).

1. Pre-Anesthesia Evaluation

Pre-anesthesia evaluation aims to assess the patient's physiological condition and determine the safest anesthesia plan. The examination includes medical history, physical examination, and laboratory tests. In this patient, no history of systemic diseases such as hypertension, diabetes mellitus, or asthma was found. Laboratory tests showed hemoglobin, leukocyte, and platelet levels within normal limits. Liver function was good, and kidney function was slightly elevated (creatinine 1.13 mg/dL), but still manageable with adequate fluid management (7).

Airway assessment is important because the surgery involves the head region. The patient does not show signs of ventilation difficulty, such as mass enlargement or facial deformity, so the use of an LMA is considered safe. The

patient has also fasted for six hours in accordance with the American Society of Anesthesiologists (ASA) guidelines to prevent aspiration (8).

2. Selection of Type and Anesthesia Technique

- The choice of general anesthesia with LMA in this case is based on several considerations:
- The surgical site is in the head region and does not involve the upper airway.
- The duration of the surgery is about 1.5 hours.
- The risk of aspiration is low since the patient has fasted adequately.
- Deep muscle relaxation is not required.

LMA provides effective ventilation without the need for endotracheal intubation. Compared to intubation, the use of LMA causes less trauma, reduces sympathetic responses, and speeds up airway reflex recovery. A meta-analysis showed that the use of LMA in low-aspiration-risk head and neck surgeries has safety comparable to endotracheal intubation (9).

3. Anesthetic Agents and Pharmacotherapy

Anesthesia induction is performed with propofol 2–2.5 mg/kg body weight intravenously, which provides a rapid hypnotic effect with smooth recovery. Fentanyl 2 μg/kg body weight is used for intraoperative analgesia due to its rapid effect and good hemodynamic stability (10,11).

For the prevention of postoperative nausea and vomiting (PONV), ondansetron 4 mg IV is administered according to international guidelines (12). For blood pressure control in case of intraoperative hypertension, labetalol is prepared, while tramadol 50–100 mg is given as additional analgesia during and after surgery.

The use of a combination of these agents reflects the principle of multimodal anesthesia, which is to use a combination of drugs with different mechanisms of action to achieve maximum analgesic effect and minimize side effects (13).

4. Fluid Management and Intraoperative Monitoring

Perioperative fluid management is carried out by calculating maintenance requirements, surgical stress, and fasting replacement. Based on a body weight of 65 kg, the total fluid for the first hour is approximately 1,040 mL. This fluid strategy aligns with the principles of Enhanced Recovery After Surgery (ERAS), which emphasizes fluid balance to maintain perfusion without causing overload (14).

During the operation, close monitoring was conducted on blood pressure, pulse, respiration, oxygen saturation, and electrocardiography. Monitoring data showed blood pressure ranging from 120–130/70–85 mmHg, pulse rate 78–90 beats per minute, and SpO_2 99–100%. These results indicate good hemodynamic stability and optimal anesthesia control.

5. Postoperative Management

The patient was transferred to the recovery room with full consciousness (compos mentis) and an Aldrete Score of 9, indicating good recovery. Vital signs were stable, and no nausea, vomiting, or airway disturbances were observed.

Postoperative therapy included intravenous Ringer's Lactate at 20 drops/min, the antibiotic ceftriaxone 1 g every 12 hours as infection prophylaxis,

as well as ketorolac 30 mg every 8 hours and tramadol as analgesics. In addition, ranitidine 50 mg every 8 hours was given to reduce stomach acid secretion and prevent stress-related gastritis.

On the first-day evaluation, the patient reported mild to moderate pain (VAS 4–5) with a stable general condition, and the surgical wound appeared in good condition without signs of infection or bleeding.

6. Analysis and Discussion

This case demonstrates the safe and effective application of general anesthesia with LMA in a patient with a head tumor during a surgery of moderate duration. The use of propofol and fentanyl was shown to provide a stable anesthetic effect without significant hemodynamic fluctuations. Propofol has a blood pressure-lowering effect through peripheral vasodilation, but this can be compensated with adequate fluid monitoring (10).

Additionally, the administration of ondansetron as PONV prophylaxis is in accordance with the recommendations of the American Society of Anesthesiologists, which emphasize the use of combination antiemetics to reduce the risk of postoperative nausea and vomiting (12).

The use of LMA has also been shown to reduce the incidence of airway trauma and accelerate the recovery of protective reflexes compared to endotracheal intubation (9). This is important in patients undergoing head surgery, where excessive airway maneuvers can interfere with the surgical field or increase intracranial pressure.

The anesthetic approach in this case aligns with the principles of Enhanced Recovery After Surgery (ERAS), which focuses on optimizing pain control, hemodynamic stability, and rapid postoperative recovery (14,16). With proper anesthetic management, patients can recover without serious complications.

CONCLUSIONS AND RECOMMENDATIONS

The administration of general anesthesia in patients with malignant peripheral nerve sheath tumors undergoing wide excision and flap procedures yielded good results with stable hemodynamic conditions, adequate pain control, and rapid postoperative recovery without significant complications.

Optimal anesthesia management is determined not only by the choice of airway devices but by the overall process, which includes:

1. Comprehensive pre-anesthesia evaluation to determine anesthesia risk and the patient's physical status.
2. Selection of anesthesia technique according to the location, duration, and complexity of the surgery.
3. Appropriate use of anesthetic drugs with the principle of multimodal anesthesia to achieve optimal analgesia and physiological stability.
4. Rational perioperative fluid management to maintain tissue perfusion.
5. Strict intraoperative monitoring and integrated postoperative care.

With the application of these principles, anesthesia in head oncology surgery can be carried out safely and effectively, supporting successful surgical outcomes and speeding up patient recovery.

FURTHER STUDY

This study still has limitations so it is necessary to conduct further research related to the topic of General Anesthesia for Wide Excision + Flap Procedure in order to perfect this research and increase insight for readers.

REFERENCES

Aldrete JA. The post-anesthesia recovery score revisited. J Clin Anesth. 1995;7(1):89–91.

American Society of Anesthesiologists. ASA Physical Status Classification System. 2020.

Brimacombe J, Berry A. The laryngeal mask airway: review and practical guide. BMJ. 1993;307(6902):931–933.

Butterworth JF, Mackey DC, Wasnick JD. Morgan & Mikhail's Clinical Anesthesiology. 6th ed. New York: McGraw-Hill Education; 2018.

Feldheiser A, Aziz O, Baldini G, et al. Enhanced recovery after surgery (ERAS): anesthetic considerations. Anesth Analg. 2016;122(3):664–682.

Gan TJ, Meyer T, Apfel CC, et al. Consensus guidelines for the management of postoperative nausea and vomiting. Anesth Analg. 2020;131(2):411–448.

Hug CC. Fentanyl: pharmacology and clinical use. Anesth Analg. 1993;76(5):1042–1051.

Kehlet H, Dahl JB. Anaesthesia, surgery, and challenges in postoperative recovery. Lancet. 2003;362(9399):1921–1928.

Kroep JR, Ouali M, Gelderblom H, et al. First-line chemotherapy for malignant peripheral nerve sheath tumor: A retrospective study. Eur J Cancer. 2011;47(3):460–466.

Ljungqvist O, Scott M, Fearon KC. Enhanced Recovery After Surgery: A Review. JAMA Surg. 2017;152(3):292–298.

Marik PE. Propofol: therapeutic indications and side-effects. Curr Pharm Des. 2004;10(29):3639–3649.

Morgan GE, Mikhail MS, Murray MJ. Clinical Anesthesiology. 6th ed. New York: McGraw-Hill Education; 2018.

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration. Anesthesiology. 2017;126(3):376–393.

Stucky CC, Johnson KN, Gray RJ, et al. Malignant Peripheral Nerve Sheath Tumors (MPNST): The Mayo Clinic Experience. Ann Surg Oncol. 2012;19(3):878–885.

Thway K, Fisher C. Malignant peripheral nerve sheath tumor: pathology and genetics. Ann Diagn Pathol. 2014;18(2):109–116.

Yu SH, Beirne OR. Laryngeal mask airway versus endotracheal tube for airway management in general anesthesia: a meta-analysis. Anesth Prog. 2010;57(1):18–30.