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المديرية العامة لمستشفى خولة
Directorate General of Khoula Hospital

Directorate of Anesthesia and Intensive Care Unit

Document Title	Adult Ventilator Liberation Guideline
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1. Dr.Abdullah AL Jadidi, Director of Anaesthesia (ICU& RT)
2. Ms.Safa AL-Raqqadi, General Nurse A, Accreditation Department, QMPSD

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Acronyms

SBT	Spontaneous Breathing Trial
SAT	Spontaneous Awakening Trial
CLT	Cuff Leak Test
MV	Mechanical Ventilation
IBW	Ideal Body Weight
PEEP	Positive End Expiratory Pressure
F_IO_2	Fraction of Inspiration Oxygen
GCS	Glasgow Coma Scale
Vt	Tidal Volume
RASS	Richmond Agitation-Sedation Scale
MAP	Mean Arterial Pressure
RSBI	Rapid Shallow Breathing Index
ETT	Endotracheal Tube
BPM	Breath Per Minute
ET	Endotracheal
NIV	Non-Invasive Ventilation
MI	Myocardial Ischemia
WOB	Work of Breathing

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1. Definitions

1.1 Spontaneous Awakening Trial (SAT): A trial performed in a sedated, mechanically ventilated patient with daily sedation interruption to assess a patient's readiness for ventilator discontinuance.

1.2 Spontaneous Breathing Trial (SBT): A trial performed in a mechanically ventilated patient to assess the ability of the patient to sustain spontaneous breathing when extubated.

1.3 Weaning: Process of discontinuing ventilatory support.

1.4 Ventilator discontinuance: Process of disconnecting mechanical ventilatory support

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Chapter One

2.Introduction

Mechanical ventilation (MV) is an essential tool to use when managing patients in the Intensive care unit (ICU). Failure of weaning from mechanical ventilation increases the length of mechanical ventilation and length of stay in the intensive care unit and it is associated with poor outcome. The process of ventilator liberation should begin as early as clinically possible.

3. Purpose

The purposes of this guideline are to:

3.1 Establish a guideline to assist the respiratory therapist, nurses, and medical staff in the determination of eligibility for discontinuation of mechanical ventilation.

3.2 Test for the opportunity to reduce ventilator support very soon after intubation.

3.3 Evaluate the patient's ability to sustain spontaneous breathing when extubated.

3.4 Limit the amount of sedative agents a patient receives and promote extubation.

3.5 Provide daily sedation interruption to assess a patient's readiness for ventilator discontinuance.

3.6 Prevent mechanical ventilation complications by reducing the duration of mechanical ventilation.

4. Scope

This Guideline applies to all healthcare professionals working in the Directorate General of Khoula Hospital (DGKH) who are involved in the long-term care of patients with tracheostomy, discharged from acute care settings to general wards and/or home.

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Chapter Two

5. Structure

It is the guideline of the Directorate General of Khoula Hospital (DGKH) to address and assess general parameters for altering mechanical ventilation in preparation for extubation. This guideline is implemented by nurses and respiratory care providers. It is designed to reduce variability in the assessment of readiness for liberation and to prevent mechanical ventilation complications by reducing the duration of treatment with MV.

5.1 Liberation guideline

a. The decision to perform a liberation guideline taken when the following criteria of readiness to start the weaning process are fulfilled:

i. Initial problem has been improved or revolved.

ii. Minimal analgesia or Spontaneous Awakening Trial (SAT) is scheduled.

iii. Minimal ventilation support (PEEP $\leq$ 8 cmH_2O; $FiO_2 \leq 50\%$ with $SpO_2 \geq 90\%$; $PaO_2 \geq$ 60mmHg; $PaO_2/FiO_2 \geq 200$ mm Hg; MV < 15L/min; RR <30 bpm > 7 bpm).

iv. Hemodynamic stability.

v. Not vent dependent.

b. The anesthetist should identify when the patient is ready to be weaned either the day before or during the morning round on the same day (weaning to be started).

5.2 Spontaneous Awakening Trial (SAT)

a. If patient is on sedation and Spontaneous Awakening Trial is scheduled; discus with bedside nurse when SAT should be initiated according to anesthetist order. (Chart Flow A).

b. Initially SAT Safety Screen has to be checked by both bedside nurse and assigned respiratory therapist before initiating SAT.

c. Assess if there is no evidence of the following criteria, then the patient considers passing the SAT safety screen.

i. No ongoing myocardial ischemia.

ii. No active seizures.

iii. No alcohol withdrawal.

iv. No agitation.

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v. No paralytics; Neuromuscular blocking agent.

vi. Normal intracranial pressure.

d. Then all sedation infusions should be stopped by staff nurse and the patient is allowed to wake up.

e. Observe for any SAT failure criteria; which include:

i. Sustained Anxiety, agitation, or pain.

ii. Respiratory rate > 35/min for 5 min or longer.

iii. Oxygen saturation < 90% for 5 min or longer.

iv. Acute cardiac arrhythmia.

v. Signs and symptoms of respiratory distress; as the following:

- Marked use of accessory muscles.
- Abdominal pyridoxal breathing.
- Dyspnea.
- Diaphoresis

f. If the patient fails the SAT, inform the assigned anesthetist, and the nurse should restart the sedation infusion at half the rate. Wait 24 hours before reinitiating the guideline.

g. If the patient passes the SAT, the respiratory therapist should proceed to the Spontaneous Breathing Trial (SBT).

5.3 Spontaneous Breathing Trial (SBT):

a. First assess the patient for Spontaneous Breathing Trial (SBT) safety screen. SBT safety screen include the following:

i. Underlying cause of respiratory failure has resolved.

ii. Glasgow Coma Scale (GCS) greater than 8.

iii. Minimal Ventilation Support (PEEP $\leq$ 8 cmH_2O; $FiO_2 \leq 50\%$ with $SpO_2 \geq 90\%$; $PaO_2 \geq$ 60mmHg; $PaO_2/FiO_2 \geq 200$ mmHg).

iv. PH between 7.3 to 7.5

v. Current RR $\leq$ 35 bpm

vi. Hemodynamically stable with none or low Vasopressor dose.

vii. Patient temperature within the normal range.

viii. Normal intracranial pressure.

ix. Inspiratory efforts; breathing spontaneously over the set ventilator rate.

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x. Sedation Scale between 0 to -2; Richmond Agitation-Sedation Scale (RASS) (See appendix 2).

b. If the patient fails SBT safety screen, inform the assigned anesthetist and maintain usual ventilation support, then reassess every 24 hours.

c. If patient passes SBT Safety Screen; keep patient on spontaneous mode with PS 0-5 cm H2O and PEEP of 5cmH2O.

d. Maintain the current FiO2 with tube compensation 100%.

e. The tolerance of SBTs for 30 to 120 min should proceed for extubation.

f. Record vital signs at the baseline, 15 minutes and 30 minutes:

i. RR ≤ 35 bpm.

ii. Exhale spontaneous Vt 6-8 ml/kg.

iii. Rapid Shallow Breathing Index (RSBI) (f/Vt) (≤ 105).

iv. Systolic BP between 90-180 mmHg.

v. No signs and symptoms of respiratory distress; as the following:

- Marked use of accessory muscles.
- Abdominal pyridoxal breathing.
- Dyspnea.
- Diaphoresis

g. Document any SBT failure criteria which include:

i. RR > 35/min or < 8/min

ii. Oxygen saturation < 90%

iii. Respiratory distress and increase WOB

iv. Agitation, anxiety and diaphoresis

v. Mental status change

vi. Acute cardiac arrhythmia

h. If SBT failure criteria recorded, inform assigned anesthetist and return to previous ventilator setting. Wait for 24 hours to initiate again.

i. If patient meets SBT criteria, SBTs should be performed every 24 hours.

j. After a successful SBT, inform the attending anesthetist for extubation order or T-piece for tracheostomy patients.

k. Patients at high risk for extubation failure, who passed SBT, extubat and put on noninvasive ventilation (NIV) to prevent re-intubation.

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Chapter Three

6. Responsibility:

6.1 The Superintendent of Anesthesia, ICU and Pain Management shall:

6.1.1 Emphasize the head of the departments the importance of following the guideline for adult ventilator liberation.

6.2 Head of the Departments (Anesthesia/Respiratory Care/Nursing In-charges) shall:

6.2.1 Reinforce to all staff the guideline for adult ventilator liberation and the importance of reporting any adverse event for patient safety.

6.3 Anesthetists shall:

6.3.1 Adhere to adult ventilator liberation guideline.

6.3.2 Order for weaning (SAT/SBT) in Al Shifa 3 Plus for nurses and respiratory therapists.

6.3.3 Inform nurses and respiratory therapist for any relative contraindications.

6.4 Nurses/Respiratory Therapists shall:

6.4.1 Adhere to adult ventilator liberation guideline.

6.4.2 Wean the patient following Al Shifa 3 Plus order.

6.4.3 Reassess the patient daily for SAT and SBT.

6.4.4 Contact assigned anesthetist & discuss for any unsuspected failure criteria.

6.4.5 Document any changes in patient condition.

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Chapter Four

7.Document history and version control table:

Version	Description	Name of Authors	Review Date
1.	Initial release	Ms. Ruqaiya Al Harthi	2025
2.	Version two	Ms. Ruqaiya Al Harthi	2028

8. References

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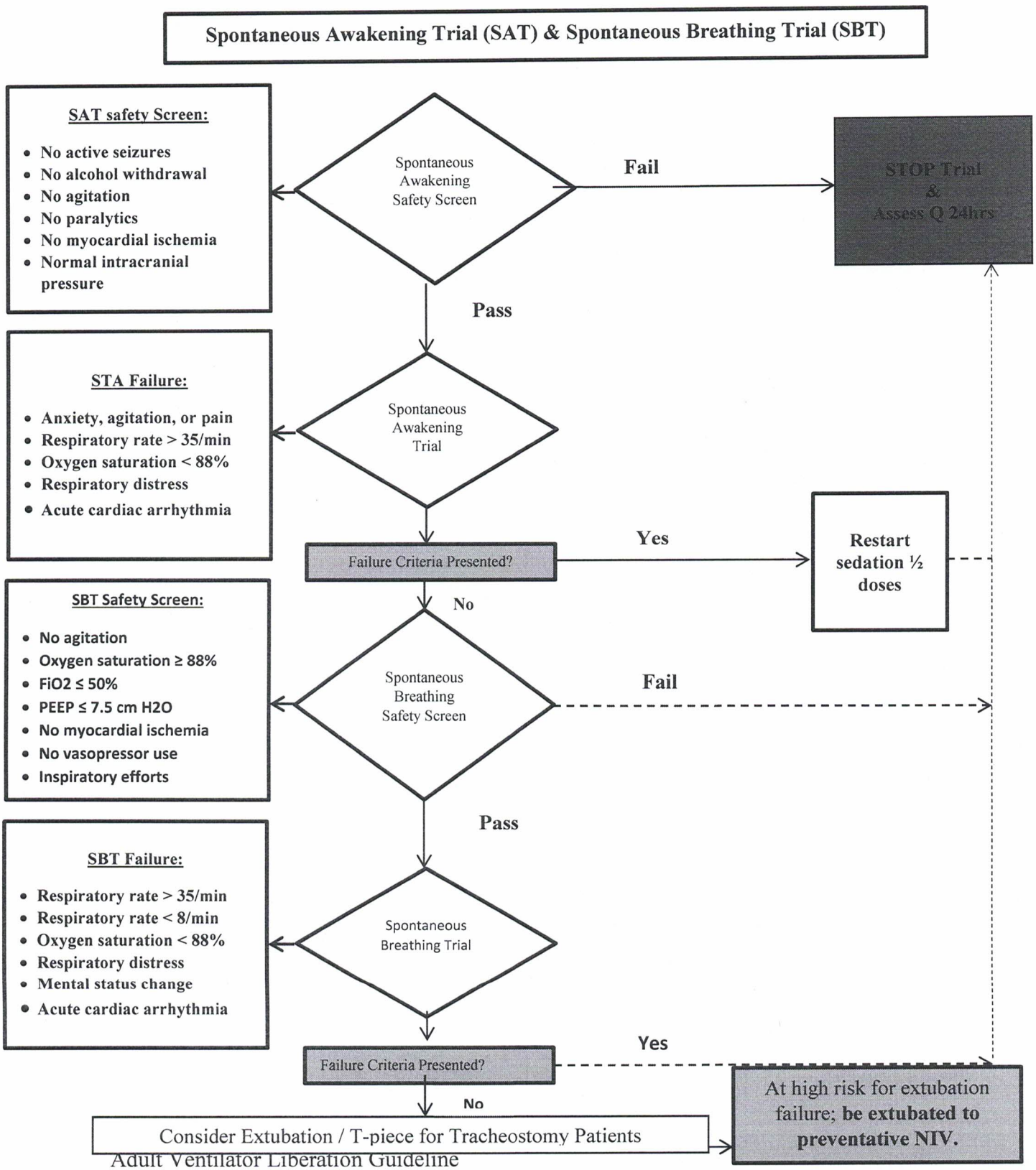
9.Annexes:

9.1 Appendix (1): Spontaneous Awakening Trial (SAT) & Spontaneous Breathing Trial (SBT)

Chart Flow A



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9.2 Appendix (2): Richmond Agitation – Sedation Scale

Richmond Agitation-Sedation Scale (RASS)		
+4	Combative	Violent, immediate danger to staff
+3	Very Agitated	Pulls or removes tube(s) or catheter(s); aggressive
+2	Agitated	Frequent non-purposeful movement, fights ventilator
+1	Restless	Anxious, apprehensive but movement not aggressive or vigorous
0	Alert & calm	
-1	Drowsy	Not fully aleart, but has sustained awaking to voice (eye opening & contact ≥ 10 sec)
-2	Light sedation	Briefly awakens to voice (eye opening & contact < 10 sec)
-3	Moderate sedation	Movement or eye-opening to voice (but no eye contact)
-4	Deep sedation	No response to voice, but movement or eye opening to physical simulation
-5	Unarousable	No response to voice or physical simulation