

BEST PRACTICES

Technical guidance of routine nursing for ICU patient

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Note for the use of this file.

This schematic checklist table is for nurses, with particular reference for ICU new staff members. The aim is to propose an outline as systematic as possible (but probably not exhaustive).

It is not a strict tool, but it is an across-the-

board reminder, extremely adaptable in terms of modifiability and adaptability to different logistical-operative contexts, such as polyvalent and specialistic ICU.

Obviously, in this COVID 19 pandemic, some interventions can not be included, but probably others will have to be changed or postponed. For this reason, I set up a right column

called "Priority", so that we can think over what would be acceptable in terms of missing nursing.

Within each step, assessments and interventions are not in strict vertical priority, but this become changeable according to clinical and logistical contexts.

Step	Assessment-Interventions	Priority
Handover	☐ Take-charge patient at the beginning of shift by collecting data from previous shift colleagues using ABCDE approach • Security • Admission diagnosis • Comorbidities-Risk factors • Ongoing therapy/Allergies • A – Consciousness/Sedation and Airway • B – Breathing; respiratory support • C – Circulation; intravascular devices; hemodynamic-cardiac support; diuresis and renal support; hematologic aspects. • D – Disability, neurological problems; pain and analgesia; drainages and catheters; nutritional supports • E – Exposure; body temperature check, skin condition (injuries); mobilization and elimination • F – Family member; aspects related to relational and psycho-emotional sphere • I – Infections; unresolved issues; multidrug-resistant infections; type of isolation	
	☐ Diagnostic therapeutic care pathway planned during the shift	

Step	Assessment-Interventions	Priority
A - Auto-Safety	☐ Before entering the patient room, perform auto-check: check the properly using of PPE as regards the procedure to be carried out	
	☐ Put on the impermeable disposable gown over the scrubs or coverall for each patient, remove and discard them properly in a waste container before exiting the patient room	
	☐ Put on disposable gloves for patient care. Change gloves if they are broken or dirty or if you have the need to move from a "dirty" to "clean" procedure (for example: after patient hygiene, before performing dressings)	
	☐ Before putting on new gloves, use alcohol-based hand sanitizers over the first pair of gloves	
	☐ Check positive or negative pressure activation of the patient room as regards clinical needs	
Setting - Safety	☐ Check the presence of AMBU bag or self-inflating resuscitator	
	☐ Check the presence of oxygen flowmeter with oxygen connector for AMBU bag	
	☐ Check suction device	
	☐ Check equipment for airway management (antimicrobial filters, HME filters, catheter mounts, water-soluble lubricants, Guedel airways, ventilation masks)	
	☐ Check the presence of aspiration catheters in various sizes	
	☐ Check HEPA filter on expiratory tract of the ventilator with the current date (mandatory replacement every 24 hours)	
	☐ Check mechanical ventilator alarms: • High and Low minute volume • High Tidal Volume • High Inspiratory Pressure • High and Low respiratory rate Set Apnea time (15 seconds at most)	
	☐ Check "Back-up Ventilation" or "Apnea Ventilation": in Pressure Support Ventilation make sure is set to ON	
	☐ Check multiparameter patient monitor: • Pulse oximetry alarms • High and Low heart Rate alarms • High and Low Blood Pressure alarms • Respiratory rate alarms (personalized) • High and Low End Tidal CO₂ (personalized) • Intracranial Pressure alarms (20 mmHg upper limit) • Low Cerebral Perfusion Pressure alarms (50 mmHg)	
	☐ Check power supply of the electro-medical devices	
	☐ Check the correspondence between prescribed IV therapy (drugs and dose) and effectively ongoing treatment in the patient room.	
	☐ Check ventilator filters and connectors (they must be secure)	
	☐ Check intravenous lines connections (they must be secure but not too tight)	
	☐ Check extracorporeal circuits (CRRT, ECMO): check the absence of kinking or clamping on the lines and the safe connections of the catheters.	
	☐ Check patient bed: raised side rails, braked bed.	
	☐ Before exiting the patient room, check IV therapy which are ending and change them in order to reduce the re-entry in patient room (so-called "infusion pump zero")	
Patient Quick look	☐ Quick patient assessment (ABCDE), in order to detect any problems concerning patient security	
A - Airways	☐ Consciousness assessment (Glasgow Coma Scale)	
	☐ Assessment of the level of sedation (Richmond Agitation Sedation Scale)	
	☐ Check natural airway • Airway Patency	

Step	Assessment-Interventions	Priority
	☐ Check artificial airway – endotracheal tube • Patency • Position (midline, right or left angle of the mouth; distance between lip and carina) • Correct ET fixation • Pressure in the ET cuff: between 25 and 30 cmH₂O (at least twice a shift, before oral hygiene and when required)	
	☐ Check artificial airway – tracheostomy tube • Type of tracheostomy tube (fenestrated/not fenestrated) • Patency: check and cleansing of inner cannula • Correct fixation of the tracheostomy tube. • Skin and stoma inspection and dressing • If the tracheostomy tube is cuffed: pressure cuff between 25 and 30 cmH₂O (at least twice a shift, before oral hygiene and when required)	
	☐ Check subglottic aspiration (in patient with ET with lumen subglottic suction) • -25 mmHg in continuous aspiration • -100/-150 in intermittent aspiration	
	☐ End Tidal CO ₂ monitoring • Mandatory in all intubated patients • Mandatory in all patients with ICP monitoring • Mandatory in all patients with CO₂ Homeostasis problems • Recommended in all other patients	
	☐ Tracheal aspiration • Mandatory closed-circuit endotracheal suction in all patients • Only when it is needed, preferably observing expiratory flow-time waveform	
	☐ Oral care once a shift • Toothbrush with cleansing agent for all patients, but those with coagulation disorders or with thrombocytopenia • Use of oral sponge swabsticks in patients with coagulation disorders or with thrombocytopenia • Use of chlorhexidine mouthwash only for intubated cardiothoracic patients	
B - Breathing	☐ Clinical respiratory assessment • Respiratory rate • Shallow/deep breathing • Thoracic-abdominal synchrony • Symmetrical chest expansion • Chest palpation looking for morphological changes and subcutaneous emphysema • Auscultation of right and left hemithorax, from the upper to the lower chest • Skin signs	
	☐ Instrumental respiratory assessment • Pulse oximetry (change sensor site at least once a day); if there is arterial cannula place the sensor on the hand with arterial cannula in order to assess distal perfusion. • Arterial blood gas test – ABG (in critically ill patient at least every 2 hours; after clinical changes; after 30 minutes from ventilator parameters changes; for electrolyte, glucose and metabolic homeostasis control; on medical prescription)	
	☐ Supplemental oxygen • Flow • FiO₂	
	☐ Non-invasive ventilation assessment • Modes of ventilation (CPAP, PSV, BiPAP/DuoPAP/BiVent) • Respiratory rate • Expired Tidal Volume • PEEP • FiO₂	

Step	Assessment-Interventions	Priority
	☐ Invasive ventilation assessment • Modes of ventilation • Respiratory rate (spontaneous and/or set) • Expired Tidal Volume • Inspiratory pressure (Peak/Plateau) • PEEP • FiO₂	
	☐ Check ventilator circuit • Place the inspiratory limb above the expiratory limb, and the Y-piece lower than catheter mount • Change every 15 days • Change in case of new patient, leakage, breaks or dirt	
	☐ Humidification of gases • Warmed for High-Flow oxygen therapy (High Flow Nasal Cannula or Venturi mask) • Active (warmed) in all patient with tracheostomy tube with supplemental oxygen, unless on different medical prescription • Passive with HME filter, if patients undergoing ventilation shorter than 48/96 hours, and with Tidal Volume not less than 7-8 ml/kg/IBW, no hypothermia, and not too many secretions • Passive with HME filter in patients who need respiratory isolation ("airborne"), for example for COVID-19, unless on different medical prescription • HME filter change, placed at the Y-piece of ventilator circuit every 24 hours	
	☐ Management of the condensation removal • Preventing the derecruitment and aerosol-producing during disconnection (use of clamp and ventilator stand-by mode)	
	☐ Check nitric oxide cylinder and circuit, if available	
	☐ Check patient position, semi-Fowler's position (30°), or if contraindicated, in Anti-Trendelenburg position	
C - Circulation	☐ Clinical circulation assessment • Pulse assessment (radial, brachial, femoral) • Capillary refill time • Skin colour • Temperature • Sweating	
	☐ Continuous instrumental monitoring • ECG (rate, rhythm, QRS assessment) • Invasive blood pressure (systolic, diastolic and mean) • Non-invasive blood pressure (systolic, diastolic and mean) • Central Venous Pressure, using the Central Venous Catheter distal lumen	
	☐ Perform 12-lead ECG in case of arrhythmia, QRS or STsegment alteration	
	☐ Check pacemaker status and functions	
	☐ DO ₂ monitoring (oxygen delivery) • PVC value (taking into account the PEEP) • ScvO₂ value (Venous blood gas from distal lumen CVC in superior vena cava) • Haemoglobin value (Arterial or venous blood gas test) • SaO₂ value (Arterial blood gas) • Cardiac output with da Echocardiography or with pulse contour analysis (PiCCO, PRAM, Vigileo)	
	☐ Organ perfusion monitoring with target mean arterial pressure of 60-65 mmHg	
	☐ Check invasive blood pressure circuit • Bag of saline pressurised to 300 mmHg • Keeping of phlebostatic axis for the transducer position (4th intercostal space mid axillary line) • Zero the transducer once per shift, and as required • Change every 96 hours	
	☐ Check safe fixation of all vascular devices	

Step	Assessment-Interventions	Priority
	☐ Check for patency of vascular devices • Testing for flashback of blood and flush the line with 10 ml of normal saline using a brisk “push-pause” technique if the lumen is not in use, by needleless connectors • Perform the control once a shift	
	☐ Management of infusion therapy in a Central Venous Catheter: • Proximal lumen: inotropic and vasoactive agents • Medial lumen: sedative medications • Distal lumen: fluid infusion /CVP measure • Others infusion therapy only in the distal lumen • Management of the continuous infusion therapy in accordance with drug compatibility	
	☐ Management of Total Parenteral Nutrition and change the infusion set at the end of the bag (every 24 hours)	
	☐ Management of electrolytes infusion in accordance with local protocol	
	☐ Management of blood glucose in accordance with local protocol, tolerated up to 140 mg/dl, above 180 mg/dl needs to be corrected.	
	☐ Removal of peripheral IV cannula in presence of CVC	
	☐ Daily inspection of the insertion site of venous access • Change of transparent dressing every 7 days, if intact • Change of gauze dressing, if intact, every 48 hours	
	☐ Infusion set change, with valve connectors and stopcocks, every 96 hours • Propofol set infusion should be changed at every syringe change	
	☐ Change of pressure transducers every 96 hours	
	☐ Check urine output hourly (0.5-1 ml/kg/h)	
	☐ Check monitoring by pulmonary artery catheter • Left atrial pressure (LAP) • Pulmonary Artery Pressure (PAP) • Pulmonary capillary wedge pressure (PCWP) • SvO₂	
	☐ Search for external bleeding, close to insertion sites of vascular access, catheters and drainages	
	☐ Blood tests according to prescription • From arterial cannula • From CVC, after stopping the infusions and using the discard method of blood drawing (i.e., prior to drawing the required volume of blood for testing, a sample of blood is withdrawn and discarded)	
	☐ Control of coagulation (aPTT) using Point of Care (in anticoagulation heparin protocols) at least every 4 hours, or if necessary (one hour after the change dosage of heparin or antithrombin III administration)	
	☐ Monitoring of Continuous Renal Replace Treatment (CRRT) • Blood flow • Reinfusion pre/post • Dialysate • Clearing • Transmembrane pressure • Detect filter clotting (fibrin, clot)	

Step	Assessment-Interventions	Priority
	☐ Monitoring of Extracorporeal Membrane Oxygenation (ECMO) • Pump speed (rpm) • Blood flow rate • Gas Flow • FiO₂ • Pre-pump pressure (negative) • Pre-membrane pressure • Post-membrane pressure • Δ P (trans- membrane pressure gradient) • Detect oxygenator clotting (fibrin) • Shaking cannula (reduction of pre-pump pressure flow)	
	☐ Monitoring of Intra-Aortic Balloon Pump (IABP) • Mode • Trigger • Augmentation IAB • Frequency of IAB ratio • ECG trace • Arterial trace • Balloon trace • systolic, diastolic and MAP augmentation pressures	
	☐ Special attention to recording groin bleeding/ooze, peripheral perfusion, colour, bilateral pulses, temperature, capillary return, movement and sensation	
	☐ Monitor urine output closely (The balloon sits above the bifurcation of the renal arteries - backward migration may compromise blood flow to the kidneys)	
	☐ Management of blood transfusion according to local protocol	
D - Disability	☐ Assessment of sedation level using the Richmond Agitation Sedation Scale (RASS) • Check miorisolution level, if a neuromuscular blocking agent is in use	
	☐ Assessment of level of consciousness using Glasgow Coma Scale (GCS) (no sedation)	
	☐ Check presence of tracheal reflex (no cough response to tracheobronchial suctioning)	
	☐ Assessment of motor deficits in lower and upper limbs and muscular strength	
	☐ Perform pupillary assessment	
	☐ Assessment of pain: • With visual analog scale (VAS) or Numerical Rating Scale (NRS), in patient able to speak • With Critical Care Pain Observation Tool (CPOT) or Behavioural Pain Scale (BPS), in patient not able to speak	
	☐ Assessment of delirium with Confusion Assessment Method – Intensive Care Unit (CAM-ICU) or Intensive Care Delirium Screening Check-List (ICDSC)	
	☐ Monitoring of intracranial pressure (ICP) with target of ICP < 20 mmHg	
D - Drainages	☐ Monitoring of cerebral perfusion pressure (CPP) with target of 50-70 mmHg	
	☐ Check urinary catheter and change it according to the guidelines	
	☐ Check the urinary drain bag and maintenance of a closed circuit	
	☐ Check the right position of the nasogastric or orogastric tube, at least once a shift or if necessary	
	☐ Daily change of the feeding tube dressing in order to prevent associated pressure ulcers.	
	☐ Enteral nutrition (EN) administration according to prescription	
	☐ Check gastric volumes residual (GRV) every 4 hours, with maximum of 300 ml, but correlated to EN rate	
	☐ Check patency of all drains, document types and amount of fluid in drain bag, at the beginning of the shift, and record drainage output.	
	☐ Check patency of pigtail drain by aspiration and control Heimlich valve, once a shift	
	☐ Check intra-abdominal pressure, filling with 25 ml of 0,9% sterile sodium chloride, and target value ≤ 10 cmH ₂ O	

Step	Assessment-Interventions	Priority
	☐ Check abdominal stoma, the skin around and dressing.	
	☐ Assessment and management of bowel functions • At least in 3rd day, no later than 5-7 days	
	☐ Check presence of diarrhea and assessment/management of devices to divert the stools.	
E - Exposure	☐ Quick exposure of the patient, at the beginning of the shift and if necessary, for quick-look assessment, concerning security problems	
	☐ Intermittent or continuous monitoring of temperature, according to clinical needs of the patient • In extracorporeal systems, continuous monitoring of temperature is needed	
	☐ Systematic assessment and inspection of the patient's skin for bedsores, correlated to devices and dressings, after hygiene care and position change	
	☐ Assessment the patient's risk of developing a pressure ulcer (Braden Scale), and the need of anti-bedsores devices: • Alternating pressure mattress • Inflatable mattress	
	☐ Check and dressing of surgery wounds	
	☐ Check and dressing of traumatic wounds	
	☐ Check and dressing of external fixators	
	☐ Check plasters	
	☐ Check immobilization devices (spinal boards and limb devices)	
	☐ Check the presence of restraint devices and control of skin integrity and circulation impairment	
	☐ Check the presence of devices for preventing deep vein thrombosis (DVT), according to medical prescription: • Elastic compression stockings • Intermittent pneumatic compression devices • Contraindicated in peripheral arterial disease, including history of peripheral arterial bypass grafting	
	☐ Check personal belongings, taken off from unconscious patient, with specific record and keeping in the safe	
E - Education	☐ Information to the awake patient about intervention and nurse care plan	
	☐ Assessment of the need for tools to improve communication between patients with tracheostomy and health workers	
	☐ Education plans for awake patients to perform early rehabilitation interventions	
	☐ Assessment psychological conditions of the patient that could need a specialistic support	
	☐ Identification of anxiety or depression in awake patient	
F - Fair positioning	☐ Check change body positioning of the patient every 2-4 hours according to: • Respiratory condition • Hemodynamic stability • Neurological conditions	
	☐ Change position in • Semi-Fowler's position (30°) • Right lateral position • Left lateral position	
	☐ Prone positioning in intubated patients, with severe hypoxemia ($\text{PaO}_2/\text{FiO}_2 \leq 150$)	
	☐ Cardiac chair positioning, if necessary and not contraindicated	
	☐ Chair positioning, if necessary and not contraindicated	

Step	Assessment-Interventions	Priority
F - Family members and significant others	☐ Make environment safe for families and visitors	
	☐ Provide nursing informations to relatives	
	☐ Provide support and help to relatives	
	☐ Management of the grief stages of relatives	
	☐ Identification of relational issues with relatives	
	☐ Identification of psychological support need for relatives	
	☐ Assessment of cultural mediation need	
I - Infection	☐ Check for precautonal isolation for patients with Multidrug Resistant Organism (MDRO), and management	
	☐ Check for precautonal isolation for immunocompromised patients and management	
	☐ Check properly PPE for management of infections during nursing care	