

BEST PRACTICES

Technical guidance of routine nursing for ICU patient

■ **STEFANO BAMBI¹, CHIARA PEDUTO², PASQUALE DAMMIANO², YARI BARDACCI², LORENZO BALLERINI², ELISA MATTIUSI³**

¹ RN, MSN, PhD Executive Board Aniarti. Azienda Ospedaliera Universitaria "Careggi" – Florence. Italy

² RN, Terapia Intensiva di Emergenza e del Trauma – "Careggi Teaching Hospital" – Florence. Italy

³ RN, Tutor didattico, Corso di Studi in Infermieristica, Università degli Studi di Udine – Udine. Italy

Translated by Maria Cristina Aguiari, RN, CCRN. Cittadella salute CTO Hospital Torino. Italy

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aniarti@aniarti.it

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	<input type="checkbox"/> Take-charge patient at the beginning of shift by collecting data from previous shift colleagues using ABCDE approach <ul style="list-style-type: none"> • 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 	
	<input type="checkbox"/> Diagnostic therapeutic care pathway planned during the shift	

Step	Assessment-Interventions	Priority
A - Auto-Safety	<input type="checkbox"/> Before entering the patient room, perform auto-check: check the properly using of PPE as regards the procedure to be carried out	
	<input type="checkbox"/> 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	
	<input type="checkbox"/> 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)	
	<input type="checkbox"/> Before putting on new gloves, use alcohol-based hand sanitizers over the first pair of gloves	
	<input type="checkbox"/> Check positive or negative pressure activation of the patient room as regards clinical needs	
Setting - Safety	<input type="checkbox"/> Check the presence of AMBU bag or self-inflating resuscitator	
	<input type="checkbox"/> Check the presence of oxygen flowmeter with oxygen connector for AMBU bag	
	<input type="checkbox"/> Check suction device	
	<input type="checkbox"/> Check equipment for airway management (antimicrobial filters, HME filters, catheter mounts, water-soluble lubricants, Guedel airways, ventilation masks)	
	<input type="checkbox"/> Check the presence of aspiration catheters in various sizes	
	<input type="checkbox"/> Check HEPA filter on expiratory tract of the ventilator with the current date (mandatory replacement every 24 hours)	
	<input type="checkbox"/> Check mechanical ventilator alarms: <ul style="list-style-type: none"> • High and Low minute volume • High Tidal Volume • High Inspiratory Pressure • High and Low respiratory rate Set Apnea time (15 seconds at most)	
	<input type="checkbox"/> Check "Back-up Ventilation" or "Apnea Ventilation": in Pressure Support Ventilation make sure is set to ON	
	<input type="checkbox"/> Check multiparameter patient monitor: <ul style="list-style-type: none"> • 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) 	
	<input type="checkbox"/> Check power supply of the electro-medical devices	
	<input type="checkbox"/> Check the correspondence between prescribed IV therapy (drugs and dose) and effectively ongoing treatment in the patient room.	
	<input type="checkbox"/> Check ventilator filters and connectors (they must be secure)	
	<input type="checkbox"/> Check intravenous lines connections (they must be secure but not too tight)	
	<input type="checkbox"/> Check extracorporeal circuits (CRRT, ECMO): check the absence of kinking or clamping on the lines and the safe connections of the catheters.	
	<input type="checkbox"/> Check patient bed: raised side rails, braked bed.	
<input type="checkbox"/> 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	<input type="checkbox"/> Quick patient assessment (ABCDE), in order to detect any problems concerning patient security	
A - Airways	<input type="checkbox"/> Consciousness assessment (Glasgow Coma Scale)	
	<input type="checkbox"/> Assessment of the level of sedation (Richmond Agitation Sedation Scale)	
	<input type="checkbox"/> Check natural airway <ul style="list-style-type: none"> • Airway Patency 	

Step	Assessment-Interventions	Priority
	<input type="checkbox"/> Check artificial airway – endotracheal tube <ul style="list-style-type: none"> • 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) 	
	<input type="checkbox"/> Check artificial airway – tracheostomy tube <ul style="list-style-type: none"> • 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) 	
	<input type="checkbox"/> Check subglottic aspiration (in patient with ET with lumen subglottic suction) <ul style="list-style-type: none"> • -25 mmHg in continuous aspiration • -100/-150 in intermittent aspiration 	
	<input type="checkbox"/> End Tidal CO ₂ monitoring <ul style="list-style-type: none"> • 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 	
	<input type="checkbox"/> Tracheal aspiration <ul style="list-style-type: none"> • Mandatory closed-circuit endotracheal suction in all patients • Only when it is needed, preferably observing expiratory flow-time waveform 	
	<input type="checkbox"/> Oral care once a shift <ul style="list-style-type: none"> • 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	<input type="checkbox"/> Clinical respiratory assessment <ul style="list-style-type: none"> • 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 	
	<input type="checkbox"/> Instrumental respiratory assessment <ul style="list-style-type: none"> • 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) 	
	<input type="checkbox"/> Supplemental oxygen <ul style="list-style-type: none"> • Flow • FiO₂ 	
	<input type="checkbox"/> Non-invasive ventilation assessment <ul style="list-style-type: none"> • Modes of ventilation (CPAP, PSV, BIPAP/DuoPAP/BiVent) • Respiratory rate • Expired Tidal Volume • PEEP • FiO₂ 	

Step	Assessment-Interventions	Priority
	<input type="checkbox"/> Invasive ventilation assessment <ul style="list-style-type: none"> • Modes of ventilation • Respiratory rate (spontaneous and/or set) • Expired Tidal Volume • Inspiratory pressure (Peak/Plateau) • PEEP • FI_{O_2} <input type="checkbox"/> Check ventilator circuit <ul style="list-style-type: none"> • 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 <input type="checkbox"/> Humidification of gases <ul style="list-style-type: none"> • 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/lBW, 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 <input type="checkbox"/> Management of the condensation removal <ul style="list-style-type: none"> • Preventing the derecruitment and aerosol-producing during disconnection (use of clamp and ventilator stand-by mode) <input type="checkbox"/> Check nitric oxide cylinder and circuit, if available <input type="checkbox"/> Check patient position, semi-Fowler's position (30°), or if contraindicated, in Anti-Trendelenburg position	
C - Circulation	<input type="checkbox"/> Clinical circulation assessment <ul style="list-style-type: none"> • Pulse assessment (radial, brachial, femoral) • Capillary refill time • Skin colour • Temperature • Sweating <input type="checkbox"/> Continuous instrumental monitoring <ul style="list-style-type: none"> • 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 <input type="checkbox"/> Perform 12-lead ECG in case of arrhythmia, QRS or STsegment alteration <input type="checkbox"/> Check pacemaker status and functions <input type="checkbox"/> DO_2 monitoring (oxygen delivery) <ul style="list-style-type: none"> • PVC value (taking into account the PEEP) • $ScvO_2$ value (Venous blood gas from distal lumen CVC in superior vena cava) • Haemoglobin value (Arterial or venous blood gas test) • SaO_2 value (Arterial blood gas) • Cardiac output with da Echocardiography or with pulse contour analysis (PICCO, PRAM, Vigileo) <input type="checkbox"/> Organ perfusion monitoring with target mean arterial pressure of 60-65 mmHg <input type="checkbox"/> Check invasive blood pressure circuit <ul style="list-style-type: none"> • 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 <input type="checkbox"/> Check safe fixation of all vascular devices	

Step	Assessment-Interventions	Priority
	<input type="checkbox"/> Check for patency of vascular devices <ul style="list-style-type: none"> • 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 	
	<input type="checkbox"/> Management of infusion therapy in a Central Venous Catheter: <ul style="list-style-type: none"> • 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 	
	<input type="checkbox"/> Management of Total Parenteral Nutrition and change the infusion set at the end of the bag (every 24 hours)	
	<input type="checkbox"/> Management of electrolytes infusion in accordance with local protocol	
	<input type="checkbox"/> Management of blood glucose in accordance with local protocol, tolerated up to 140 mg/dl, above 180 mg/dl needs to be corrected.	
	<input type="checkbox"/> Removal of peripheral IV cannula in presence of CVC	
	<input type="checkbox"/> Daily inspection of the insertion site of venous access <ul style="list-style-type: none"> • Change of transparent dressing every 7 days, if intact • Change of gauze dressing, if intact, every 48 hours 	
	<input type="checkbox"/> Infusion set change, with valve connectors and stopcocks, every 7 days <ul style="list-style-type: none"> • Propofol set infusion should be changed at every syringe change 	
	<input type="checkbox"/> Change of pressure transducers every 7 days	
	<input type="checkbox"/> Check urine output hourly (0.5-1 ml/kg/h)	
	<input type="checkbox"/> Check monitoring by pulmonary artery catheter <ul style="list-style-type: none"> • Left atrial pressure (LAP) • Pulmonary Artery Pressure (PAP) • Pulmonary capillary wedge pressure (PCWP) • SvO₂ 	
	<input type="checkbox"/> Search for external bleeding, close to insertion sites of vascular access, catheters and drainages	
	<input type="checkbox"/> Blood tests according to prescription <ul style="list-style-type: none"> • 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) 	
	<input type="checkbox"/> 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)	
	<input type="checkbox"/> Monitoring of Continuous Renal Replace Treatment (CRRT) <ul style="list-style-type: none"> • Blood flow • Reinfusion pre/post • Dialysate • Clearing • Transmembrane pressure • Detect filter clotting (fibrin, clot) 	

Step	Assessment-Interventions	Priority
	<input type="checkbox"/> Monitoring of Extracorporeal Membrane Oxygenation (ECMO) <ul style="list-style-type: none"> • 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) <input type="checkbox"/> Monitoring of Intra-Aortic Balloon Pump (IABP) <ul style="list-style-type: none"> • Mode • Trigger • Augmentation IAB • Frequency of IAB ratio • ECG trace • Arterial trace • Balloon trace • systolic, diastolic and MAP augmentation pressures <input type="checkbox"/> Special attention to recording groin bleeding/ooze, peripheral perfusion, colour, bilateral pulses, temperature, capillary return, movement and sensation <input type="checkbox"/> Monitor urine output closely (The balloon sits above the bifurcation of the renal arteries - backward migration may compromise blood flow to the kidneys) <input type="checkbox"/> Management of blood transfusion according to local protocol	
D - Disability	<input type="checkbox"/> Assessment of sedation level using the Richmond Agitation Sedation Scale (RASS) <ul style="list-style-type: none"> • Check miorisolution level, if a neuromuscular blocking agent is in use <input type="checkbox"/> Assessment of level of consciousness using Glasgow Coma Scale (GCS) (no sedation) <input type="checkbox"/> Check presence of tracheal reflex (no cough response to tracheobronchial suctioning) <input type="checkbox"/> Assessment of motor deficits in lower and upper limbs and muscular strength <input type="checkbox"/> Perform pupillary assessment <input type="checkbox"/> Assessment of pain: <ul style="list-style-type: none"> • 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 <input type="checkbox"/> Assessment of delirium with Confusion Assessment Method – Intensive Care Unit (CAM-ICU) or Intensive Care Delirium Screening Check-List (ICDSC) <input type="checkbox"/> Monitoring of intracranial pressure (ICP) with target of ICP < 20 mmHg <input type="checkbox"/> Monitoring of cerebral perfusion pressure (CPP) with target of 50-70 mmHg	
D - Drainages	<input type="checkbox"/> Check urinary catheter and change it according to the guidelines <input type="checkbox"/> Check the urinary drain bag and maintenance of a closed circuit <input type="checkbox"/> Check the right position of the nasogastric or orogastric tube, at least once a shift or if necessary <input type="checkbox"/> Daily change of the feeding tube dressing in order to prevent associated pressure ulcers. <input type="checkbox"/> Enteral nutrition (EN) administration according to prescription <input type="checkbox"/> Check gastric volumes residual (GRV) every 4 hours, with maximum of 300 ml, but correlated to EN rate <input type="checkbox"/> Check patency of all drains, document types and amount of fluid in drain bag, at the beginning of the shift, and record drainage output. <input type="checkbox"/> Check patency of pigtail drain by aspiration and control Heimlich valve, once a shift <input type="checkbox"/> 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
	<input type="checkbox"/> Check abdominal stoma, the skin around and dressing. <input type="checkbox"/> Assessment and management of bowel functions <ul style="list-style-type: none"> • At least in 3rd day, no later than 5-7 days <input type="checkbox"/> Check presence of diarrhea and assessment/management of devices to divert the stools.	
E - Exposure	<input type="checkbox"/> Quick exposure of the patient, at the beginning of the shift and if necessary, for quick-look assessment, concerning security problems <input type="checkbox"/> Intermittent or continuous monitoring of temperature, according to clinical needs of the patient <ul style="list-style-type: none"> • In extracorporeal systems, continuous monitoring of temperature is needed <input type="checkbox"/> Systematic assessment and inspection of the patient's skin for bedsores, correlated to devices and dressings, after hygiene care and position change <input type="checkbox"/> Assessment the patient's risk of developing a pressure ulcer (Braden Scale), and the need of anti-bedsores devices: <ul style="list-style-type: none"> • Alternating pressure mattress • Inflatable mattress <input type="checkbox"/> Check and dressing of surgery wounds <input type="checkbox"/> Check and dressing of traumatic wounds <input type="checkbox"/> Check and dressing of external fixators <input type="checkbox"/> Check plasters <input type="checkbox"/> Check immobilization devices (spinal boards and limb devices) <input type="checkbox"/> Check the presence of restraint devices and control of skin integrity and circulation impairment <input type="checkbox"/> Check the presence of devices for preventing deep vein thrombosis (DVT), according to medical prescription: <ul style="list-style-type: none"> • Elastic compression stockings • Intermittent pneumatic compression devices • Contraindicated in peripheral arterial disease, including history of peripheral arterial bypass grafting <input type="checkbox"/> Check personal belongings, taken off from unconscious patient, with specific record and keeping in the safe	
E - Education	<input type="checkbox"/> Information to the awake patient about intervention and nurse care plan <input type="checkbox"/> Assessment of the need for tools to improve communication between patients with tracheostomy and health workers <input type="checkbox"/> Education plans for awake patients to perform early rehabilitation interventions <input type="checkbox"/> Assessment psychological conditions of the patient that could need a specialistic support <input type="checkbox"/> Identification of anxiety or depression in awake patient	
F - Fair positioning	<input type="checkbox"/> Check change body positioning of the patient every 2-4 hours according to: <ul style="list-style-type: none"> • Respiratory condition • Hemodynamic stability • Neurological conditions <input type="checkbox"/> Change position in <ul style="list-style-type: none"> • Semi-Fowler's position (30°) • Right lateral position • Left lateral position <input type="checkbox"/> Prone positioning in intubated patients, with severe hypoxemia ($PaO_2/FiO_2 \leq 150$) <input type="checkbox"/> Cardiac chair positioning, if necessary and not contraindicated <input type="checkbox"/> Chair positioning, if necessary and not contraindicated	

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