2024 Neonatal and pediatric equipment standardization instructions and recommendations for Emergency Medical Services (EMS), prehospital emergency care and patient transport in Iceland, from the Yfirlæknir bráðaþjónustu utan sjúkrahúsa, Iceland.

Rationale for this set of instructions and recommendations

Pediatric patients are of the greatest interest for medical activities, since they are the main source of achievable gain in years of life in any health care system that is efficiency driven. Decreasing clinical variability by standardization of equipment will decrease clinical errors, and patient safety incidents in number and severity will decrease. Therefore, there is the need to define the minimum equipment at the disposal of EMS personnel when responding to neonatal and pediatric emergencies. Also, the systematic use of medical items check lists, as recommended by the World Health Organization, by increasing adherence to clinical guidelines and best clinical practices, decreases the likelihood of bad clinical outcomes. That is why below a minimum equipment check list is defined.

This list, that is subject to future updates, has been possible after reflecting on best practices, updated standards in use, and expert consultation. Apart from the equipment list, the pediatric compatibility of all medical equipment present in the EMS unit must be ensured. This includes, but is not restricted to, infusion pumps, secretion suction units, ventilators, monitor defibrillators, pulse oximeters, clinical thermometers. All items must be authorized for the use in Iceland, CE marked, latex free, suitable for ambulance/aircraft/boat use, used with compatible fixation systems to the vehicle to prevent projection or falls, and able to be operated safely outdoors under all year-round Icelandic weather conditions.

Standardization instructions

This list is a minimum list. No items can be missing to consider the responding EMS unit fully operational. Additional equipment can be added at the discretion of the provider in a permanent, sustainable way, and the corresponding additions to the checklist will be considered standard from the moment of that decision. Some items can be exchanged with other equivalent or with superior properties and capacity. E.g.: if a continuous electronic CO2 monitoring system is systematically available, then CO2 colorimetric devices can be substituted by disposable CO2 probes compatible with the continuous CO2 monitoring system already in place. Please see footnotes on the list.

All items must be periodically – and always after every use - checked on their presence, integrity, expiry date when apply, sterilization date when apply, and must be kept within manufacturer range of temperature, moist and light protection. Care must be observed in battery powered items, to ensure enough operating life that is defined by the driving time to the farthest possible health care center/hospital for patient transfer plus one hour. All items are single use, except when explicitly indicated. For these reusable products, manufacturer instructions for cleaning and disinfecting must be observed and documented. All applicable legal requirements, and specifically the Medical Devices Act, in regard to documented training for end users, must be observed too.

The “LIST OF MINIMUM EQUIPMENT FOR NEONATAL AND PEDIATRIC CARE IN GROUND/ AIR/SEA EMS ” is found at the end of this document .

Recommendations

Recommendations are:

1.The items will be collected in a portable single bag identified as NEONATAL/PEDIATRIC, with adequate level of protection from light, moisture, temperature, and mechanical deterioration.

2.Adequate sensing and monitoring elements will be in the bag to document compliance with the range of recommended temperature exposure of the equipment.

3.Safety numbered sealing of the bag/s after every check will be provided.

4.Check dates, expiry dates and responsible person record will be kept by the EMS to document and ensure integrity and traceability of the process.

5.This equipment and operation will be contemplated in the operational procedures / protocols or manuals of the EMS agency or operator, preferably kept under a standardized quality system, such as UNE ISO 9001/ UNE ISO 1789.

References

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Reykjavik, Aug 19th, 2024

Vicente Sánchez-Brunete Ingelmo, MD

Yfirlæknir bráðaþjónustu utan sjúkrahúsa

2024 Neonatal and pediatric training recommendations for Emergency Medical Services (EMS), prehospital emergency care and patient transport in Iceland, from the Yfirlæknir bráðaþjónustu utan sjúkrahúsa, Iceland.

Rationale for this set of recommendations

Pediatric patients are of the greatest interest for medical activities, since they are the main source of achievable gain in years of life in any health care system that is efficiency driven. After a survey conducted in all health districts, the results show uneven training, not reaching optimal level. Decreasing clinical variability by standardization of training will decrease clinical errors, and patient safety incidents in number and severity will decrease. Therefore, there is the need to define the minimum training received by all EMS personnel when responding to neonatal and pediatric emergencies.

Standardization recommendations

All EMS operations involved personnel (including EMT, paramedics, doctors, and nurses) need to comply with the minimum training required. This minimum training is specified

below. Additional training may be desirable to comply with specific and local needs.

• EMT B*. EPBLS initial course or refresher in the last 24 months.
• EMT I/A*. EPILS initial course or refresher in the last 24 months.
• Paramedic*. EPALS initial course or refresher in the last 24 months.
• Doctor*. EPALS initial course or refresher in the last 24 months.
• Nurse*. EPALS initial course or refresher in the last 24 months.

*If expected to work on board of Air ambulance or helicopter, need additional NLS course.

The standard course structure is the contemplated by the European Resuscitation Council (ERC), widely used in Iceland as the model to follow. It is considered equivalent the training provided by the American Heart Association (AHA), and their equivalents in other locations. EPBLS is European Pediatric Basic Life Support. EPILS is European Pediatric Intermediate Life Support. EPALS is European Pediatric Advanced Life Support. NLS is Neonatal Life Support.

Recertifications are currently valid for 24 months, but if it changes, training should be

modified accordingly. Reykjavik, Aug 19th, 2024

Vicente Sánchez-Brunete Ingelmo, MD

Yfirlæknir bráðaþjónustu utan sjúkrahúsa

MINIMUM EQUIPMENT FOR NEONATAL AND PEDIATRIC CARE IN GROUND/AIR/SEA EMS

ITEM	AMOUNT
SCALPEL WITH HANDLE #15 BLADE	1
SCALPEL WITH HANDLE #20 BLADE	1
STERILE PLASTIC CORD CLAMP	4
STERILE TWIZZERS	1
HEMOSTATIC FORCEPS MOSQUITO 125MM, REUSABLE	1
IRIS STERILE SCISSORS 115MM, REUSABLE	1
COTTON GAUZE 16X25CM PACK	1
SUTURE SILK #0 71-8OCM STRAIGHT NEEDLE, TRIANGULAR SECTION 59-60MM	1
SUTURE SILK #2/0 71-80 CM NEEDLE 3/8CIRCULAR 19 MM, TRIANGULAR SECTION	1
SURGICAL FIELD 60 X45 CM, STERILE, SINGLE USE	1
COTTON GAUZE COMPRESS 45X45CM PACK	1
STERILE NITRILE GLOVES, SIZE LARGE	2
STERILE NITRILE GLOVES, SIZE MEDIUM	2
STERILE NITRILE GLOVES, SIZE SMALL	2

RESCUE BLANKET, GOLDEN/SILVER, SINGLE USE 210X160CM	2
PAEDIATRIC DEFIBRILLATOR ADHESIVE ELECTRODE KIT	1
ELECTRODE / ECG NEONATAL<25MM	1
ELECTRODE/ECG PEDIATRIC 25-35MM	1
STABILIZATION AND POSITIONING SPLINT 6-16CM x 4 CM	1
NON INVASIVE BLOOD PRESSURE CUFF NEONATAL AND PEDIATRIC, REUSABLE	1
NEONATAL PULSIOXYMETER SENSOR, SINGLE USE	1
PEDIATRIC PULSIOXYMETER SENSOR, SINGLE USE	1
BROSELOW TAPE, REUSABLE	1
PEDIATRIC DOUBLE BELL STETHOSCOPE , REUSABLE	1
TONGUE DEPRESSOR PLASTIC	1
PEDIATRIC MAGILL FORCEPS 200MM	1
CHEST DRAIN TUBE WITH TROCAR #8	2
CHEST DRAIN TUBE WITH TROCAR #10	2
GUEDEL CANNULA #00	1
GUEDEL CANNULA #0	1
GUEDEL CANNULA #1	1
GUEDEL CANNULA #2	1
GUEDEL CANNULA #3	1
NASOPHARYNGEAL AIRWAY CANNULA #4.5	1
NASOPHARYNGEAL AIRWAY CANNULA #5	1
ENDOTRACHEAL INTUBATION STYLET 2,5-4,5 MM, REUSABLE	1
ENDOTRACHEAL TUBE, CUFFED #2	1
ENDOTRACHEAL TUBE, CUFFED #2.5	1
ENDOTRACHEAL TUBE, CUFFED #3	1
ENDOTRACHEAL TUBE, CUFFED #3,5	1
ENDOTRACHEAL TUBE, CUFFED #4	1
ENDOTRACHEAL TUBE, CUFFED #4,5	1
ENDOTRACHEAL TUBE, CUFFED #5	1
ENDOTRACHEAL TUBE, CUFFED #5,5	1
ENDOTRACHEAL TUBE, CUFFED #6	1
ENDOTRACHEAL TUBE, CUFFED #6,5	1

SYRINGE EXCENTRIC LUER CONNECTION 20 ML	1

DISPOSABLE LARYNGEAL MASK #1,5	1
DISPOSABLE LARYNGEAL MASK #2	1
DISPOSABLE LARYNGEAL MASK #2,5	1
DISPOSABLE LARYNGEAL MASK #3	1
NASAL OXYGEN PEDIATRIC PRONGS	1
PEDIATRIC OXYGEN MASK	1
PAEDIATRIC OXYGEN MASK, WITH OXYGEN RESERVOIR	1
PEDIATRIC OXYGEN MASK WITH NEBULIZER	1
INTRAOSSEOUS NEEDLE ILLINOIS TYPE 16G ADJUSTABLE 22-48MM *	2
INTRAOSSEOUS NEEDLE INLLINOIS TYPE 18G AJUSTABLE14-38MM *	2
TRANSPARENT ADHESIVE DRESSING FOR IV CATHETER STABILIZATION 7X8CM	2
NASAL POLIURETANE DRUG NEBULIZATION CONE	1
CATHETER OVER NEEDLE 22G (0.9X25MM) WITH SAFETY SYSTEM	2
CATHETER OVER NEEDLE 24G (0.7X19MM) WITH SAFETY SYSTEM	2
DRIP CHAMBER (MICRO DRIP)**	2
FLOW CONTROLLER SET**	2
PEDIATRIC VENOUS TOURNIQUET, REUSABLE	1
RUBBER ELASTIC BAND FOR NEONATE IV PLACEMENT	1
SYRINGE LUER LOCK, CONCENTRIC 20 ML	1
VASCULAR ACCESS 3 WAY STOPCOCK WITH EXTENSION 15CM	2
NATRIUM CHLORIDE 0.9% INYECTABLE10 ML PLASTIC CONTAINER	2
NATRIUM CHLORIDE 0.9% INYECTABLE 100 ML PLASTIC CONTAINER	2
UMBILICAL CATHETER PVC 1 WAY 5 FRX38CM	2
UMBILICAL CATHETHER PVC 1 WAY 3,5 FRX38CM	2
SILK TAPE 2,5 CM WIDE ROLL	1
ENDOTRACHEAL TUBE HOLDER THOMAS TYPE	1
LARYNGOSCOPE PEDIATRIC, HALOGEN OPTIC FIBER, SINGLE USE BLADES***	1
CO2 COLORIMETRIC SENSOR****	1
PVC O2 CONNECTION 2M, REUSABLE	1
PEDIATRIC BAG VALVE DEVICE 500ML WITH 02 RESERVOIR, REUSABLE	1
BACTERIAL FILTER	1
RESUSCITATION MASK #00, REUSABLE	1
RESUSCITATION MASK #0, REUSABLE	1
RESUSCITATION MASK #1, REUSABLE	1

RESUSCITATION MASK #2, REUSABLE	1
PEEP VALVE 30CM H2O, REUSABLE	1
PVC SUCTION CANNULA WITH VALVE 06CHX50CM	1
PVC SUCTION CANNULA WITH VALVE 8CHX50 CM	1
PVC SUCTION CANNULA WITH VALVE 10CHX50CM	1
PVC SUCTION CANNULA WITH VALVE 12CHX50CM	1
PVC OPEN LEVIN TYPE NASOGASTRIC TRANSPARENT SINGLE TUBE 14CHX120CM	1
PVC NASOGASTRIC TUBE SALEM TYPE DUAL TUBE04CHX90CM	1
PVC NASOGASTRIC TUBE SALEM TYPE DUAL TUBE06CHX90CM	1
PVC NASOGASTRIC TUBE SALEM TYPE DUAL TUBE08CHX90CM	1
PVC NASOGASTRIC TUBE SALEM TYPE DUAL TUBE10CHX90CM	1
PVC NASOGASTRIC TUBE SALEM TYPE DUAL TUBE 12CHX90CM	1
PVC NASOGASTRIC TUBE SALEM TYPE DUAL TUBE 16CHX120CM	1
TONGUE DEPRESSOR PLASTIC	1
CERVICAL COLLAR, PEDIATRIC SIZE	1

BACKBOARD PEDIATRIC SIZE, REUSABLE	1
PELVIC BINDER, PEDIATRIC SIZE	1
URINARY CATHETER PEDIATRIC SIZE KITS (6F-22F)	1
INFUSION WARMER, REUSABLE	1
PEDIATRIC THERMOMETER, REUSABLE*****	1
PEDIATRIC NOISE PROTECTION, REUSABLE	1

* To be replaced by motorized intraosseous needle insertion system, if available

** To be replaced by compatible infusion pump sets, if pump available.
*** To be repaced by pediatric single use blades for videolaryngoscopy if videolaryngoscopy is available

****To be replaced by CO_2 sensors if electronic continuous monitoring is available
***** To be replaced by electronic thermometer probe if electronic continuous monitoring is available.

DRUGS TO BE AVAILABLE FOR NEONATAL CARE AND TRANSPORT

DRUG	AMOUNT
ADENOSINE 3 mg/ml	1
ADRENALIN 0,1 mg/ml	2
AMPICILIN 1g	1
ATROPINE 0,5 mg/ml	2

CALCIUM GLUCONATE 10%	2
CEFOTAXIME 1g	1
DOPAMIN 40 mg/ml	1
FUROSEMIDE 10mg/ml	2
FENTANYL 50 µg/ml	2
MIDAZOLAM 1 mg/ml	1
MORPHINE 10 mg/ml	2
NALOXONE 0,4mg/ml	2
PARACETAMOL RECTAL 60 mg	2
PHENOBARBITAL 200mg/ml	2
SUXAMETONIUM 50 mg/ml*	2
ROCURONIUM 10 mg/ml*	1
PGE1 0,5 mg/ml*	1

*Need refrigeration control