NVIC tracheotomy protocol COVID-19 (April 20st, 2020)

Accountability:
This protocol complements the existing NVIC tracheotomy protocol[1] and is written based on recommendations from the Dutch ENT association[2], international scientific associations and scientific literature[3-6]. It describes the procedures to be followed and provides guidance on the use of materials and resources. The reason for a separate protocol is the fact that the corona crisis necessitates specific adaptations to provide maximum protection for health workers against contamination. Since the most experienced person should perform the tracheotomy, we have limited ourselves to the specific differences / additions to the standard tracheotomy protocol.

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Abbreviations:

- AGP: aerosol generating procedure.
- COVID-19: corona virus disease 2019.
- CRM: Crew Resource Management.
- FFP: filtering facepiece particles.
- NVIC: Dutch Society of Intensive Care Medicine.
- PDT: percutaneous dilatation tracheotomy.
- PPE: personal protective equipment.

Background:

- Performing a tracheotomy on a COVID-19 (suspected) patient is considered a high-risk procedure, because it is an AGP.
- Cannula care is accompanied by frequent AGPs (such as suctioning).
- When comparing PDT and a surgical tracheotomy, it is unclear whether one procedure is safer than the other. All in all and provided that PPE are properly complied with, PDT is preferable in the ICU, of course partly dependent on local knowledge and expertise.
- Ventilation in patients with COVID-19 is often prolonged. Assume the normal indications for a tracheotomy, taking into account the following:
  - Do not perform an early tracheotomy (within a week) in COVID patients, but only after about two weeks at the earliest. In general, early tracheotomy with prolonged need for artificial ventilation does not lead to less mortality or shortening of the ICU-duration[7].
  - Do not perform a tracheotomy until the patient is stable, abdominal ventilation is no longer required and the prognosis appears to be good.
  - If possible: postpone a tracheotomy so that the risk of infectiousness is minimized (the exact moment of non-infectiousness is currently still uncertain to be determined).

General advice regarding PDT preparation in COVID patient[2-6]:

- If possible, perform the procedure in a single room with closed doors.
- The team that carries out the procedure must be as experienced and as small as possible, with a maximum of five people in the room. Decide beforehand who is needed in the room and discuss the division of labor:
    - Responsible for the airway, with or without assistant
    - Responsible for the procedure, with or without assistant
    - ICU nurse in the room
    - ICU nurse in the lock or within calling distance.
- Rest is important for the protection and optimal functioning of the team.

Materials for PDT:

- Care for:
    - PPE according to local protocol, including face shield for all those present in the room.
    - Careful choice of cannula, because later switches should be kept to a minimum. Suggestion: Size 7 cuffed and fenestrated to allow early speech.
    - Sterile drape on patient's face to protect against air leakage and to wrap the ET-tube after the cannula is inserted.

Anesthesia in PDT:

- Specific point of attention after (long-term) prone positioning[8]:
    - Due to the prone position, even after a few hours, swelling of the upper airways can occur. This can lead to an anatomically difficult airway.
- Care for:
    - CRM: properly discuss the airway plan and disconnection moments.
    - Good neuromuscular relaxation so that coughing is prevented.
    - PEEP level as low as possible for minimal flow during apnea.
- Provide apnea ("no flow", put the ventilator temporarily on stand-by) because of additional danger for AGP during the following moments:
    - Tube: withdraw with an empty cuff, until cuff is inflated again. Retraction with inflated cuff is also an option, if done with care.
    - Bronchoscopy: during viewing through the bronchoscope.
    - Procedure: from the moment the large dilator is removed until the cannula is inserted and the ventilator is reconnected.
    - Finally: during procedure, cover puncture site as much as possible.
- Conduct airway interventions with the greatest possible distance to the patient in view of AGP:
    - Video laryngoscopy instead of conventional laryngoscopy, if available.
    - Video bronchoscopy instead of direct bronchoscopy, if available.

In surgical tracheostomy OR (in case of contraindication for PDT):

- Transfer ICU-patient to OR in PPE, “clean” employee to operate elevator and doors.
- Preferably work on OR with adapted air treatment so that the pressure on OK is lower compared to sterile traffic space and preferably also the corridor (negative pressure hierarchy).
- Only necessary materials OR, all carts outside the OR:
  - Overtake patient on OR table, ICU bed remains OK during procedure.
- Only necessary team members within:
  - 1 anesthesiologist (no resident), 1 nurse anesthetist.
  - 1 ENT doctor and an assistant
  - 1 circulation nurse in the OR.
  - 1 circulation nurse outside of OR.
- No door movements between time-out and sign-out.
- See also the recommendations of the Dutch ENT association[2].

After the procedure (ICU):

- Check cannula position with capnogram.
- Ventilator settings in accordance with the latest insights (lung protective).
- Briefing according to CRM.
- Clean up carefully used materials.
- Clean chamber and materials according to local protocol.

Aftercare:

- Minimal manipulations, change dressing only when saturated or signs of infection.
- Suction, desufflation and cannula change are AGP, so perform on indication and apply PPE.
- Preferably use closed suction system.
- Speaking valve can be used (one way valve). Beware of cuff desufflation, or unplanned detachment / removal of the speaking valve; all are AGP and therefore PPE necessary.
- Regular cuff pressure check.
- After separation from the ventilator, place a ProTrach XtraCare filter (HME-F) on the cannula.
- In patient after TLE (total laryngeal extirpation): use Provox Micron HME-F.

Corona Acronym[9]:

- **C**over yourself: PPE during insertion procedure, extra attention at critical moments.\
- **O**perating **R**oom: Doors closed, experienced team.
- **O**pen the trachea: Deep relaxation, apnea (“no flow”) during disconnection.
- **N**ursing and **A**irway: PPE for manipulations, careful planning of decanulation / cannula change.

Disclaimer:

- This protocol has been drawn up on behalf of the NVIC by authors with experience in the field of tracheotomy on the basis of information available to them and can be adapted in accordance with new insights regarding COVID-19.
- This protocol can be used to base hospital policies on.
- The Dutch Society of Intensive Care Medicine (NVIC) is not liable for the accuracy and completeness of the information contained in this document.

Literature:

1. NVIC guideline tracheostomy. https://nvic.nl/richtlijnen/tracheostomie-2019.
2. Aanbevelingen rondom uitvoeren tracheotomie tijdens COVID-19 pandemie. Versie 06-04-2020 Honings J, Takes R, de Bree R. https://www.kno-leden.nl/leden/auth.
3. BLA tracheostomy guideline COVID-19, April 2020. https://www.britishlaryngological.org/sites/default/files/BLA%20Tracheostomy%20guideline%20-BLA%20April%202020%20FINAL.pdf.
4. Tracheotomy recommendations during the COVID-19 pandemic. https://www.entnet.org/content/tracheotomy-recommendations-during-covid-19-pandemic.
5. COVID-19 Tracheostomy. Framework for open tracheostomy in COVID-19 patients. ENT UK, 23-3-2020.
6. Guidelines for tracheostomy during COVID 19. Johns Hopkins, Baltimore. March 25, 2020
7. Effect of early versus late tracheostomy placement on survival in patients receiving mechanical ventilation: the TracMan randomized trial. Young D, Harrison DA, Cuthbertson BH, Rowan K; TracMan Collaborators. JAMA. 2013;309(20):2121-2129.
8. Anaesthesia in the prone position. Edgecombe, H, Carter, K, Yarrow S. Br J Anaesth 2008;100:165-83.
9. CORONA-steps for tracheotomy in COVID-19 patients: a staff-safe method for airway management. Oral Oncology 2020.