STUDY OF THE DETERMINANTS OF THE SUCCESS OF DECANULATION IN TRACHEOTOMY PATIENTS IN THE DIFFICULT-TO-WEAN UNIT. A COHORT STUDY

ACRONYM: DESCATRON

Version n°3 of 14/01/2021

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PROTOCOL VERSION HISTORY

Version	Date	Reasons
2	15/12/2020	Avis du CPP
3	14/01/2021	Avis du CPP

SUMMARY OF THE RESEARCH

Manager	Forcilles Hospital-Cognacq-Jay Foundation
Person who directs and monitors the research	PERETOUT Jean-Baptiste
Title	Study of the determinants of successful decanulation in tracheostomized patients in the post-intensive care unit. A cohort study
Acronym	DESCATRON
Protocol version	n° of 14/01/2021
Rationale / context	The success factors for decanulation are not well known in the literature and the decision to decanulate is mainly based on clinical judgment. The failure rate of decanulation is between 2 and 25% with a poor prognosis in case of failure.
Main Objective	To determine the factors associated with successful decanulation in tracheostomised patients admitted to Difficult-to-Wean Unit.
Secondary objectives	The secondary objectives are to evaluate in tracheostomized patients hospitalized in Difficult-to-Wean Unit.: -The prevalence of successful decanulation ; -The prevalence of successful weaning from invasive ventilation; -Factors associated with successful weaning from invasive ventilation (VI); -Demographic characteristics of these patients at admission; -The ventilatory characteristics of these patients at admission; -Biological characteristics of these patients at admission;
Research scheme	Prospective, monocentric, interventional cohort study with minimal risks and constraints falling under 2° of article L.1121-1 of the Public Health Code.
Inclusion criteria	-Admission to Difficult-to-Wean Unit at Forcilles Hospital; -Presence of a tracheotomy on admission to DIFFICULT-TO-WEAN UNIT; -Presence of invasive ventilation on admission to DIFFICULT-TO-WEAN UNIT with a predicted duration of > 48 hours; -Patient aged at least 18 years at the time of inclusion; -Affiliation to or beneficiary of a social security scheme; -Oral, free, informed and express consent of the patient or a relative.
Non-inclusion criteria	-Known pregnancy ; -Person subject to a legal protection measure; -Person under guardianship or curatorship; -Refusal of access to data by the patient or the designated trusted person.
Primary endpoint	Factors potentially associated with successful decanulation will be collected prospectively: -Severity factors related to the ICU stay;

	-Ventilatory factors; -Respiratory factors; -Extra-respiratory factors;
Secondary evaluation criteria	-Proportion of successful decanulation among all included patients; -Proportion of successful weaning from IV among all included patients; -Collection of biological parameters within the first 48 hours of admission to DIFFICULT-TO-WEAN UNIT; -Ventilatory parameters on admission to DIFFICULT-TO-WEAN UNIT; -Demographic characteristics of these patients during DIFFICULT-TO-WEAN UNIT hospitalisation: mortality, duration of hospitalisation, duration of invasive ventilation. -Nutritional status.
Comparison groups	None
Number of subjects needed	100
Expected number of centres	1
Duration of the research	25 months
Statistical analysis of data	Univariate comparisons will use the usual statistical tests after verification of the distribution of the variables (Chi2 or Fisher's test, t-test, anova or their non-parametric equivalents Wilcoxon and Kruskal-Wallis tests). The variables will be compared between the 2 groups (failure or success of decanulation) by the appropriate tests according to the type of variables (quantitative or qualitative) and their distribution. The selection of variables in the prediction model will be done by multivariate logistic regression based on AIC.
Expected benefits	Useful information for post-ICU settings follow-up and for prioritising or not early rehabilitation in these patients with prolonged stays in intensive care with tracheostomy.
Source of funding	Hôpital Forcilles
Independent Supervisory Committee planned	None
Gestionnaire	Hôpital Forcilles-Fondation Cognacq-Jay

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1 Rationnal

Invasive mechanical ventilation after tracheal intubation is a common ICU procedure to treat patients with acute respiratory failure.

However, even if the acute event is resolved, the length of stay in the ICU may be prolonged by the maintenance of prolonged mechanical ventilation. There are many factors that contribute to the maintenance of prolonged mechanical ventilation and prevent progress in weaning from the ventilator: curarisation, lung infections, pre-existing respiratory disease etc (1).

It has been shown that a delay in weaning is associated with a higher rate of complications in the ICU, an increase in the length of stay due to increased neuromyopathy and nutritional disorders (undernutrition, swallowing disorders) as well as a decrease in survival in the ICU (2)(3).

In case of prolonged invasive ventilation, after several failed weaning and re-intubation (4), these patients are therefore most often tracheotomised by percutaneous or surgical means in order to advance in ventilatory weaning.

The evolution of these tracheostomised patients is long and the difficulties of weaning from mechanical ventilation in this population are partly linked to the lack of professional means allowing satisfactory rehabilitation before decanulation (5).

The weaning units, initially created in the United States (6), then in France from the beginning of the 2000s, have improved the success rate of weaning in these patients.

The challenge of tracheal decanulation remains the ultimate goal in these patients. Several studies have shown the interest of a multidisciplinary management of these patients: physicians, physiotherapists, speech therapists, nurses etc. with their own role in the different stages of weaning and decanulation (7)(8)(9)(10).

The stages of the decanulation process are described in a few studies: switching to spontaneous ventilation without occasional mechanical assistance, repeated spontaneous ventilation sessions during the day, daytime spontaneous ventilation, daytime and nighttime spontaneous ventilation with, in parallel with these progressive sessions, a resumption of speech and swallowing (10)(11)(12)(13).

The factors for successful decanulation are not well known in the literature and the decision to decanulate is mainly based on clinical judgement: weaning from mechanical ventilation, normal nausea reflex, effective cough, ability to swallow secretions, correct saturation SaO_2>90% for more than 24 hours (14).

The failure rate of decanulation is between 2 and 25% (15)(16) with a poor prognosis in case of failure (17).

Thus, the determination of the success factors for decanulation of tracheostomised patients is a major challenge to select and optimise the management of these patients.

2 Hypothèse de recherche

The severity of the resuscitated patient, factors related to invasive ventilation, respiratory and extra-respiratory status are independent factors for successful decanulation.

3 Objectives

3.1 Main Objective

The main objective is to determine the factors associated with successful decanulation in tracheostomised patients admitted to the Difficult-to-Wean Unit.

3.2 Secondary objectives

The secondary objectives are to evaluate in tracheostomized patients hospitalized in Difficult-to-Wean Unit:

- The prevalence of successful decanulation ;
- The prevalence of successful weaning from invasive ventilation;
- Factors associated with successful weaning from invasive ventilation (VI);
- Demographic characteristics of these patients at admission;
- The ventilatory characteristics of these patients at admission;
- Biological characteristics of these patients at admission;
- The nutritional status of these patients at admission.

4 Outcome

4.1 Main outcome

Successful decanulation is defined as maintenance of spontaneous ventilation in the absence of recanulation, acute use of non-invasive ventilation (NIV) or death within 48 hours.
Factors potentially associated with successful decanulation will be collected prospectively:

- Severity factors related to the ICU stay:
    - o Total number of oro-tracheal intubations ;
    - o Number of days on mechanical ventilation;
    - o Curarisation or not with duration
    - o Whether or not prone sessions were performed with duration;
    - o Whether or not ECMO was used as a back-up;
    - o Number of pneumopathies acquired under mechanical ventilation;
    - o IGS2 ;
- Ventilatory factors :
    - o Number of failed extubations before tracheostomy in the ICU;
    - o Duration of mechanical ventilation before tracheostomy in the ICU (days);
    - o Type of tracheostomy used: percutaneous or surgical;
    - o Time to first attempt at Difficult-to-Wean Unit de-ventilation (days);
    - o Time to 24-hour at Difficult-to-Wean Unit de-ventilation (days);
    - o Time from 24-hour deventilation to successful DIFFICULT-TO-WEAN UNIT decanulation (days);
    - o Number of ventilator-associated lung diseases (VAPs) in at Difficult-to-Wean Unit;
- Respiratory factors:
    - o Ultrasound lung ventilation score on admission to at Difficult-to-Wean Unit;
    - o Diaphragmatic dysfunction on admission to at Difficult-to-Wean Unit;
    - o Bronchial fibroscopy abnormalities prior to decanulation;
- Extra-respiratory factors:
    - o Confusional state on admission to at Difficult-to-Wean Unit (CAM-ICU, Appendix 1);
    - o Existing swallowing disorders (assessed after 6 hours of ventilation) by the modified Cowling swallowing score (18);
    - o Oral status on admission to at Difficult-to-Wean Unit (normal, moderately impaired, dilapidated, no teeth);
    - o ICU-Acquired muscle weakness (MRC score) on admission to at Difficult-to-Wean Unit;

4.2 Secondary outcomes

- Proportion of successful decanulation among all included patients (prevalence of successful decanulation) ;
- Proportion of successful weaning from IV among all included patients (prevalence of successful weaning from IV). Successful weaning from invasive ventilation is defined as the absence of invasive ventilation >48h ;
- The same factors potentially associated with successful weaning from IV will be collected as described in section 4.1.
- Collection of biological parameters within the first 48 hours of admission to Difficult-to-Wean Unit: haemoglobin, leukocytes, lymphocytes, neutrophils, troponin, renal function (urea, creatinine, GFR), metabolic function (calcium, magnesium, phosphate, TSH, cortisol at 8 hours, 25(OH)D) and inflammatory function (albumin, CRP);
- Ventilatory parameters on admission to Difficult-to-Wean Unit: ventilatory mode (VAC, VSAI), ventilatory settings (FiO2, PEP, AI, FR, Vt);
- Demographic characteristics of these patients during Difficult-to-Wean Unit hospitalisation: mortality, length of hospitalisation, duration of invasive ventilation.
- Nutritional assessment by evaluation of grip strength by Handgrip at admission and discharge from the Difficult-to-Wean Unit, by evaluation of the stage of sacral eschar at admission to the DIFFICULT-TO-WEAN UNIT, by measurement of resting energy expenditure by calorimetry at admission to the DIFFICULT-TO-WEAN UNIT and by measurement of lean mass, fat mass and dilution by impedancemetry at admission to the Difficult-to-Wean Unit.

5 Patient selection

5.1 Inclusion criteria

- Admission to DIFFICULT-TO-WEAN UNIT at Forcilles Hospital;
- Presence of a tracheotomy on admission to Difficult-to-Wean Unit;
- Presence of invasive ventilation on admission to Difficult-to-Wean Unit with a predicted duration of > 48 hours;
- Patient aged at least 18 years at the time of inclusion;
- Affiliation to or beneficiary of a social security scheme;
- Oral, free, informed and express consent of the patient or a relative.

5.2 Non-inclusion criteria

- Known pregnancy ;
- Person subject to a legal protection measure;
- Person under guardianship or curatorship;
- Refusal of access to data by the patient or the designated trusted person.

5.3 Recruitment procedures

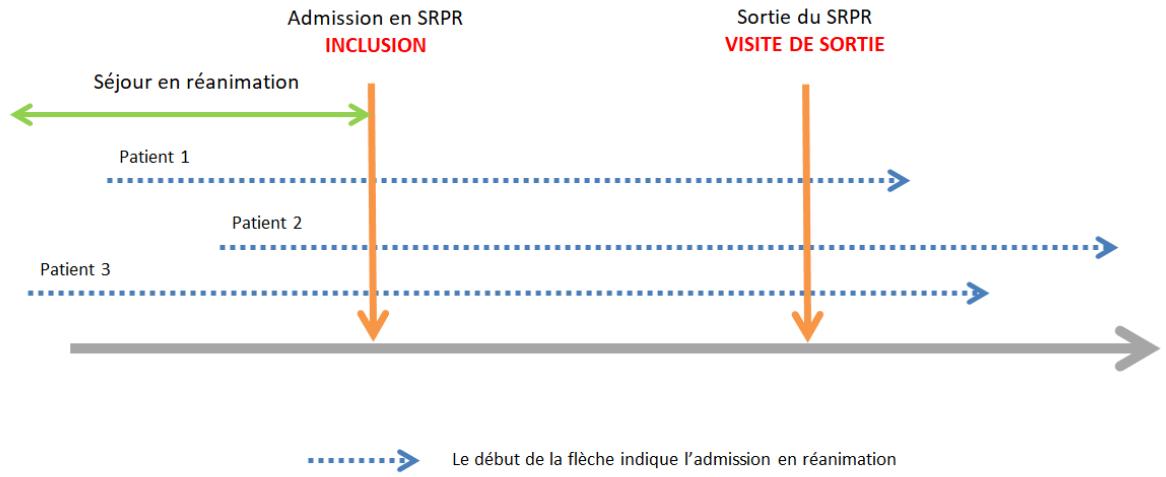
Patients will be recruited prospectively and consecutively from the Difficult-to-wean Unit (=Post-ICU settings) of the Forcilles Hospital following an ICU stay. One of the investigating physicians will identify the patient upon confirmation of transfer from an ICU to the Difficult-to-Wean Unit.

6 Research design

6.1 Type of study

This is a prospective, monocentric, interventional cohort study with minimal risk and constraints falling under 2° of article L.1121-1 of the Public Health Code (Category 2, Jardé law).

6.2 Outline of the research



6.3 Provisional timetable for the research

The duration of recruitment will be 24 months with a follow-up of patients for 1 month, i.e. a total duration of the study estimated at 25 months.

- PPC submission: November 2020;
- Start of inclusion: January 2021;
- Duration of the inclusion period: 2 years;
- Duration of participation of each patient: 1 month (average length of stay in DIFFICULT-TO-WEAN UNIT);
- End of inclusions: January 2023;
- Total duration of the research: 2 years and 1 month;
- Communication in congresses: National and international congresses in intensive care and anesthesiology;
- Publication: July 2023

7 Description of the usual post-ICU settings management

There will be no change to the usual management of Difficult-to-Wean Unit inpatients under this protocol.

7.1 Medical and nursing procedures

Medical procedures for diagnostic or therapeutic purposes and nursing care will be carried out in the usual way, respecting hygiene measures. These procedures consist of all the treatments and care usually provided to a patient hospitalised in a Difficult-to-Wean Unit, mainly

- Treatment of respiratory failure;
- Treatment of co-morbidities;
- Measures to prevent and treat complications related to inpatient care.

Similarly, in order to be able to evaluate and adapt the management of the patient in the Difficult-to-Wean Unit as best as possible, an entry biological assessment is carried out within 48 hours of admission. The biological assessment includes the following elements: haemoglobin, leucocytes, lymphocytes, neutrophils, troponin, renal function (urea, creatinine, GFR), metabolic function (calcium, magnesium, phosphate, TSH, cortisol at 8 hours, 25(OH)D) and inflammatory function (albumin, CRP)

Morphological characteristics (height, weight) are measured in the usual way on admission of the patient in order to adapt the nutritional management.

7.2 Weaning from mechanical ventilation

Patients admitted to Difficult-to-Wean Unit will be tracheostomised and invasively ventilated in a difficult or prolonged weaning situation (4).

Causes of weaning failure or decanulation (cardiac, respiratory, neurological, muscular, etc.) will be treated according to good practice guidelines.

7.3 Early rehabilitation

Patients admitted to the DIFFICULT-TO-WEAN UNIT receive early rehabilitation as part of the prevention and treatment of complications related to ICU hospitalisation.
Rehabilitation will be carried out in the usual way by the teams of physiotherapists, speech therapists, nurses and care assistants (according to their respective skills). The rehabilitation intervention is prescribed by the doctor. In the absence of a specific indication from the doctor, the physiotherapist or speech therapist chooses the type of rehabilitation act according to the patient's condition.
The frequency of rehabilitation will depend on the doctor's prescription if it specifies it, on the habits and resources of the department and on the patient's condition.

7.4 ICU-acquired muscle weakness assessment

ICUAW is assessed using the MRC score, performed by the ward physiotherapists on admission of the patient. The MRC score is widely used in resuscitation patients to detect acquired muscle weakness (19)(20). The score assesses 3 muscle groups for each of the upper and lower limbs. Each muscle group will be scored between 0 and 5 according to the voluntary strength developed. An overall score out of 60 is calculated (Appendix 2).

7.5 Assessment of swallowing disorders

As part of the patient's speech and language therapy, an assessment of swallowing disorders is carried out by a member of the speech and language therapy team when the patient tolerates several hours of deventilation per day.
For this purpose, we will use the modified Cowling swallowing score which consists of 4 points (Appendix 3): no disorder, abnormality to solids, abnormality to liquids, abnormality to liquids and solids.
The assessment is based on the detection of liquid, solid or liquid and solid false routes by ingestion techniques of coloured or uncoloured liquids/foods with the search for these potential false routes in the airways via tracheal aspirations through tracheostomy.

7.6 Decanulation bronchial fibroscopy

As part of the patient's laryngeal and pulmonary assessment prior to tracheostomy decanulation, a bronchial fibroscopy will be performed as a matter of routine by the department's physicians.

The objectives of this fibroscopy are described in Appendix 4. The objectives are the evaluation of the ENT sphere with the search for oedema of the hypopharynx, the arytenoids, the evaluation of the mobility of the vocal cords and the evaluation of the sensitivity of the hypopharynx. The assessment is followed by an evaluation of the trachea, including the positioning of the tracheostomy cannula, the existence of tracheal ring fractures, the search for granuloma, tracheomalacia and bronchomalacia.

7.7 Decanulation decision

The decision to decanulate follows a progressive de-ventilation and assessment protocol based on respiratory and extra-respiratory criteria:

Respiratory criteria :
- Patient under mechanical ventilation 24 hours a day: the tracheostomy cannula is a non-windowed or a windowed cannula with a low pressure cuff of the Silhey® LPC, Bivona® Mid-Range Air Cuf or Portex® Blue-Line Ultra type; allowing to limit the risks of tracheal lesions due to the cuff;

- Patient under mechanical ventilation <18h/24h or dislocated > 6h/24h (with the cuff of the tracheostomy cannula deflated): the cannula is changed for a non fenestrated high pressure cuffed cannula such as Bivona® TTS. This type of cannula is with a plated silicone cuff and is very well tolerated and facilitates speech therapy exercises. The size of the tracheostomy cannula is sometimes reduced to facilitate the exercises but this is not consensual and is more a matter of practice specific to each department.

- Patient discharged during the day: generally 8am-6pm, then progressive lengthening of the time before nocturnal reventilation (plateau at 8pm-10pm-00am).

- Patients discharged during the day and early evening: this discharging is continued throughout the night. Complete 24-hour de-ventilation is recorded when the patient is de-ventilated for 48 hours without the need for re-ventilation.

- Patient is deventilated 24 hours a day: the next step consists of placing a plug over the tracheostomy orifice. Thus, the patient's "classical" respiratory tract is used and the patient is in a respiratory situation equivalent to a patient without a tracheostomy tube.

Extra-respiratory criteria:

After 48 hours with the cannula plugged, in the absence of a respiratory event, the patient is considered decanulable. Various assessments are carried out to ensure that there are no potentially negative predictive factors:

- Speech therapy: pharyngolaryngeal oedema is assessed by phonation exercises. These exercises can also be used to assess vocal cord and/or glossal damage. Swallowing of liquids and solids is tested.
- Physiotherapy: neuromuscular and diaphragmatic function (MRC score, ultrasound) are assessed.

Decanulation is possible when the patient does not have a major swallowing disorder, pharyngo-laryngeal oedema or laryngeal sensitivity disorder with risk of passive false routes (salivary or food) and when muscle recovery, absence or recovery of diaphragmatic dysfunction and trunk tone are satisfactory.

These extra-respiratory parameters are intimately linked to respiratory progress. Indeed, without satisfactory neuromuscular recovery, without orthophonic reinforcement of swallowing, the patient will not be able to progress on the ventilatory level.

Once all the parameters are satisfactory and a decanulation fibroscopy does not reveal any anomaly contraindicating decanulation, the tracheostomy cannula is removed. To do this, the cannula is simply removed and an occlusive dressing is placed over the tracheal orifice. This usually closes within 3 to 5 days.

8 Assessment procedures added by the research

The collection of data and the examinations necessary for the evaluation criteria will be carried out by one of the investigators not involved in the management of the patient.

8.1 Ultrasound measurements

The ultrasound measurements will be performed by one of the physiotherapists or investigating physicians. The physiotherapist is entitled to perform ultrasound subject to training (21).
All the physiotherapists investigators have been trained according to the teaching recommendations for lung ultrasound (22) and are already involved in other research projects using lung and diaphragm ultrasound (https://clinicaltrials.gov/ct2/show/NCT02474797 and https://clinicaltrials.gov/ct2/show/NCT02881814).
When a physiotherapist performs an ultrasound scan, a referring resuscitation physician will be present to control the execution of the examination and to ensure that the recommendations of practice are respected. He will also ensure that the patient's management is not modified during the examination. The referring resuscitators are resuscitators trained in ultrasound (either through a diploma, qualifying training or acquired during their clinical experience) and named below Dr Gérald CHOUKROUN, Dr Pascal MEYER and Dr Jean-Baptiste PERETOUT.

8.2 Lung ultrasound

Lung ultrasound will be performed as described in Appendix 5. It is used to assess the state of lung ventilation (Appendix 5). A score from 0 to 3 (normal ventilation to complete loss of ventilation, respectively) is applied to each thoracic region. An overall lung aeration score out of 36 is calculated (Appendix 6). An ultrasound report is written (Appendix 7).

8.3 Diaphragm ultrasound

Ultrasound of the diaphragm will assess the excursion (mobility) and thickening of the diaphragm on the right and left. The procedure is described in Appendix 8. Each measurement will be repeated 3 times, the best one will be retained.

9 Conduct of the study

9.1 Pre-inclusion visit

9.1.1 Checking inclusion and non-inclusion criteria

When a patient is admitted to the Difficult-to-Wean Unit, one of the investigators checks the presence of inclusion criteria and the absence of non-inclusion criteria in the hospital admission report (HIR), during the admission visit and in the patient's computerised record.

9.1.2 Patient information and consent

When all the criteria allow the inclusion of the patient, the investigating physician informs the patient of the purpose of the study during a room visit. He provides the patient with all the information described in the information note (Appendix 9).

The state of consciousness of certain patients (under temporary sedation) when they are admitted to the Difficult-to-Wean Unit will not allow them to receive information related to the research and the collection of consent, and the information will be given to the person close to them who has been declared a trusted person (Appendix 10). As soon as the patient is awake, he or she will be informed of the research and asked for express oral consent to continue the research (Appendix 11). Decanulation only takes place when the patient is awake and compatible with good swallowing and satisfactory neuromuscular function.

In the event of a new ban on visits to hospital departments due to the health crisis, information and oral consent from the trusted support person will be given by telephone or videoconference.

9.2 Inclusion visit

All the data collected will be entered in the CRF..

9.2.1 Collection of consent

After sufficient time for reflection, the patient's or the patient's relative's express oral consent should be obtained. The date on which the patient or the patient's relative agreed to participate in the research is recorded in the computerised medical record, as is the date of withdrawal of participation, if any.

In the event that a patient's relative has given oral express consent, the patient will be informed of this research as soon as possible and asked for oral express consent for the possible continuation of the research (Appendix 11).

9.2.2 Data collection at inclusion

At the inclusion visit, the following data will be collected from the patient's computerised medical record, or directly from the patient or relative if data is missing:

- Age, sex (male/female), weight, height, body mass index (BMI);
- Medical history: chronic heart disease (hypertension, coronary artery disease, dyslipidaemia, rhythm disorder), diabetes, chronic respiratory disease (Chronic Obstructive Pulmonary Disease (COPD), Sleep Apnoea Hypopnoea Syndrome (SAHOS), neurological disease, cancer, chronic renal failure, smoking (active, weaned, no), chronic alcoholism (yes, no);
- Data related to the initial ICU stay:
    - o Type of intensive care unit (medical, surgical, polyvalent) and type of institution (public, private non-profit, private);
    - o Reason for admission to intensive care: acute respiratory failure (ARF), ARF on chronic respiratory failure (CRF), cardiogenic shock, septic shock, haemorrhagic shock, polytrauma, post-operative, cardiorespiratory arrest (CRA), stroke, burns, pancreatitis, coma;
    - o IGS2 score on initial admission to the ICU.
- Number of failed extubations;
- Total duration of oro-tracheal intubation before tracheostomy (days);
- Number of VAPs (days);
- Performance of prone sessions (yes/no);
- If applicable, total duration of prone position (days);
- Use of ECMO support (veno-venous/arteriovenous/no);
- Tracheostomy performed (percutaneous/surgical/not);
- Resuscitation neuromyopathy (yes/no);

- Presence of BMR/BHR (yes/no);
- Limitation and discontinuation of active therapies (LATA) in the ICU (yes/no);
- Length of stay in intensive care (days);
- Type of tracheostomy cannula: uncuffed fenestrated, cuffed fenestrated, uncuffed non fenestrated, cuffed non fenestrated;
- Cannula model (Shiley/Bivona/Trachoe/Other);
- Presence of mechanical ventilation (yes/no) and parameters:
    - o Mode: Controlled/PS/Other
    - o PS, PEEP, Vt, HR
    - o FiO2 (%)
- Biological check-up on admission within 48 hours of admission to DIFFICULT-TO-WEAN UNIT: haemoglobin, leucocytes, lymphocytes, neutrophils, troponin, renal function (urea, creatinine, GFR), metabolic function (calcium, magnesium, phosphate, TSH, cortisol at 8 hours, 25(OH)D) and inflammatory function (albumin, CRP);
- MRC score;
- Pulmonary ultrasound ;
- Diaphragmatic ultrasound;
- Confusional state by CAM-ICU (yes/no) (Appendix) ;
- Oral status (normal/moderate impairment/decay/no teeth);
- Vocal status (normal/minimal alteration/severe alteration/absence);
- Swallowing disorders by modified Cowling score (liquids/solids/both/not);
- Presence of undernutrition (severe/moderate/minimal/no);
- Presence of a nasogastric tube (yes/no);
- Presence of a percutaneous gastrostomy (yes/no);
- Oral feeding resumed (yes/no).

For data collection regarding the ICU hospitalisation prior to DIFFICULT-TO-WEAN UNIT hospitalisation, this will be done on the basis of hospitalisation reports and, if necessary, by requesting additional information through telephone calls to the ICU services or the attending physician.

9.3 End of research visit

The end-of-research visit will be carried out when the patient is discharged from the DIFFICULT-TO-WEAN UNIT. The necessary additional information will be collected from the patient's computerised medical record.
The variables collected are :

- Time to spontaneous ventilation (days) ;
- Time to 1st attempt at de-ventilation (days);
- Time to 24-hour de-ventilation (days);
- Time between 24-hour deventilation and successful final decanulation (days);
- Number of decanulations performed;
- Performance of a decanulation bronchial fibroscopy (yes/no) with abnormalities observed:
    - o pharyngeal oedema ;
    - o unilateral vocal cord paralysis;
    - o Bilateral vocal cord paralysis;
    - o unilateral arytenoid palsy
    - o bilateral arytenoid palsy;
    - o Tracheal ring fracture;
    - o No abnormality observed.
- Number of VAPs in DIFFICULT-TO-WEAN UNIT ;
- Total duration of antibiotic therapy (days) ;
- MRC score;
- Presence of undernutrition (severe/moderate/minimal/no);
- Presence of a nasogastric tube (yes/no);
- Presence of a percutaneous gastrostomy (yes/no);
- Oral feeding resumed (yes/no);
- Mode of discharge (return to intensive care, return home, death).

9.4 Bias control

In order to limit a possible measurement bias, the MRC score, the ultrasound measurements and the fibroscopic evaluation will be performed by one of the investigating physicians or physiotherapists, according to their respective competences, who are not part of the patient's care team.

9.5 Summary of all visits

Données/actes	Pré-inclusion	Inclusion	Fin de recherche
Recueil dans le CRH en réanimation, le DMI ou auprès du patient/proche			
Information du patient ou du proche	**X**		
Consentement du patient ou du proche		**X**	
Données anthropométriques (âge, poids, taille, sexe, IMC)		**X**	
Antécédents médicaux		**X**	
Données liées au séjour initial en réanimation		**X**	
Données liées à la ventilation : trachéotomie, VM (modes et paramètres)		**X**	
Etapes sevrage ventilatoire (temps avant déventilation journée, temps avant déventilation complète)			**X**
Durée de séjour en SRPR			**X**
Modalités de sortie du SRPR			**X**
Mesures cliniques, physiologiques et biologiques			
Bilan biologique (urée, créatinine, DFG, troponine, Hb, leucocytes, PNN, lymphocytes, calcium, magnesium, phosphates		**X**	
Albumine, pré-albumine, CRP, 25(OH)D, TSH, cortisol à 8h		**X**	
Scores fonctionnels			
MRC		**X**	**X**
Hand-grip		**x**	**X**
Calorimétrie		**X**	
Impédancemétrie :masse maigre, masse grasse, dilution		**X**	
Echographie			
Diaphragme		**X**	**X**
Pulmonaire		**X**	**X**
Nutrition			
Alimentation PO, entérale par GEP ou SNG		**X**	**X**
Orthophonie			
Troubles déglutition, état bucco dentaire, voix, état confusionnel		**X**	

10 Statistics

10.1 Number of subjects needed

The calculation of the number of subjects required is based on the number of explanatory variables to be included in the multiple logistic regression model to determine the factors associated with successful decanulation. The "1 variable per 10 events" rule is applied. (23)
We anticipate 6 variables to be included in the final multivariate predictive model, after selection of variables in univariate analysis, based on an estimated 60% success of decanulation (retrospective estimate on data available in the department), i.e. a necessary number of subjects of 100 patients.

10.2 General aspects

Descriptive statistics will be based on the use of means (± standard deviation) or medians (interquartile range) depending on the distribution of quantitative variables. Qualitative variables will be described in terms of numbers and percentages.
Univariate analyses will use the usual statistical tests after checking the distribution of the variables (Chi2 or Fisher's test; t-test, ANOVA or their non-parametric equivalents, Wilcoxon and Kruskal-Wallis tests). The Shapiro-Wilk test will be used to check whether the distribution of the data follows a normal distribution.
The multivariate analyses will be carried out by linear or multiple logistic regression models, depending on the type of variables.
The tests will be carried out with a significance level of 5%. The calculations will be made using R software (version 3.6.1, www.R-project.org) and Stata 15.0.

10.3 Main objective

Patients will be classified into 2 groups: success or failure of decanulation. The variables collected will be compared between the 2 groups by the appropriate tests according to the type of variables (quantitative or qualitative) and their distribution. The results of these comparisons will be used to select the variables showing a difference between the 2 groups ($p < 0.20$) for inclusion in the multivariate logistic regression. (24)(25)
The previously selected ultrasound variables will be included in the model predicting the success of decanulation. Multiple logistic regression with variable selection using the Akaike information criterion (AIC) method will be used. The presence of multicollinearity between variables will also be investigated and the variable eliminated if necessary.

11 Expected results in terms of scientific and professional advances

This study will determine the factors contributing to the success of decanulation in patients admitted to DIFFICULT-TO-WEAN UNIT after a prolonged ICU stay. The evaluation of these success factors will provide data that is still lacking due to the lack of literature in specialised post-resuscitation ventilatory weaning facilities.
This information may be useful in the post-resuscitation follow-up and in the prioritisation or not of early rehabilitation in these patients.

12 Expected benefits and risks for patients

12.1 Minimal risks and constraints added by the research

The risks and constraints for the patient will be minimal.
They are mainly related to the extra time the patient will spend on the initial assessment by the physiotherapy team with the ultrasound. Ultrasound is a non-invasive, non-irradiating and totally painless tool.
The other procedures are an integral part of the conventional management of tracheostomised patients in DIFFICULT-TO-WEAN UNIT.

12.2 Expected patient benefits

This study will improve our knowledge of the factors involved in the success of ventilatory weaning in tracheostomised patients.

This will provide information on the elements involved in the success of decanulation in this patient population in order to best adapt the management in early rehabilitation and potentially adapt the therapeutic conduct.

The data collected will also provide information on the clinical and biological profile of patients admitted to DIFFICULT-TO-WEAN UNIT.

13 Ethical and regulatory aspects

The Forcilles-Fondation Cognacq-Jay hospital promoter and the person(s) directing and supervising the research undertake to ensure that this research is carried out in accordance with law n°2004-806 of 9 August 2004 relating to public health policy and the regulatory provisions in force (articles L.1121-1, L.1121-2 and L.1121-3 of the Public Health Code. The data recorded during this research will be subject to computerised processing in compliance with law n°78-17 of 6 January 1978 relating to information technology, files and freedoms, amended by law n° 2018-493 of 20 June 2018 (decree n° 2018-687 of 1° August 2018) and order n° 2018-1125 of 12 December 2018.
The research will be conducted in accordance with this protocol.

13.1 Role of the promoter

The research commission of the Forcilles-Fondation Cognacq-Jay hospital, promoter of this research, submits the file to the opinion of the relevant Comité de Protection des Personnes (CPP) (CPP Ouest III) whose opinion will be notified in the information note intended for the persons concerned.
The natural or legal person who initiates the research, manages it and ensures that it is financed is called the sponsor.

13.2 Submission to the PPC

This research will be submitted to a Committee for the Protection of Individuals, which will be drawn by lot within the framework of the "Jardé law" (article L.1121-4 of the Public Health Code, decree no. 2016-1537 of 16 November 2016, which came into force on 18 November 2016).
The opinion of the above-mentioned committee is notified in the information note intended for the persons concerned. A copy of this opinion and a summary of the research will be sent to the ANSM.

13.3 Data protection

This research is subject to law n°78-17 of 6 January 1978 relating to information technology, files and freedoms as amended by law n° 2018-493 of 20 June 2018 (decree n° 2018-687 of 1 August 2018). Information on the rights of persons participating in this research (right of access and rectification, right to object to the transmission of data covered by professional

secrecy likely to be used in the context of this research) is included in the information note intended for the patient.
A reference methodology specific to the processing of personal data carried out in the context of biomedical research defined by Law 2004-806 of 9 August 2004 as falling within the scope of Articles L.1121-1 et seq. of the Public Health Code was updated by the CNIL in May 2018 (Deliberation No. 2018-153 of 3 May 2018) following the publication of European Regulation No. 2016/679 (General Data Protection Regulation). This methodology allows a simplified declaration procedure when the nature of the data collected in the research is compatible with the list provided by the CNIL in its reference document. This study is part of the MR001 reference methodology to which the Forcilles-Fondation Cognacq-Jay hospital has committed to comply.

13.4 Insurance

The Sponsor takes out insurance covering its own civil liability and that of any person involved in the performance of the research for the entire duration of the research, regardless of the nature of the links between the participants and the Sponsor (Article L.1121-10 of the Public Health Code). The sponsor is also responsible for the compensation of the harmful consequences of the research for the person who undergoes it and for that of his or her dependents, unless it can be proved that the damage is not attributable to its fault or to that of any other party involved, without the possibility of invoking the act of a third party or the voluntary withdrawal of the person who initially agreed to undergo the research. Where the sponsor is not liable, the victims may be compensated under the conditions set out in Article L.1142-3.
The Forcilles-Fondation Cognacq-Jay hospital has taken out insurance under contract no. 163607 guaranteeing its civil liability as well as that of any intervening party with the company SHAM for the entire duration of the research, in accordance with article L.1121-10 of the Public Health Code.

13.5 Substantial amendment to the protocol

The investigator or coordinator informs the research commission of the Forcilles-Fondation Cogacq-Jay hospital of any proposed modification of the protocol. Any substantial modification will be submitted by the sponsor of this research to the CPP for its opinion.

13.6 Information note and express consent

In accordance with Article L.1122-1 of the Public Health Code, the information provided to the persons who are to be involved in the research is the subject of a written document submitted in advance to the personal protection committee. The ethical opinion of the CPP Ouest III has been requested.

The investigator at the centre offers the patient, or a relative if the patient is incapacitated, to participate in the study. The investigator informs the patient orally of the terms of the study and gives him/her the information note. If the patient gives free, informed and express oral consent to participate in the protocol, the information given orally and in writing, as well as the collection of oral consent, will be recorded in the patient's medical record.

In the event that a relative of the patient has given consent, as soon as possible, the patient will be informed of the research and asked for oral consent for the possible continuation of the research.

Patients are free to participate or withdraw from the study at any time in accordance with Article 21 of the GDPR. Data collected until the patient withdraws consent will be used unless the patient expressly requests otherwise. The withdrawal of consent by the patient and the agreement to use or not the data previously collected will be traced in the patient's medical file.

When the research is completed, the person who is to be the subject of the research may be informed of the overall results of the research in a manner to be specified in the information document.

13.7 Expected deadline for publication of results in an international journal

The deadline for the publication of the results is 30 months.

13.8 Data management

For each subject, an identification code (corresponding to the centre number-inclusion number-Initial Surname-Initial First Name) will be assigned. The data collected will be confidential and coded (only the identification code will appear). The concordance table linking the assigned identification code and the participant's name will be kept by the principal investigator in a file with computer restricted access rights. The data will be entered into a password protected Excel® file held by the principal investigator. Data processing and statistical analysis will be carried out at the Forcilles-Fondation Cognacq-Jay hospital.
The promoter is the owner of the data and no use or transmission to a third party can be made without his prior agreement.
The specific documents of a type 2 interventional research ("Loi Jardé", decree n° 2016-1537 of 16 November 2016, which came into force on 18 November 2016) with minimal risks and constraints will be archived by all parties for a period of 15 years after the end of the research.
This indexed archive includes :

- successive versions of the protocol (identified by version number and date);
- correspondence ;
- the inclusion list or register ;
- the data collection document ;
- research-specific annexes ;
- the final report of the research.

The database used for the statistical analysis must also be archived by the person responsible for the analysis (paper or computer).

13.9 Human and financial resources

The Forcilles-Fondation Cognacq-Jay hospital is equipped with human, material and technical resources to carry out this research project.

13.10 Data properties

The Forcilles-Fondation Cognacq-Jay Hospital is the owner of the data and no use or transmission to a third party may be made without its prior agreement.

14 Bibliography

1. Shin H-J, Chang J-S, Ahn S, Kim T-O, Park C-K, Lim J-H, et al. Clinical factors associated with weaning failure in patients requiring prolonged mechanical ventilation. J Thorac Dis. janv 2017;9(1):143-50.

2. Epstein SK, Ciubotaru RL. Independent effects of etiology of failure and time to reintubation on outcome for patients failing extubation. Am J Respir Crit Care Med. août 1998;158(2):489-93.

3. Thille AW, Richard J-CM, Brochard L. The decision to extubate in the intensive care unit. Am J Respir Crit Care Med. 15 juin 2013;187(12):1294-302.

4. Boles J-M, Bion J, Connors A, Herridge M, Marsh B, Melot C, et al. Weaning from mechanical ventilation. Eur Respir J. mai 2007;29(5):1033-56.

5. Boynton JH, Hawkins K, Eastridge BJ, O'Keefe GE. Tracheostomy timing and the duration of weaning in patients with acute respiratory failure. Crit Care Lond Engl. août 2004;8(4):R261-267.

6. Scheinhorn DJ, Chao DC, Stearn-Hassenpflug M, Wallace WA. Outcomes in post-ICU mechanical ventilation: a therapist-implemented weaning protocol. Chest. janv 2001;119(1):236-42.

7. Welton C, Morrison M, Catalig M, Chris J, Pataki J. Can an interprofessional tracheostomy team improve weaning to decannulation times? A quality improvement evaluation. Can J Respir Ther CJRT Rev Can Ther Respir RCTR. 2016;52(1):7-11.

8. Thomas S, Sauter W, Starrost U, Pohl M, Mehrholz J. Time to decannulation and associated risk factors in the postacute rehabilitation of critically ill patients with intensive care unit-acquired weakness: a cohort study. Eur J Phys Rehabil Med. août 2017;53(4):501-7.

9. Gundogdu I, Ozturk EA, Umay E, Karaahmet OZ, Unlu E, Cakci A. Implementation of a respiratory rehabilitation protocol: weaning from the ventilator and tracheostomy in difficult-to-wean patients with spinal cord injury. Disabil Rehabil. 2017;39(12):1162-70.

10. Mah JW, Staff II, Fisher SR, Butler KL. Improving Decannulation and Swallowing Function: A Comprehensive, Multidisciplinary Approach to Post-Tracheostomy Care. Respir Care. févr 2017;62(2):137-43.

11. Everitt E. Managing the weaning of a temporary tracheostomy. Nurs Times. 18 mai 2016;112(20):17-9.

12. Pandian V, Miller CR, Schiavi AJ, Yarmus L, Contractor A, Haut ER, et al. Utilization of a standardized tracheostomy capping and decannulation protocol to improve patient safety. The Laryngoscope. août 2014;124(8):1794-800.

13. Zanata I de L, Santos RS, Hirata GC. Tracheal decannulation protocol in patients affected by traumatic brain injury. Int Arch Otorhinolaryngol. avr 2014;18(2):108-14.
14. Choate K, Barbetti J, Currey J. Tracheostomy decannulation failure rate following critical illness: a prospective descriptive study. Aust Crit Care Off J Confed Aust Crit Care Nurses. févr 2009;22(1):8-15.
15. O'Connor HH, White AC. Tracheostomy decannulation. Respir Care. août 2010;55(8):1076-81.
16. Bach JR, Saporito LR. Indications and criteria for decannulation and transition from invasive to noninvasive long-term ventilatory support. Respir Care. mai 1994;39(5):515-28; discussion 529-531.
17. Singh RK, Saran S, Baronia AK. The practice of tracheostomy decannulation-a systematic review. J Intensive Care. 2017;5:38.
18. Cowling, Hale, Grundy. Management of malignant oesophageal obstruction withself-expanding metallic stents. Br J Surg. févr 1998;85(2):264-6.
19. Kress JP, Hall JB. ICU-Acquired Weakness and Recovery from Critical Illness. N Engl J Med. 24 avr 2014;370(17):1626-35.
20. De Jonghe B. Paresis Acquired in the Intensive Care UnitA Prospective Multicenter Study. JAMA. 11 déc 2002;288(22):2859.
21. CNOMK. AVIS DU CONSEIL NATIONAL DE L'ORDRE DU 27 MARS 2015 MODIFIE LE 24 SEPTEMBRE 2015 ET RELATIF A L'ECHOGRAPHIE. 2015.
22. Royal College of Radiologists (Great Britain). Ultrasound training recommendations for medical and surgical specialties. London: The Royal College of Radiologists; 2005.
23. van Smeden M, de Groot JAH, Moons KGM, Collins GS, Altman DG, Eijkemans MJC, et al. No rationale for 1 variable per 10 events criterion for binary logistic regression analysis. BMC Med Res Methodol. 24 2016;16(1):163.
24. Fardet L, Galicier L, Lambotte O, Marzac C, Aumont C, Chahwan D, et al. Development and validation of the HScore, a score for the diagnosis of reactive hemophagocytic syndrome. Arthritis Rheumatol Hoboken NJ. sept 2014;66(9):2613-20.
25. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Crit Care Med. oct 1985;13(10):818-29.
26. Ely EW, Inouye SK, Bernard GR, Gordon S, Francis J, May L, et al. Delirium in Mechanically Ventilated Patients: Validity and Reliability of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). JAMA. 5 déc 2001;286(21):2703.
27. Knyrim K, Wagner H-J, Bethge N, Keymling M, Vakil N. A Controlled Trial of an Expansile Metal Stent for Palliation of Esophageal Obstruction Due to Inoperable Cancer. N Engl J Med. 28 oct 1993;329(18):1302-7.

28. Kleyweg RP, Van Der Meché FGA, Schmitz PIM. Interobserver agreement in the assessment of muscle strength and functional abilities in Guillain-Barré syndrome: Muscle Strength Assessment in GBS. Muscle Nerve. nov 1991;14(11):1103-9.

29. Bouhemad B, Brisson H, Le-Guen M, Arbelot C, Lu Q, Rouby J-J. Bedside Ultrasound Assessment of Positive End-Expiratory Pressure–induced Lung Recruitment. Am J Respir Crit Care Med. févr 2011;183(3):341-7.

30. Soummer A, Perbet S, Brisson H, Arbelot C, Constantin J-M, Lu Q, et al. Ultrasound assessment of lung aeration loss during a successful weaning trial predicts postextubation distress*: Crit Care Med. juill 2012;40(7):2064-72.

15 Appendices

Appendix 1: CAM-ICU Confusion Assessment Score

Appendix 2: MRC Score

Appendix 3: Modified Cowling Swallowing Score

Appendix 4: Bronchial fibroscopy procedure

Appendix 5: Lung ultrasound procedure

Appendix 6: Lung ventilation score

Appendix 7: Lung ultrasound report

Appendix 8: Ultrasound of the diaphragm

Appendix 9: Patient information note

Appendix 10: Tutor/Proxy briefing note

Appendix 11: Background note to the research process

15.1 Appendix 1: CAM-ICU Confusion Assessment Score (26)

The score can only be used in patients who are able to open their eyes and shake hands on demand.

Criterion 1: Sudden onset and fluctuating course
Is the change in the patient's mental state sudden? (yes=positive/no=negative)
Are there any fluctuations over the last 24 hours? (yes=positive/no=negative)

Criterion 2: Inattention
Does the patient have difficulty focusing attention?
ABRACADABRA" test: spell out each letter (1-2 seconds between each letter) and ask the patient to shake hands on the letter "A":
The test is positive if there are more than two errors (either the patient does not serve the hand on the letter A or serves it on another letter)

Criterion 3: Disorganised thinking

- YES/NO question
    - Does a stone float?
    - Are there fish in the sea?
    - Does one kilogram weigh more than two kilograms?

The test is positive if there is more than one wrong answer

- Verbal orders
    - Tell the patient: "Show me the same number of fingers" (Show two fingers)
    - Then "Do the same with the other hand".

The test is positive if the patient is wrong in these two commands

Criterion 4: Vigilance Assessment
Overall, how would you rate your patient's general condition?
Alert, Vigilant, Lethargic, Stuporous, Comatose
The test is positive if the level of awareness is other than alert

The diagnosis of delirium requires the presence of 3 of the 4 criteria. Criteria 1 and 2 are always required, together with criteria 3 or 4.

15.2 Appendix 2: MRC Score (28)

RIGHT					Function	LEFT				
					Shoulder abduction					
					Elbow flexion					
					Wrist extension					
					Subtotal upper limbs (/15)					
					Hip flexion					
					Knee extension					
					Ankle dorsal flexion					
					Subtotal lower limbs (/15)					
					SCORE					
					Date: ..../..../.... ..../60					
					Date: ..../..../.... ..../60					
					Date: ..../..../.... ..../60					
					Date: ..../..../.... ..../60					
					Date: ..../..../.... ..../60					

Score assigned to each muscle group :

- 0 = no visible contraction
- 1 = visible contractions without limb movement
- 2 = insufficient movement to overcome weightlessness
- 3 = movements to overcome weightlessness
- 4 = movements against weightlessness and resistance
- 5 = normal muscle strength

15.3 Appendix 3: Modified Cowling Swallowing Score (18)

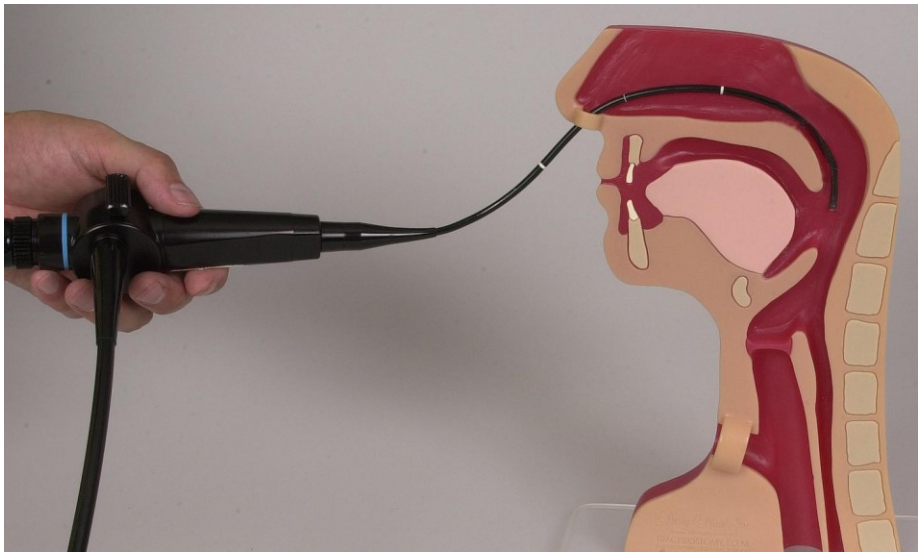
Cowling swallowing and dysphagia assessment score from the Knyrim score (27)

- 0 = no anomaly
- 1 = solids anomaly
- 2 = liquid anomaly
- 3 = liquid and solid anomaly

15.4 Appendix 4: Procedure for decanulation bronchial fibroscopy

Material

A flexible bronchial fiberscope is very suitable.



Examination procedures

The examination is performed under local anaesthesia of the nasal cavity with lidocaine spray and application of lidocaine gel on the fiberscope to allow painless penetration and progression through the nasal cavity.

The patient is placed in a semi-seated position with spirometry monitoring and oxygen therapy if required.

The endoscopic airway examination begins with the exploration of the pharynx, hypopharynx and larynx. The elements visualised are: the ENT sphere as a whole, the epiglottis, the valleculae, the arytenoids, the vocal cords, the piriform sinuses and the position of the nasogastric tube in the latter.

Sensitivity analysis is also tested.

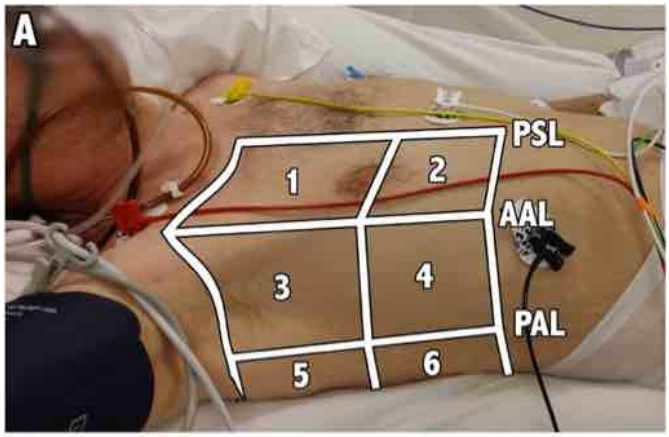
The analysis continues with subglottic exploration with crossing of the vocal cords, visualization of the trachea, placement of the tracheostomy cannula and visualization of the underlying airway.

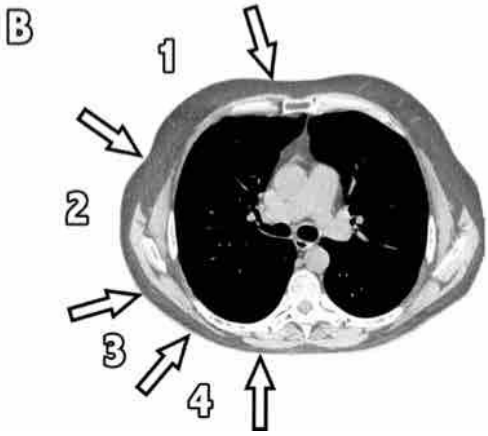
Several lesions are looked for: laryngeal and/or pharyngeal oedema, granuloma, tracheal ring fracture, inflammation, uni/bilateral vocal cord paralysis, uni/bilateral arytenoid paralysis, granuloma, tracheal stenosis, tracheomalacia or cannula malposition.

15.5 Appendix 5: Procedure for lung ultrasound

Materials

In thoracic ultrasound, a simple device is quite suitable. More sophisticated equipment offers filters to manage artefacts: since lung ultrasound is based on the analysis of artefacts linked to the presence of air, it is obvious that they should be avoided. Two types of probe are used: the convex probe, low frequency, which allows exploration of the thoracic compartment in depth (e.g.: pulmonary parenchyma) and the linear probe, high frequency, which allows exploration of superficial structures (e.g.: pleura). The linear probe will be preferentially used, except for the exploration of consolidations or effusions.





Thoracic topography

The lung is a large organ, so it is necessary to specify the thoracic regions to be examined (Figure A): the axillary space is delimited by an anterior axillary line (AAL) and a posterior axillary line (PAL). These define an anterior region of exploration, bounded medially by the parasternal line (PSL), a lateral region, bounded by the anterior and posterior axillary lines, and a posterior region, bounded medially by the posterior axillary line and medially by the mid-scapular or paravertebral line. Each region is divided into an upper and lower part. Four levels of investigation are possible, depending on what the examiner is looking for (Figure B). For a conventional examination, the first three levels are used and each hemithorax thus comprises six regions to be explored.

Examination procedures

The patient is placed in a semi-seated position (30° inclination). The patient may be positioned slightly to the side for exploration of the posterior regions (examination level 3).

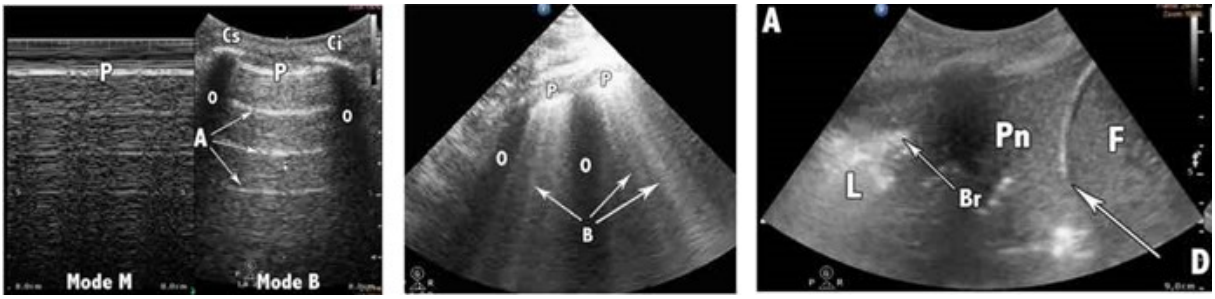
The location of the liver on the right and the spleen on the left identifies the diaphragm, separating the thoracic compartment from the abdominal compartment.

The ultrasound probe is placed in an intercostal space along a horizontal axis (minor axis), providing a transverse view (Figure B). Each intercostal space of the different regions is thus explored by moving the probe transversely, from the inside to the outside.

Assessment of lung ventilation

Exploration of the 12 thoracic regions allows a global assessment of pulmonary aeration. Four levels of ventilation are defined (Figure below):

- Normal ventilation (N): presence of pleural slip and A-lines and less than two isolated B-lines;
- Moderate loss of ventilation (B1): presence of multiple, well-defined B-lines (at least 3);
- Severe loss of aeration (B2): presence of coalescing B-lines;
- Lung consolidation (C).



Normal ventilation B lines (B1) Consolidation

15.6 Appendix 6: Ultrasound Lung Aeration Score (29)

Exploration of the 12 thoracic regions allows a global assessment of pulmonary aeration. Four levels of ventilation are defined (30) :

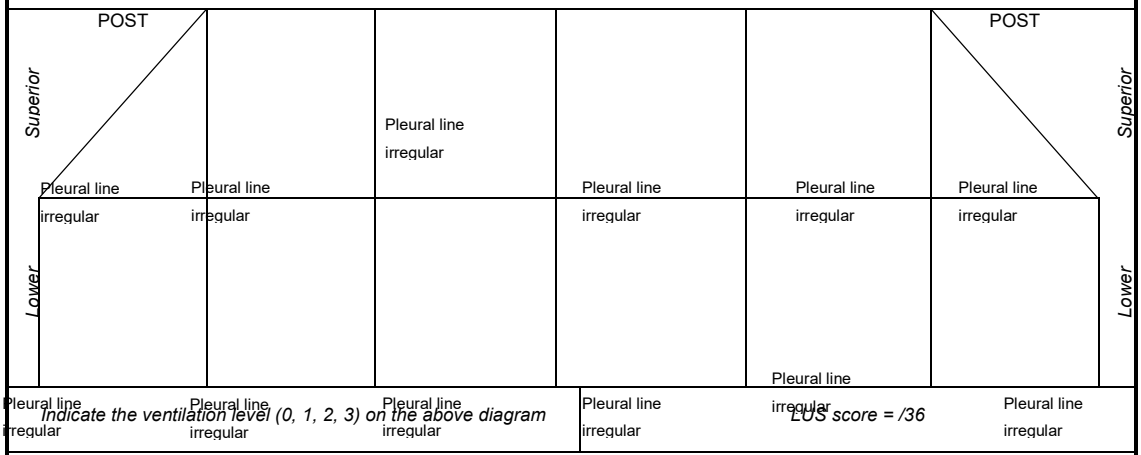
- Normal ventilation (N): presence of pleural slip and A-lines and less than two isolated B-lines;
- Moderate loss of ventilation (B1): presence of multiple, well-defined B-lines (at least 3);
- Severe loss of aeration (B2): presence of coalescing B-lines;
- Lung consolidation (C).

A global score can be calculated: N=0, B1=1, B2=2, C=3, for each of the thoracic regions, i.e. a total score out of 36.

15.7 Appendix 7: Lung ultrasound report

FAN PARAMETERS *(circle mode and fill in parameters at time of review)*						
Mode	VAC	CAVI	PC	VSAI	NIV	Spontaneous breathing
Parameters	Tidal volume = PEP **=**			AI = PEP =		

LUNG VENTILATION



Indicate the ventilation level (0, 1, 2, 3) on the above diagram *LUS score = /36*

If there is a consolidation, indicate the corresponding letter(s) *(on the diagram and following the "3"):*

a. Deep ripped-looking border
b. Deep edge with a smooth appearance
c. Dynamic aeriform bronchogram
d. Static aeriform bronchogram
e. Aeriform punctiform bronchogram
f. Aeriform thread-like bronchogram
g. Fluid bronchogram
h. Vascular pattern
i. Shunt (Doppler)
j. Subpleural consolidations

Specify the presence of a pleural effusion and its location by annotating EP

+ A (anechoic) **or Heter** (heterogeneous complex) **or Homo** (homogeneous complex) **or C** (partitioned) and PLD

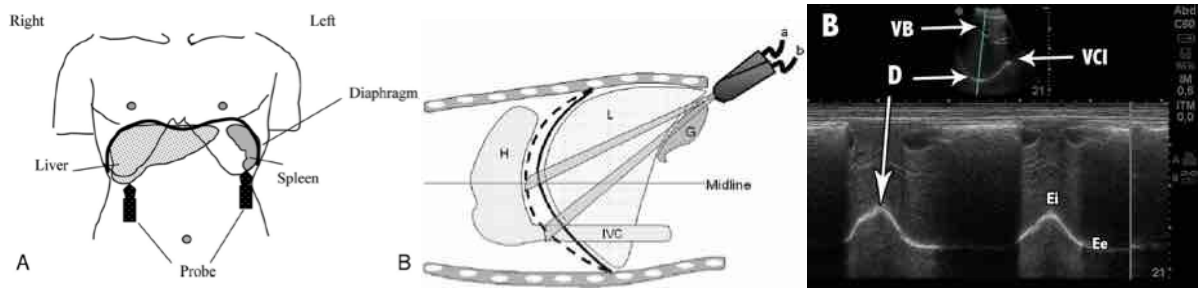
DISTRIBUTION OF VENTILATION DISORDERS	
Homogenous	Focus
Heterogeneous	Diffuse

DIAPHRAGM				
	Right		Left	
tdi/tde (cm)				
DTF (%)				
EXC (cm)				

TO BE FILLED IN	
Quality of the review : Good Wrong **Operator :**	**Signature of the referring ultrasound physician:**

15.8 Appendix 8: Diaphragmatic ultrasound

When assessing the diaphragm in mechanically ventilated patients, and if the patient's respiratory status permits, the ventilator parameters are changed by the physician: AI = 7 cmH20 and PEEP = 0 cmH20, to reflect spontaneous ventilation conditions.



Diaphragm excursion: anterior subcostal route: The convex probe is placed in the anterior subcostal route, between the anterior axillary line and the mid-clavicular line: B mode is initially used to obtain the best visual approach. After this identification, the measurement of the diaphragm excursion is carried out in TM mode: during inspiration the diaphragm moves towards the probe and away from it during expiration. The excursion is equal to the distance measured between inspiration and expiration (maximum effort required from the patient). An excursion < 2.5 cm (LerolleChest, 2009) indicates a diaphragm dysfunction.

Thickening of the diaphragm: Examination modalities: The probe is placed in an intercostal space, between the median and anterior axillary line, 0.5cm to 2cm below the costophrenic sinus. In B-mode, the diaphragm appears as a hypoechoic structure between two hyperechoic layers: the pleura (outer layer) and the peritoneum (inner layer). The thickening fraction (TF) is measured in B mode according to the following formula: TF (%) = [(end-inspiratory thickness - end-expiratory thickness)/ end-expiratory thickness] x 100. The patient is asked to perform maximum inspiration and expiration. A TF < 25% indicates diaphragm dysfunction.

15.9 Appendix 9: Patient information note

DARC VADOC

"Study of the determinants of successful decanulation in tracheostomized patients in the post-resuscitation rehabilitation ward. A cohort study".

RCB ID: 2020-A02942-37

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Madam, Sir,

Dr. ....., investigator of the study, working in the Post-Resuscitation Rehabilitation Department of the Forcilles-Fondation Cognacq-Jay Hospital, invites you to participate in this research.

Your decision to participate is entirely free and voluntary.

Please read the information below carefully, ask any questions you may have and take as much time as you wish to reflect on your decision to participate in this research.

You are admitted to the post-resuscitation rehabilitation department following an inpatient stay in intensive care for severe respiratory disease. Your respiratory condition has required a tracheotomy to continue weaning from artificial ventilation.

What is the purpose of this research?

The aim of this research is to determine the factors for successful decanulation, i.e. removal of the cannula inserted in the trachea and connected to the ventilator, of tracheostomised patients in order to select and optimise the management of these patients.

How does this research work?

As part of the rehabilitation you will receive in the department, we propose to study your respiratory function by performing a lung and diaphragm ultrasound.

The ultrasound examination is painless, non-invasive and risk-free. It is carried out by the physiotherapist or doctor, using the ultrasound machine, an ultrasound probe and jelly water.

The ultrasound will be performed once, when you are first admitted to the intensive care unit, and will last about 30 minutes.

Your constraints in this research?

The constraints of this research consist of 1 ultrasound scan of the thorax, lasting a maximum of 30 minutes.

Possible adverse effects

As your participation in this protocol does not involve any administration of treatment other than what is currently recommended or any other changes to the conventional management of the patient in the ICU, no adverse effects are expected.

- **No additional treatment will be administered**
- **No additional blood tests will be required**.

The ultrasound will be performed transthoracically, i.e. by placing the probe on your chest. The examination is therefore non-invasive, completely painless and does not involve exposure to X-rays.

Your participation in this research will not incur any additional costs compared to those you would have had in the usual follow-up of your disease.

What are the expected benefits of this research?

This study should improve our knowledge of the factors involved in successful ventilatory weaning of tracheostomised patients. This will provide information on the elements involved in the success of decanulation in order to better adapt the therapeutic approach.

What are the conditions for participating in this study?

In order to participate in this research, you must be affiliated to or benefit from a social security scheme. However, your participation in this research will not result in any additional costs for you compared to those incurred in the usual care.

Number of patients planned and duration of research?

This research will last 25 months with a 24 month recruitment period to include 100 patients.

What data is collected for the research?

The medical data collected during this study will be processed in a computerised, coded and confidential manner. The main data collected will be anthropometric data (age, weight, height, etc.), related to medical history, ventilator settings, biological check-ups, and the results of check-ups by rehabilitation professionals (physiotherapists, dieticians, speech therapists). No information bearing your name will be provided to anyone except the doctor in charge of the study and authorised personnel. All data collected will be confidential and coded and analysed by the Clinical Research Commission of the Forcilles-Fondation Cognacq-Jay Hospital, the research sponsor. The identification list (correspondence between your code for the study and your identity) will be kept strictly confidential.

In accordance with the regulations in force, the data will be kept until the final research report is produced and then archived for 15 years.

The data controller is the promoter, Hôpital Forcilles-Fondation Cognacq-Jay, route de Servon 77150 Férolles-Attilly.

Legal basis for data processing

The processing of the data is based on the legitimate interests of the controller, Article 6 paragraph 1 point f, read in conjunction with the necessity of the processing for scientific research purposes, Article 9 paragraph 2 point j, of the European Regulation N° 2016/679 (General Data Protection Regulation, GDPR).

What are your rights?

Your participation in this research is **entirely free and voluntary**. You have the right not to participate in this research.

You cannot be included in an interventional research protocol with minimal risks and constraints without having been informed beforehand. Your doctor must provide you with all the necessary explanations concerning this research, which must comply with the provisions of Article 13 of European Regulation No. 2016/679 (General Data Protection Regulation, GDPR). In accordance with article L.1122-1 of the Public Health Code, the entire research file has been submitted to the Comité de Protection des Personnes, CPP Ile de France 2, which issued a favourable opinion on xx/xx/xxxx.

The Forcilles-Fondation Cognacq-Jay hospital has taken out insurance under contract no. 163607 guaranteeing its civil liability and that of all those involved with the company SHAM.
You can stop participating in the research at any time without justification. This will not affect the quality of the care and treatment provided to you or your relationship with your doctor. The data collected until you withdraw your consent will be used unless you expressly request it. Indeed, in accordance with Article 17 of the GDPR, you have the right to request the deletion of your data already collected. The withdrawal of your consent and the agreement to use or not your previously collected data will be traced in your medical file.

In accordance with the provisions of Articles 15 and 16 of Regulation (EU) 2016/679 of 27 April 2016 (General Data Protection Regulation), you have a right of access, rectification, erasure or restriction of processing. You can find out more about your rights by visiting the CNIL website https://www.cnil.fr/fr/reglement-europeen-protection-donnees/chapitre3. In accordance with the provisions of Article 21 of the RGPD, you also have the right to object to the transmission of data likely to be used in the context of this research and to be processed. Your request must be addressed to the Data Protection Officer of the Cognacq-Jay Foundation, either by e-mail to dpo@cognacq-jay.fr or by post to the address: Hôpital Forcilles-Fondation Cognacq-Jay, Délégué à la Protection des Données, route de Servon 77150 Férolles-Attilly. You also have the right to lodge a complaint with the Commission Nationale de l'Informatique et des Libertés - CNIL (French personal data control authority, website: www.cnil.fr).
In application of the provisions of article L. 1111-7 of the Public Health Code, you may also access all of your medical data directly or through a doctor of your choice.
Your medical file will remain confidential and can only be consulted under the responsibility of the doctor in charge of your treatment, as well as by the health authorities and by persons duly mandated by the Forcilles-Fondation Cognacq-Jay hospital for research and subject to professional secrecy.
If, after having read all this information and discussed all aspects with the doctor in charge of the research, you have had sufficient time to reflect on your decision and you decide to participate in this research, the research information and your oral consent will be notified and dated in your medical file.

The agreement to participate in this research is free and voluntary.
You may refuse or withdraw your consent at any time without explanation or prejudice.

Any questions?

Dr. _____ (tel. _____) is at your disposal for any further information you may require before and during the research.

15.10Appendix 10: Information note to the relative

DARC VADOC

"Study of the determinants of successful decanulation in tracheostomized patients in the post-resuscitation rehabilitation ward. A cohort study".

RCB ID: 2020-A02942-37

PRINCIPAL INVESTIGATOR
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Dear Sir or Madam,

Due to his condition which makes him unable to receive and understand the information that will be given to him, we are transmitting to you the information and the proposal of participation of Mr, Mrs, Mr (delete as appropriate) (name, first name)..... in the study presented below, under the responsibility of Dr ....., the investigator of the study.

Your opinion on this participation is entirely free and voluntary.

Please read the information below carefully, ask any questions you may have, and take as much time as you wish to reflect on your decision as to whether or not your loved one should participate in this research.

ATTENTION

You can only give your consent :

- if you and the patient you are caring for are not legally deprived of your right to give such consent;

- whether the patient you are caring for is covered by social security;

- if you consider that your decision would probably be that of the patient you are caring for;

- if you feel fully informed;

- if you were able to ask the doctor in charge of the study all the questions you wanted to ask about the research and the way it was going to be carried out and if you consider that you were given satisfactory answers (if, during the study, you have new questions, you can ask them to the doctor in charge of the study, in particular if they concern the interest of the study, the ratio of benefits and risks or the usefulness of collecting certain data from your family member) ;

- if you feel free to give your consent to such participation;

- if you accept that the patient you are caring for may not agree with you and when they get better and are consulted again, do not give consent to continue their participation.

Even if you give your consent today, you may withdraw it at any time and study-related interventions will be stopped as quickly as possible so that no harm is done to the patient. The relationship and quality of current or future care that the patient will receive will not be changed in any way should this occur. The information collected previously to this stop will be used unless you do not want it to be used. You should then inform the patient's doctor who will suggest appropriate medical follow-up.

Your relative is in a post-resuscitation rehabilitation unit following an in-patient stay in intensive care for severe respiratory disease. His or her respiratory condition has required a tracheotomy to continue weaning from artificial ventilation.

What is the purpose of this research?

The aim of this research is to determine the factors for successful decanulation, i.e. removal of the cannula inserted in the trachea and connected to the ventilator, of tracheostomised patients in order to select and optimise the management of these patients.

How does this research work?

As part of the rehabilitation your relative will receive in the department, we propose to study his or her respiratory function by performing a lung and diaphragm ultrasound.

The ultrasound examination is painless, non-invasive and risk-free. It is carried out by the physiotherapist or doctor, using the ultrasound machine, an ultrasound probe and jelly water.

The ultrasound will be performed once, during his initial admission to the post-resuscitation rehabilitation department and will last about 30 minutes.

What are the constraints for your family member in this search?

The constraints of this research consist of 1 ultrasound scan of the thorax, lasting a maximum of 30 minutes.

Possible adverse effects

As participation in this protocol does not involve any administration of treatment other than what is currently recommended or any other changes to the conventional management of the post-resuscitation patient, no adverse effects are expected.

- **No additional treatment will be administered**
- **No additional blood tests will be required**.

The ultrasound will be performed transthoracically, i.e. by placing the probe on the chest of your loved one. The examination is therefore non-invasive, completely painless and does not involve exposure to X-rays.

Your loved one's participation in this research will not result in any additional costs compared to those that would have been incurred in the usual follow-up of their illness.

What are the expected benefits of this research?

This study should improve our knowledge of the factors involved in successful ventilatory weaning of tracheostomised patients. This will provide information on the elements involved in the success of decanulation in order to better adapt the therapeutic approach.

What are the conditions for participating in this study?

In order to participate in this research, your relative must be affiliated to or benefit from a social security scheme. However, participation in this research will not result in any additional costs for your relative compared to those incurred in the usual care.

Number of patients planned and duration of research?

This research will last 25 months with a 24 month recruitment period to include 100 patients.

What data is collected for the research?

The medical data collected during this study will be processed in a computerised, coded and confidential manner. The main data collected will be anthropometric data (age, weight, height, etc.), related to medical history, ventilator settings, biological check-ups, and the results of check-ups by rehabilitation professionals (physiotherapists, dieticians, speech therapists). No information bearing your relative's name will be provided to anyone except the doctor in charge of the study and authorised personnel. All data collected will be confidential and coded and analysed by the Clinical Research Commission of the Forcilles-Fondation Cognacq-Jay Hospital, the promoter of the research. The identification list (correspondence between your code for the study and your identity) will be kept strictly confidential.

In accordance with the regulations in force, the data will be kept until the final research report is produced and then archived for 15 years.

The data controller is the promoter, Hôpital Forcilles-Fondation Cognacq-Jay, route de Servon 77150 Férolles-Attilly.

Legal basis for data processing

The processing of the data is based on the legitimate interests of the controller, Article 6 paragraph 1 point f, read in conjunction with the necessity of the processing for scientific research purposes, Article 9 paragraph 2 point j, of the European Regulation N° 2016/679 (General Data Protection Regulation, GDPR).

What are your rights?

Your relative's participation in this research is **entirely free and voluntary**. Your relative's doctor must provide you with all the necessary explanations concerning this research, which must comply with the provisions of Article 13 of European Regulation No. 2016/679 (General Data Protection Regulation, GDPR). In accordance with article L.1122-1 of the Public Health Code, the entire research file has been submitted to the Comité de Protection des Personnes, CPP Ile de France 2, which issued a favourable opinion on xx/xx/xxxx.

The Forcilles-Fondation Cognacq-Jay hospital has taken out insurance under contract no. 163607 guaranteeing its civil liability and that of all those involved with the company SHAM.

You can stop your participation in the research at any time without justification. This will not affect the quality of the care and treatment provided to your relative or his or her relationship

with the doctor. The data collected until the withdrawal of consent will be used unless you expressly request it. Indeed, in accordance with Article 17 of the GDPR, your relative has the right to request the deletion of your data already collected. The withdrawal of his or her consent and the agreement to use or not use his or her previously collected data will be traced in your medical file.

In accordance with the provisions of Articles 15 and 16 of Regulation (EU) 2016/679 of 27 April 2016 (General Data Protection Regulation), your loved one has a right of access, rectification, erasure or restriction of processing. You can find out more about your loved one's rights by visiting the CNIL website https://www.cnil.fr/fr/reglement-europeen-protection-donnees/chapitre3. In accordance with the provisions of Article 21 of the RGPD, your relative also has the right to object to the transmission of data that may be used in the context of this research and to be processed. His/her request must be addressed to the Data Protection Officer of the Cognacq-Jay Foundation, either by e-mail to dpo@cognacq-jay.fr, or by post to the address: Hôpital Forcilles-Fondation Cognacq-Jay, Délégué à la Protection des Données, route de Servon 77150 Férolles-Attilly. The user also has the right to lodge a complaint with the Commission Nationale de l'Informatique et des Libertés - CNIL (French authority for the control of personal data, website: www.cnil.fr).
In application of the provisions of article L. 1111-7 of the Public Health Code, your relative may also access all medical data concerning him or her directly or through a doctor of his or her choice.
Your relative's medical file will remain confidential and can only be consulted under the responsibility of the doctor in charge of your treatment, as well as by the health authorities and by persons duly mandated by the Forcilles-Fondation Cognacq-Jay hospital for research and subject to professional secrecy.
If, after having read all this information and discussed all aspects with the doctor in charge of the research, you have had sufficient time to reflect on your decision and you agree to your relative taking part in this research, the information about the research and your oral consent will be notified and dated in your medical file.

The agreement to participate in this research is free and voluntary.
You may refuse or withdraw your consent at any time without explanation or prejudice.

Any questions?

Dr. _____ (tel. _____) is at your disposal for any further information you may require before and during the research.

15.11 Appendix 11: Patient information note for further research

DARC VADOC

"Study of the determinants of successful decanulation in tracheostomized patients in the post-resuscitation rehabilitation ward. A cohort study".

RCB ID: 2020-A02942-37

PRINCIPAL INVESTIGATOR
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Dear Sir or Madam,

Due to the severity of your condition, we were unable to ask for your prior consent and you were included on ...../...../..... in a research study entitled DESCATRON.

In accordance with the law (article L.1122-1-3 of the Public Health Code), the trusted person you have designated or your parent/relative has been asked to agree to your participation in this research.

Now that you are able to understand and express your wishes, we ask for your consent to continue your participation in this research.
The doctor told you that you were free to accept or refuse further participation in this research.

Your decision to participate is entirely free and voluntary.

Please read the information below carefully, ask any questions you may have and take as much time as you wish to reflect on your decision to participate in this research.

You are admitted to the post-resuscitation rehabilitation department following an inpatient stay in intensive care for severe respiratory disease. Your respiratory condition has required a tracheotomy to continue weaning from artificial ventilation.

What is the purpose of this research?

The aim of this research is to determine the factors for successful decanulation, i.e. removal of the cannula inserted in the trachea and connected to the ventilator, of tracheostomised patients in order to select and optimise the management of these patients.

How does this research work?

As part of the rehabilitation you will receive in the department, we propose to study your respiratory function by performing a lung and diaphragm ultrasound.

The ultrasound examination is painless, non-invasive and risk-free. It is carried out by the physiotherapist or doctor, using the ultrasound machine, an ultrasound probe and jelly water.

The ultrasound will be performed once, when you are first admitted to the intensive care unit, and will last about 30 minutes.

Your constraints in this research?

The constraints of this research consist of 1 ultrasound scan of the thorax, lasting a maximum of 30 minutes.

Possible adverse effects

As your participation in this protocol does not involve the administration of any treatment other than that which is currently recommended or any other changes to the conventional management of the patient in the ICU, no adverse effects are expected.

- **No additional treatment will be administered**
- **No additional blood tests will be required**.

The ultrasound will be performed transthoracically, i.e. by placing the probe on your chest. The examination is therefore non-invasive, completely painless and does not involve exposure to X-rays.

Your participation in this research will not incur any additional costs compared to those you would have had in the usual follow-up of your disease.

What are the expected benefits of this research?

This study should improve our knowledge of the factors involved in successful ventilatory weaning of tracheostomised patients. This will provide information on the elements involved in the success of decanulation in order to better adapt the therapeutic approach.

What are the conditions for participating in this study?

In order to participate in this research, you must be affiliated to or benefit from a social security scheme. However, your participation in this research will not result in any additional costs for you compared to those incurred in the usual care.

Number of patients planned and duration of research?

This research will last 25 months with a 24-month recruitment period to include 100 patients.

What data is collected for research?

The medical data collected during this study will be processed in a computerised, coded and confidential manner. The main data collected will be anthropometric data (age, weight, height, etc.), related to medical history, ventilator settings, biological check-ups, and the results of check-ups by rehabilitation professionals (physiotherapists, dieticians, speech therapists).

No information bearing your name will be provided to anyone except the doctor in charge of the study and authorized personnel. All data collected will be confidential and coded and analysed within the Clinical Research Commission of the Forcilles-Fondation Cognacq-Jay Hospital, promoter of the research. The identification list (correspondence between your code for the study and your identity) will be kept strictly confidential.

In accordance with the regulations in force, the data will be kept until the final research report is produced and then archived for 15 years.

The data controller is the promoter, Hôpital Forcilles-Fondation Cognacq-Jay, route de Servon 77150 Férolles-Attilly.

Legal basis for data processing

The processing of the data is based on the legitimate interests of the controller, Article 6 paragraph 1 point f, read in conjunction with the necessity of the processing for scientific research purposes, Article 9 paragraph 2 point j, of the European Regulation N° 2016/679 (General Data Protection Regulation, GDPR).

What are your rights?

Your participation in this research is **entirely free and voluntary**. You have the right not to participate in this research.

You cannot be included in an interventional research protocol with minimal risks and constraints without having been informed beforehand. Your doctor must provide you with all the necessary explanations concerning this research, which must comply with the provisions of Article 13 of European Regulation No. 2016/679 (General Data Protection Regulation, GDPR). In accordance with article L.1122-1 of the Public Health Code, the entire research file has been submitted to the Comité de Protection des Personnes, CPP Ile de France 2, which issued a favourable opinion on xx/xx/xxxx.

The Forcilles-Fondation Cognacq-Jay hospital has taken out insurance under contract no. 163607 guaranteeing its civil liability and that of all those involved with the company SHAM.

You can stop participating in the research at any time without justification. This will not affect the quality of the care and treatment provided to you or your relationship with your doctor. The data collected until you withdraw your consent will be used unless you expressly request it. Indeed, in accordance with Article 17 of the GDPR, you have the right to request the deletion of your data already collected. The withdrawal of your consent and the agreement to use or not your previously collected data will be traced in your medical file.

In accordance with the provisions of Articles 15 and 16 of Regulation (EU) 2016/679 of 27 April 2016 (General Data Protection Regulation), you have a right of access, rectification, erasure or restriction of processing. You can find out more about your rights by visiting the CNIL website https://www.cnil.fr/fr/reglement-europeen-protection-donnees/chapitre3. In accordance with the provisions of Article 21 of the RGPD, you also have the right to object to the transmission of data likely to be used in the context of this research and to be processed. Your request must be addressed to the Data Protection Officer of the Cognacq-Jay Foundation, either by e-mail to dpo@cognacq-jay.fr or by post to the address: Hôpital Forcilles-Fondation Cognacq-Jay, Délégué à la Protection des Données, route de Servon 77150 Férolles-Attilly. You also have the right to lodge a complaint with the Commission Nationale de l'Informatique et des Libertés - CNIL (French personal data control authority, website: www.cnil.fr).

In application of the provisions of article L. 1111-7 of the Public Health Code, you may also access all of your medical data directly or through a doctor of your choice.

Your medical file will remain confidential and can only be consulted under the responsibility of the doctor in charge of your treatment, as well as by the health authorities and by persons duly mandated by the Forcilles-Fondation Cognacq-Jay hospital for research and subject to professional secrecy.

If, after having read all this information and discussed all aspects with the doctor in charge of the research, you have had sufficient time to reflect on your decision and you decide to

participate in this research, the research information and your oral consent will be notified and dated in your medical file.

The agreement to participate in this research is free and voluntary.
You may refuse or withdraw your consent at any time without explanation or prejudice.

Any questions?

Dr. _____ (tel. _____) is at your disposal for any further information you may require before and during the research.