Geriatric rehabilitation and Covid-19 : a Case Report

Marine Brika (marine.brika@hnfc.fr)
Hopital Nord France Comte

Maeva Bossu
Hopital Nord Franche Comte

Lilian Fautrelle
Universite de Toulouse

France Mourey
Universite de Bourgogne

Alexandre Kubicki
Hopital Nord Franche Comte

Case Report

Keywords: Covid-19, Geriatric rehabilitation, Frailty, clinical reasoning, screening

Posted Date: September 16th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-76560/v1

Version of Record: A version of this preprint was published at SN Comprehensive Clinical Medicine on November 9th, 2020. See the published version at https://doi.org/10.1007/s42399-020-00613-5.

Abstract

Introduction : Covid-19 infection has particularly affected older adults. Clinical observations in this population highlight major respiratory impairment associated with development or aggravation of frailty state.

Case Presentation : Mr P is a 93 years old frail patient, hospitalized after a COVID-19 infection. The assessment process of this patient has been supported by an innovative multi-systemic tool developed in view of the COVID-19 clinical consequences and a systemic evaluation of motor functions by the Frail BESTest. This process allowed presenting a mixed clinical picture associating an important respiratory distress (linked with the acute respiratory distress syndrome) and an evident motor frailty. The care plan was developed accordingly, and four assessment were done in the same manner until the return home of Mr P

Conclusion : This case report allows seeing holistically a COVID-19 clinical picture, showing the different axis of clinical reasoning to enhance the rehabilitation process. Furthermore, this case report illustrate the importance of rehabilitation in the Covid-19 context.

Introduction

The COVID-19 pandemic targets aged adults, especially when they carry comorbidities [1]. In elderly adults, frailty corresponds to the clinical consequences of the physiological function decline, involving a pathological aging. Frailty is characterized by a loss of functional supplies, leading to a high risk of falls, of institutionalization, and sometimes of death [2]. Aged adults who survive the COVID-19 could present several frailty criteria after the respiratory distress and sometimes several days in an intensive care unit. Clinical pictures are multiples, associating respiratory and vascular consequences, bed rest effects, medication effects, in a psychological context of anxiety [3-4].

Case Description

The case report of Mr P is dedicated to underline the mixed clinical picture of an Acute Respiratory Distress Syndrome (ARDS) and a motor frailty. This case seems highly generalizable in the pandemic context where high age and associated diseases are major factors of death.

The 3 of March, 2020, Mr P. is hospitalized for a COVID-19 infection, confirmed by a thoracic scan showing the typical ground-glass opacities (Figure 1). His pulmonary function decreased, involving an oxygen supplementation of 15L/min. His clinical evolution confirms the oxygen dependency between 12 and 15L/min. Mr P is transferred in the rehabilitation unit the 04.22.2020. Mr P leaves alone in his house with a bedroom at the first stair. He is able to walk without technical support, inside and outside. During the examination, Mr P. clearly expresses that he want to go back at home, with his anterior functional level. An important fear of falling is noticed, measured at 15/28 with the short-FES [5]. Mr P also indicates that he

fell twice a year during 2019, when walking in his garden, and explains that he had difficulties to get up from the floor.

Diagnostic Assessment

We conducted the evaluation by a two filters analysis. The first one consists of evaluating the deficiencies linked with the COVID-19 infection and the associated ARDS, through a specific COVID-19 aggregation of scales. The second one targets the motor function using the Frail'BESTest [6] in order to orientate the clinical reasoning.

Level 1: The specific COVID-19 evaluation

In front of the heterogeneity of COVID-19 clinical pictures, we tried to propose a global summery including several clinical examinations. The available literature [7-8] spots a pulmonary typical deficiency associated with several new clinical scripts (ARDS, Psychomotor dis-adaptation syndrome, acquired pneumopathy, acquired neuromyopathy, etc.). The aggregation of scales was done in a transdisciplinary rehabilitation approach to screen all the important aspects consecutive to the infection. Tests were retained for their usability, their reliability and their validity.

- Social and behavioral functions are evaluated with the RAMSAY score [9] and the RASS scale [10].
- Some items of the Hamilton scale (HDRS) are used to measure the psychological and emotional state [11].
- The simplified cardiac and respiratory evaluation allows to measure the usual parameters with the mMRC dyspnea scale [12] and the Borg scale [13]. The peak cough flow rate (PCFr) is also measured [14-15].
- In accordance with the loss of mass frequently described [8], the body Mass Index is noted. Swallowing function is evaluated with simple tests.
- Frailty detection is based on several tests showing a good sensitivity : the gait speed measure [16], the chair test in one minute [17], the functional reach test [18] and the grip strenght test [19].
- Neuro-motor functions are evaluated by the PFIT-scored [20] and the MMRC [21-22]. A few items of the Mini Motor Test [23] and the BESTest [24] allow a large vision of the patient.
- A binary analysis of statesthesia and tact are proposed in addition to the other senses.
- About sensitivity, a double assessment including statesthesia and touch [25] is done.

The evaluation synthesis of Mr P is displayed on Figure 2a and 2b.

Level 2: Reasoning with the Frail'BESTest.

The Frail'BESTest has been developed to make it possible to include frail older adults when using a systemic evaluation [6]. Therapists can therefore directly manage therapeutic intervention for different

types of balance deficiencies. Overall, 6 sub-systems have been addressed: 1: anticipations, 2: reactions, 3: locomotion, 4: sensorial orientation, 5: biomechanical constraints and 6: asymmetric gait.

Diagnostic

Mr P, a 93 years old patient, presents a respiratory dysfunction linked with a Covid-19 infection (saturation at 91% with 7 liters Oxygen supplementation), subsequent effort incapacity, and posturo-motor deficiencies. Motor automatisms are impaired, and several articular and muscular constraints remain. Mr P seems enlisted in a frailty process, leading to an increased dependency, an impossibility to return at home, and a relative social isolation.

Therapeutic intervention

The protocol was carried out in agreement with legal and international requirements (Declaration of Helsinki, 1964). Mr P was informed about the publication project and gave their written consent before the evaluation.

Mr P followed a rehabilitation program which included mainly physical therapy and nutritional monitoring. He received one session of physical therapy per day. This session lasted in average 30 minutes. Considering the physiotherapy diagnosis of Mr P. as well as the age-specific lung physiology of the patient [26], some cardiopulmonary rehabilitation exercises allowing both maintenance of ventilator functions and the improvement of hematosis can be proposed. During all of these exercises, precautions, red flags and stop criteria indicated in the HAS Quick Response [27] should be followed.

The next paragraph will show the aims and exercises samples that have been proposed to Mr P.We would like to improve both transverse abdominis and diaphragm by active, functional and resistive treatment including threshold systems, hypopressive exercise and functional ventilation during efforts [28–30]. In order to limit physiological impairment, some exercises including thoracic movement with arms, chest and spine mobility are introduced during global therapy in both ways : inhale and exhale [31-32]. In order to improve oxygenation and prevent congestion, ventilation should be harmonized throughout the lung territories and mucociliary clearance should be promoted. Thus, high-volume ventilator-type work that includes tele-inspirational holds while avoiding the specific collapses associated with senescence. For example, exercises of type EDIC, ITLA (Inspiratory Technical for Lifting Atelectasis), Elpr, ACBT with open glottis are proposed [33-34]. Concerning rehabilitation with effort, it is necessary to increase the ventilatory threshold, to improve the muscular function and decrease dyspnea. This will also improve hematosis and oxidative metabolism. An early and progressive cardiopulmonary rehabilitation program is established and based on Borg scale [35-36]. For Mr P. it includes optimal loading, aerobic work by paliers as well as endurance. This program mainly uses functional exercises such as treadmill walking (between 60-80% of the TM6 or of the chair-test or top toes test) [37]. It also seems important to prevent dysphagia in the medium term and to optimize the use of the functions of the nose (warm, filter and humidify the air). So, nasal ventilation and correction of the tongue position is essential. For example mindless nasal ventilation and tongue palate position is followed and lingual resistive exercise and sensitive work are proposed. In a

final perspective of patient's autonomy, throughout the rehabilitation, an education to the perception of effort, the use of the Borg scale, the self-assessment of his respiratory capacities and the criteria of alerts is carried out [38].

On the other hand, in connection with the systemic evaluation of the balance function and motor frailty of Mr P, several sensory-motor exercises are proposed. To improve the efficiency of posture-movement coordination, self-paced perturbations of balance were worked with speed and variability [39]. For example, Mr P. must reach a colored target on the ground as quickly as possible once the physiotherapist has indicated the color he has hit. To reactivate postural adaptations and fall avoidance reactions, Mr P performs exercises working on extrinsic imbalances (unpredictable balance perturbation [40]. For example, Mr. P had to react to manual pushes from the physiotherapist. In order to improve muscular power, functional muscular exercises were performed in a closed chain and with a time constraint [41]. For example, Mr. P had to go up and down a step to the beat of a metronome. In order to regain physiological ankle mobility and to enhance the rolling of foot during walking, active mobilization exercises were carried out during physiotherapy sessions and also by the patient independently in his room [42]. To reduce the podal dependency, Mr P performed static and dynamic balance exercises on different ground textures (e.g. standing on foam, walking on a mat, walking outside in the grass...). Finally, exercises integrating the work of spatial and temporal parameters of the walk and changes of direction were carried out. These exercises were aimed at improving walking kinetics and would participate in the evolution of the technical walking help.

Follow up and outcomes

The 4 assessments performed by the COVID-19 specific evaluation showed an overall improvement of the patient in several functions. In terms of psychological and emotional state, the anxiety with regard to oxygen dependence disappeared. Indeed, at the initial assessment the patient had 7L of oxygen in the high concentration face mask. At the final evaluation, he had only 1L of oxygen left in the nasal cannula. Pulmonary auscultation, which initially revealed a lack of ventilation associated with congestion of the middle and distal airways, also improved. Final auscultation is evaluated without particularities. The assessment of cognitive and behavioral functions remained unchanged over the course of the 4 assessments. Initial clinical observations did not show impairment of these functions. The initial preliminary assessment of the vascular and cutaneous system had shown the presence of a stage 1 pressure ulcer (National Pressure Ulcer Adivory Panel Stage Classification) behind the ears due to the oxygen mask. At final evaluation, the pressure ulcer was no longer present. No vascular disorders have occurred during the hospitalization. Moreover, there was no significant change in swallowing function, as Mr. P did not present any swallowing problems.

The changes in the scores of the quantitative outcomes of the different functions are summarized in Table 1.

Section	Item	Evaluation n°1	Evaluation n°2	Evaluation n°3	Evaluation n°4
Date		27/04/2020	20/05/2020	29/05/2020	8/06/2020
Cardio-respiratory	Oxygenotherapy ($L.min^{-1}$)	7	2	1	1
	Dyspnea : mMRC score	rank 3	rank 3	rank 3	rank 3
	Dyspnea : Borg score	7/10	6/10	6/10	4/10
	SpO_2 (Oxygen saturation) at rest	91%	92%	92%	94%
	Sp02 after walking	84%	86%	88%	86%
	Respiratory frequence	24	22	20	19
	Chest expansion / Ventilatory assymetry (cm)	4	5	5	6
	Level of muscular strength	Diaphragm = 3/5 Transversus abdominis = 3/5	Diaphragm = 3/5 Transversus abdominis : = 3/5	Diaphragm = 3/5 Transversus abdominis : = 3/5	Diaphragm = 4/5 Transversus abdominis : = 4/5
Frailty	Gait speed ($m.s^{-1}$)	NE	0,33with rollator	0,4 with rollator	0,57 with rollator
	Grip strenght (kg)	26	30	30	32
	One min Sit to Stand Test	8	12	12	15
	FRT (cm)	20	20	21	23
Functional and neuromotor	PFIT-scored	5,9/10	5,9/10	6,4/10	7,1/10
	mMRC	44/60	50/60	56/60	56/60
	BESTest III-10 : Mounted on tiptoe	Score 2	Score 2	Score 2	Score 2

Table 1: A summary table on the differents evaluations with specific Covid-19 evaluation

The 4 assessments of Frail'BESTest show an improvement in the score of some subsystems. The results are summarized in Table 2.

FrailBestTest	Initiale evaluation	Intermediate evaluation (number one)	Intermediate evaluation (number two)	Final evaluation
Date	27/04/2020	20/05/2020	29/05/2020	8/06/2020
System A : Anticipations	3	3	3	4
System B : Reactions	0	0	0	1
System C : Locomotion	NE	1	2	2
System D : Sensory orientation	2	2	2	2
System E : Biomechanical constraints	2	3	3	4
System F : gait symetry	4	4	4	4
Total score	11	13	14	18
Gait speed ($m.s^{-1}$)	NE	0,33 with rollator	0,4 with rollator	0,57 with rollator

Table 2: A summary table on the differents evaluations with FrailBestTest

Discussion And Conclusions

This case allows underlining the global approach that is necessary in a geriatric rehabilitation context associated with the COVID-19 infection. Although the long term follow-up is not yet available, it seems important to continue the clinical pictures description associated with this virus in order to better organize rehabilitation strategies. Indeed, the rehabilitation process represents the other challenge of the pandemic situation in several countries characterized by a high proportion of frail patients [43]. To our point of view, it is important to understand that the problem is not only to rescue a patient for its acute respiratory problem, but more to prevent the functional dependency associated with the infection consequences, especially in the Intensive Care Units where chronic diseases are frequently acquired.

Mr P was probably lucky to come back at home, with a high level of independency. His age and relative frailty were, at the beginning, considered as bad prognosis factors. As it is frequent in geriatric rehabilitation, age it is not only a question of number. In the same manner, frailty should not be questioned as an independence level, but more in terms of functional reserves. Mr P presented sufficient functional reserves, although he was certainly frail upon arrival at the hospital.

Several papers describe the physiotherapy associated with COVID-19 infection since the pandemic beginning. A lot of them described adults patients, often aged up to 65 years, considering the

respiratory/pulmonary rehabilitation. Strengths recommendations are available to manage these COVID-19 patients [8]. However, age and frailty are key factors to target the needs of these patients, and all our health systems should be adapted to the second wave of the pandemic situation: the rehabilitation wave [44].

Although a higher vulnerability of geriatric patients has been observed, the literature on aged COVID-19 patients has remained very scarce. A few studies adequately targeted these patients, and described interesting clinical pictures and associated medical treatments [45]. However, to our knowledge, this is the first case report highlighting the rehabilitation process with an aged COVID-19 patient who needs to be seen equally as a respiratory case and as a frail patient.

Declarations

- **Funding**: none

- **Conflict of Interest**: The authors state that there are no financial or personal relationships with other people or organizations that could inappropriately influence (bias) their work

- **Ethical approval**: The protocol performed in this case report is in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards

- **Informed consent:** Mr P was informed about the publication project and gave their consent

References

1. Promislow DEL. A geroscience perspective on COVID-19 mortality. *J Gerontol A Biol Sci Med Sci*. Published online April 17, 2020. doi:10.1093/gerona/glaa094
2. Silva-Obregón JA, Quintana-Díaz M, Saboya-Sánchez S, et al. Frailty as a predictor of short- and long-term mortality in critically ill older medical patients. *J Crit Care*. 2020;55:79-85. doi:10.1016/j.jcrc.2019.10.018
3. Simpson R, Robinson L. Rehabilitation After Critical Illness in People With COVID-19 Infection. *Am J Phys Med Rehabil*. 2020;99(6):470-474. doi:10.1097/PHM.0000000000001443
4. Ceravolo MG, de Sire A, Andrenelli E, Negrini F, Negrini S. Systematic rapid “living” review on rehabilitation needs due to COVID-19: update to March 31st, 2020. *Eur J Phys Rehabil Med*. 2020;56(3):347-353. doi:10.23736/S1973-9087.20.06329-7
5. Hauer KA, Kempen GIJM, Schwenk M, et al. Validity and sensitivity to change of the falls efficacy scales international to assess fear of falling in older adults with and without cognitive impairment. *Gerontology*. 2011;57(5):462-472. doi:10.1159/000320054
6. Kubicki A, Brika M, Coquisart L, Basile G, Laroche D, Mourey F. The Frail’BESTest. An adaptation of the “Balance Evaluation System Test” for frail older adults. Description, internal consistency and inter-rater

reliability. *Clinical Interventions in Aging*. Published online 2020.

7. Lescure F-X, Bouadma L, Nguyen D, et al. Clinical and virological data of the first cases of COVID-19 in Europe: a case series. *Lancet Infect Dis*. 2020;20(6):697-706. doi:10.1016/S1473-3099(20)30200-0
8. Thomas P, Baldwin C, Bissett B, et al. Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations. *J Physiother*. 2020;66(2):73-82. doi:10.1016/j.jphys.2020.03.011
9. Carrasco G. Instruments for monitoring intensive care unit sedation. *Crit Care*. 2000;4(4):217-225. doi:10.1186/cc697
10. Ely EW, Truman B, Shintani A, et al. Monitoring sedation status over time in ICU patients: reliability and validity of the Richmond Agitation-Sedation Scale (RASS). *JAMA*. 2003;289(22):2983-2991. doi:10.1001/jama.289.22.2983
11. Carrozzino D, Patierno C, Fava GA, Guidi J. The Hamilton Rating Scales for Depression: A Critical Review of Clinimetric Properties of Different Versions. *Psychother Psychosom*. 2020;89(3):133-150. doi:10.1159/000506879
12. Munari AB, Gulart AA, Dos Santos K, Venâncio RS, Karloh M, Mayer AF. Modified Medical Research Council Dyspnea Scale in GOLD Classification Better Reflects Physical Activities of Daily Living. *Respir Care*. 2018;63(1):77-85. doi:10.4187/respcare.05636
13. Borg GA. Psychophysical bases of perceived exertion. *Med Sci Sports Exerc*. 1982;14(5):377-381.
14. Bianchi C, Baiardi P, Khirani S, Cantarella G. Cough peak flow as a predictor of pulmonary morbidity in patients with dysphagia. *Am J Phys Med Rehabil*. 2012;91(9):783-788. doi:10.1097/PHM.0b013e3182556701
15. Kim J, Davenport P, Sapienza C. Effect of expiratory muscle strength training on elderly cough function. *Arch Gerontol Geriatr*. 2009;48(3):361-366. doi:10.1016/j.archger.2008.03.006
16. Middleton A, Fritz SL, Lusardi M. Walking speed: the functional vital sign. *J Aging Phys Act*. 2015;23(2):314-322. doi:10.1123/japa.2013-0236
17. Puhan MA, Siebeling L, Zoller M, Muggensturm P, ter Riet G. Simple functional performance tests and mortality in COPD. *Eur Respir J*. 2013;42(4):956-963. doi:10.1183/09031936.00131612
18. Scena S, Steindler R, Ceci M, Zuccaro SM, Carmeli E. Computerized Functional Reach Test to Measure Balance Stability in Elderly Patients With Neurological Disorders. *J Clin Med Res*. 2016;8(10):715-720. doi:10.14740/jocmr2652w
19. Dodds RM, Syddall HE, Cooper R, et al. Grip strength across the life course: normative data from twelve British studies. *PLoS ONE*. 2014;9(12):e113637. doi:10.1371/journal.pone.0113637
20. Denehy L, de Morton NA, Skinner EH, et al. A physical function test for use in the intensive care unit: validity, responsiveness, and predictive utility of the physical function ICU test (scored). *Phys Ther*. 2013;93(12):1636-1645. doi:10.2522/ptj.20120310
21. Jolley SE, Bunnell AE, Hough CL. ICU-Acquired Weakness. *Chest*. 2016;150(5):1129-1140. doi:10.1016/j.chest.2016.03.045

22. Hermans G, Clerckx B, Vanhullebusch T, et al. Interobserver agreement of Medical Research Council sum-score and handgrip strength in the intensive care unit. *Muscle Nerve*. 2012;45(1):18-25. doi:10.1002/mus.22219
23. Mourey F, Camus A, d'Athis P, et al. Mini motor test: a clinical test for rehabilitation of patients showing psychomotor disadaptation syndrome (PDS). *Arch Gerontol Geriatr*. 2005;40(2):201-211. doi:10.1016/j.archger.2004.08.004
24. Horak FB, Wrisley DM, Frank J. The Balance Evaluation Systems Test (BESTest) to differentiate balance deficits. *Phys Ther*. 2009;89(5):484-498. doi:10.2522/ptj.20080071
25. Baig AM. Neurological manifestations in COVID-19 caused by SARS-CoV-2. *CNS Neurosci Ther*. 2020;26(5):499-501. doi:10.1111/cns.13372
26. Skloot GS. The Effects of Aging on Lung Structure and Function. *Clin Geriatr Med*. 2017;33(4):447-457. doi:10.1016/j.cger.2017.06.001
27. Prise en charge des patients post-COVID-19 en médecine physique et de réadaptation (MPR), en soins de suite et de réadaptation (SSR), et retour à domicile. Haute Autorité de Santé. Accessed July 27, 2020. https://www.has-sante.fr/jcms/p_3179826/fr/prise-en-charge-des-patients-post-covid-19-en-medecine-physique-et-de-readaptation-mpr-en-soins-de-suite-et-de-readaptation-ssr-et-retour-a-domicile
28. Babcock MA, Pegelow DF, Johnson BD, Dempsey JA. Aerobic fitness effects on exercise-induced low-frequency diaphragm fatigue. *J Appl Physiol*. 1996;81(5):2156-2164. doi:10.1152/jappl.1996.81.5.2156
29. Fulton I, McEvoy M, Pieterse J, Williams M, Thoirs K, Petkov J. Transversus abdominis: changes in thickness during the unsupported upper limb exercise test in older adults. *Physiother Theory Pract*. 2009;25(8):523-532. doi:10.3109/09593980802665023
30. O'Kroy JA, Coast R. Effects of Flow and Resistive Training on Respiratory Muscle Endurance and Strength. *RES*. 1993;60(5):279-283. doi:10.1159/000196216
31. Han JW, Kim YM. Effect of breathing exercises combined with dynamic upper extremity exercises on the pulmonary function of young adults. *J Back Musculoskelet Rehabil*. 2018;31(2):405-409. doi:10.3233/BMR-170823
32. Petrofsky JS, Cuneo M, Dial R, Pawley AK, Hill J. Core Strengthening and Balance in the Geriatric Population. 2005;5(3):11.
33. Lewis LK, Williams MT, Olds TS. The active cycle of breathing technique: a systematic review and meta-analysis. *Respir Med*. 2012;106(2):155-172. doi:10.1016/j.rmed.2011.10.014
34. Pryor JA. Physiotherapy for airway clearance in adults. *Eur Respir J*. 1999;14(6):1418-1424. doi:10.1183/09031936.99.14614189
35. Svedahl K, MacIntosh BR. Anaerobic threshold: the concept and methods of measurement. *Can J Appl Physiol*. 2003;28(2):299-323. doi:10.1139/h03-023
36. Alexander JL, Phillips WT, Wagner CL. The effect of strength training on functional fitness in older patients with chronic lung disease enrolled in pulmonary rehabilitation. *Rehabil Nurs*. 2008;33(3):91-97. doi:10.1002/j.2048-7940.2008.tb00211.x

37. Opasich C, Patrignani A, Mazza A, Gualco A, Cobelli F, Pinna GD. An elderly-centered, personalized, physiotherapy program early after cardiac surgery. *Eur J Cardiovasc Prev Rehabil*. 2010;17(5):582-587. doi:10.1097/HJR.0b013e3283394977
38. O'Donnell DE, Chau LK, Webb KA. Qualitative aspects of exertional dyspnea in patients with interstitial lung disease. *J Appl Physiol*. 1998;84(6):2000-2009. doi:10.1152/jappl.1998.84.6.2000
39. Jagdhane S, Kanekar N, Aruin AS. The Effect of a Four-Week Balance Training Program on Anticipatory Postural Adjustments in Older Adults: A Pilot Feasibility Study. *Curr Aging Sci*. 2016;9(4):295-300. doi:10.2174/1874609809666160413113443
40. Mansfield A, Peters AL, Liu BA, Maki BE. Effect of a perturbation-based balance training program on compensatory stepping and grasping reactions in older adults: a randomized controlled trial. *Phys Ther*. 2010;90(4):476-491. doi:10.2522/ptj.20090070
41. Foldvari M, Clark M, Laviolette LC, et al. Association of muscle power with functional status in community-dwelling elderly women. *J Gerontol A Biol Sci Med Sci*. 2000;55(4):M192-199. doi:10.1093/gerona/55.4.m192
42. Smajla D, García-Ramos A, Tomazin K, Strojnik V. Selective effect of static stretching, concentric contractions, and a one-leg balance task on ankle motion sense in young and older adults. *Gait Posture*. 2019;71:1-6. doi:10.1016/j.gaitpost.2019.04.006
43. Özkeskin M, Elibol N, Bakırhan S. Risk of COVID-19 disease in the elderly population and physiotherapy. *Physiotherapy*. 2020;108:76-77. doi:10.1016/j.physio.2020.05.003
44. De Biase S, Cook L, Skelton DA, Witham M, ten Hove R. The COVID-19 rehabilitation pandemic1. *Age and Ageing*. Published online May 29, 2020:afaa118. doi:10.1093/ageing/afaa118
45. Bentivegna E, Luciani M, Spuntarelli V, et al. Extremely Severe Case of COVID-19 Pneumonia Recovered Despite Bad Prognostic Indicators: a Didactic Report. *SN Compr Clin Med*. Published online June 29, 2020. doi:10.1007/s42399-020-00383-0

Figures

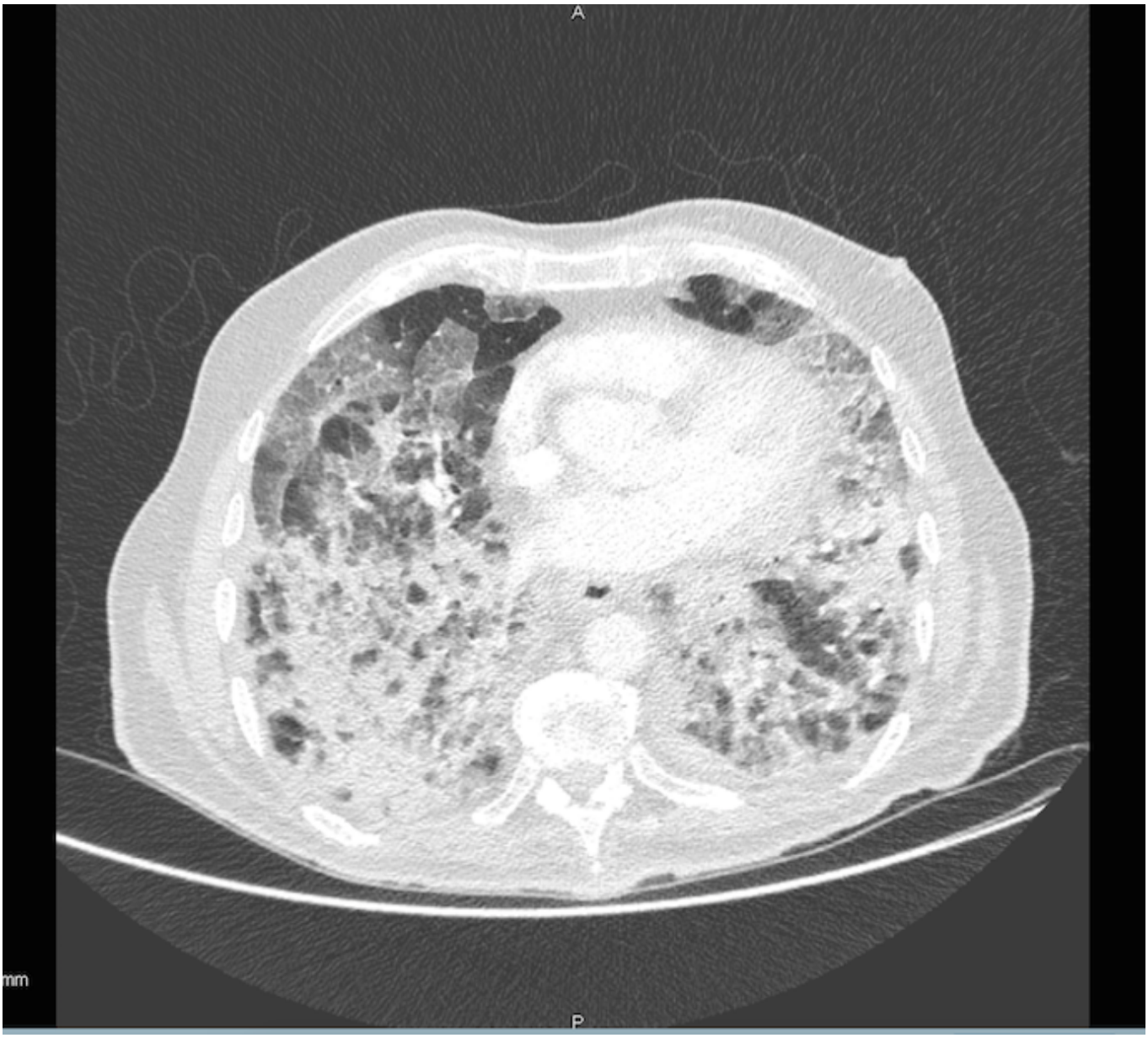
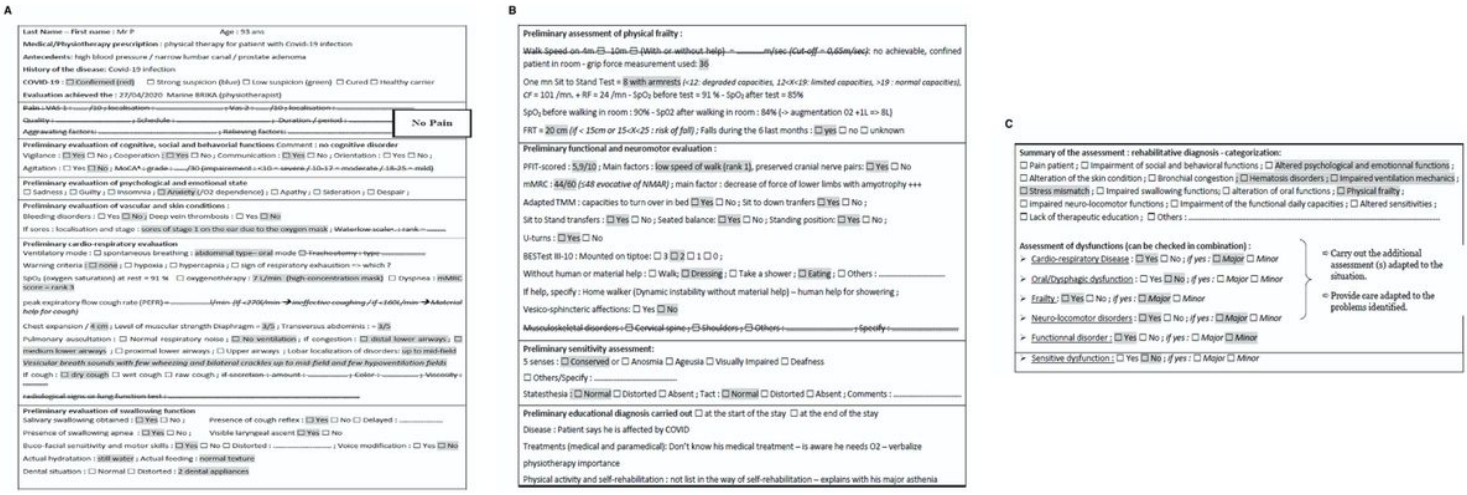


Figure 1

Thoracic scan showing the typical ground-glass opacities



A

Last Name – First name : Mr P Age : 93 ans
Medical/Physiotherapy prescription : physical therapy for patient with Covid-19 infection
Antecedents: high blood pressure / narrow lumbar canal / prostate adenoma
History of the disease: Covid-19 infection
COVID-19 : ☐ Confirmed (red) ☐ Strong suspicion (blue) ☐ Low suspicion (green) ☐ Cured ☐ Healthy carrier
Evaluation achieved the : 27/04/2020 Marine BRIKA (physiotherapist)
~~**Pain** : VAS-1 = ... /10 ; localisation : ..... VAS-2 = ... /10 ; localisation : .....~~
~~**Quality** : ..... ; Schedule : ..... ; Duration / period : .....~~
~~**Aggravating factors**: ..... ; Relieving factors: .....~~ **No Pain**
Preliminary evaluation of cognitive, social and behavorial functions Comment : no cognitive disorder
Vigilance : ☐ Yes ☐ No ; Cooperation : ☐ Yes ☐ No ; Communication : ☐ Yes ☐ No ; Orientation : ☐ Yes ☐ No ;
Agitation : ☐ Yes ☐ No ; MoCA* ; grade : ..... /30 (impairment : <10 = severe / 10-17 = moderate / 18-25 = mild)
Preliminary evaluation of psychological and emotional state
☐ Sadness ; ☐ Guilty ; ☐ Insomnia ; ☐ Anxiety ; (O2 dependence) ; ☐ Apathy ; ☐ Sideration ; ☐ Despair ;
Preliminary evaluation of vascular and skin conditions :
Bleeding disorders : ☐ Yes ☐ No ; Deep vein thrombosis : ☐ Yes ☐ No
If sores : localisation and stage : sores of stage 1 on the ear due to the oxygen mask ; ~~Waterlow scale : rank = ...~~
Preliminary cardio-respiratory evaluation
Ventilatory mode : ☐ spontaneous breathing ; abdominal type – oral mode ~~☐ Tracheotomy ; type .....~~
Warning criteria ☐ none ; ☐ hypoxia ; ☐ hypercapnia ; ☐ sign of respiratory exhaustion => which ?
SpO_2 (oxygen saturation) at rest = 91 % ☐ oxygenotherapy : 7 L/min (high concentration mask) ☐ Dyspnea : mMRC score = rank 3
~~peak expiratory flow cough rate (PEFR) = ... L/min (if <270L/min → ineffective coughing / if <160L/min → Material help for cough)~~
Chest expansion / 4 cm ; Level of muscular strength Diaphragm – 3/5 ; Transversus abdominis : – 3/5
Pulmonary auscultation : ☐ Normal respiratory noise ; ☐ No ventilation ; if congestion : ☐ distal lower airways ; ☐ medium lower airways ; ☐ proximal lower airways ; ☐ Upper airways ; Lobar localization of disorders: up to mid-field
Vesicular breath sounds with few wheezing and bilateral crackles up to mid field and few hypoventilation fields
If cough : ☐ dry cough ☐ wet cough ☐ raw cough ; ~~if secretion : amount : ..... ; Color : ..... ; Viscosity : .....~~
~~radiological signs on lung function test : .....~~
Preliminary evaluation of swallowing function
Salivary swallowing obtained : ☐ Yes ☐ No ; Presence of cough reflex : ☐ Yes ☐ No ☐ Delayed : .....
Presence of swallowing apnea : ☐ Yes ☐ No ; Visible laryngeal ascent ☐ Yes ☐ No
Buco-facial sensitivity and motor skills : ☐ Yes ☐ No ☐ Distorted : ..... ; Voice modification : ☐ Yes ☐ No
Actual hydratation : still water ; Actual feeding : normal texture
Dental situation : ☐ Normal ☐ Distorted ; 2 dental appliances

B

Preliminary assessment of physical frailty :
~~Walk Speed on 4m ☐ 10m ☐ (With or without help) = ... m/sec (Cut-off = 0,65m/sec)~~: no achievable, confined patient in room - grip force measurement used: 36
One mn Sit to Stand Test = 8 with armrests *(<12: degraded capacities, 12<X<19: limited capacities, >19 : normal capacities)*, CF = 101 /mn. + RF = 24 /mn - SpO_2 before test = 91 % - SpO_2 after test = 85%
SpO_2 before walking in room : 90% - Sp02 after walking in room : 84% (-> augmentation 02 +1L => 8L)
FRT = 20 cm *(if < 15cm or 15<X<25 : risk of fall)* ; Falls during the 6 last months : ☐ yes ☐ no ☐ unknown
Preliminary functional and neuromotor evaluation :
PFIT-scored : 5,9/10 ; Main factors : low speed of walk (rank 1), preserved cranial nerve pairs: ☐ Yes ☐ No
mMRC : 44/60 *(≤48 evocative of NMAR)* ; main factor : decrease of force of lower limbs with amyotrophy +++
Adapted TMM : capacities to turn over in bed ☐ Yes ☐ No ; Sit to down tranfers ☐ Yes ☐ No ;
Sit to Stand transfers : ☐ Yes ☐ No ; Seated balance: ☐ Yes ☐ No ; Standing position: ☐ Yes ☐ No ;
U-turns : ☐ Yes ☐ No
BESTest III-10 : Mounted on tiptoe: ☐ 3 ☐ 2 ☐ 1 ☐ 0 ;
Without human or material help : ☐ Walk; ☐ Dressing ; ☐ Take a shower ; ☐ Eating ; ☐ Others : .....
If help, specify : Home walker (Dynamic instability without material help) – human help for showering ;
Vesico-sphincteric affections: ☐ Yes ☐ No
~~Musculoskeletal disorders : ☐ Cervical spine ; ☐ Shoulders ; ☐ Others : ..... ; Specify : .....~~
Preliminary sensitivity assessment:
5 senses : ☐ Conserved or ☐ Anosmia ☐ Ageusia ☐ Visually Impaired ☐ Deafness
☐ Others/Specify : .....
Statesthesia : ☐ Normal ☐ Distorted ☐ Absent ; Tact : ☐ Normal ☐ Distorted ☐ Absent ; Comments : .....
Preliminary educational diagnosis carried out ☐ at the start of the stay ☐ at the end of the stay
Disease : Patient says he is affected by COVID
Treatments (medical and paramedical): Don't know his medical treatment – is aware he needs O2 – verbalize physiotherapy importance
Physical activity and self-rehabilitation : not list in the way of self-rehabilitation – explains with his major asthenia

C

Summary of the assessment : rehabilitative diagnosis - categorization:
☐ Pain patient ; ☐ Impairment of social and behavioral functions ; ☐ Altered psychological and emotionnal functions ; ☐ Alteration of the skin condition ; ☐ Bronchial congestion ; ☐ Hematosis disorders ; ☐ Impaired ventilation mechanics ; ☐ Stress mismatch ; ☐ Impaired swallowing functions; ☐ alteration of oral functions ; ☐ Physical frailty ; ☐ Impaired neuro-locomotor functions ; ☐ Impairment of the functional daily capacities ; ☐ Altered sensitivities ; ☐ Lack of therapeutic education ; ☐ Others : .....

Assessment of dysfunctions (can be checked in combination) :
- Cardio-respiratory Disease : ☐ Yes ☐ No ; *if yes :* ☐ *Major* ☐ *Minor*
- Oral/Dysphagic dysfunction : ☐ Yes ☐ No ; *if yes :* ☐ *Major* ☐ *Minor*
- Frailty : ☐ Yes ☐ No ; *if yes :* ☐ *Major* ☐ *Minor*
- Neuro-locomotor disorders : ☐ Yes ☐ No ; *if yes :* ☐ *Major* ☐ *Minor*
- Functionnal disorder : ☐ Yes ☐ No ; *if yes :* ☐ *Major* ☐ *Minor*

⇒ Carry out the additional assessment (s) adapted to the situation.
⇒ Provide care adapted to the problems identified.

- Sensitive dysfunction : ☐ Yes ☐ No ; *if yes :* ☐ *Major* ☐ *Minor*

Figure 2

A. Part one of specific Covid-19 evaluation B. Part two of specific Covid-19 evaluation C. Part three of specific Covid-19 evaluation