

# COVID-19 and the Vascular Elderly Subject: Illustration of Therapeutic Management with Corticosteroids in an Elderly Diabetic Patient with COVID-19

Ibrahima Amadou Dembele<sup>1,2</sup>, Abrar-Ahmad Zulfiqar<sup>1</sup>, Romuald Nounga Nyanke<sup>2,3\*</sup>, Sékou Landoure<sup>2</sup>, Stéphane Loique Djeugoue<sup>2,4</sup>, Adama Sinayoko<sup>2</sup>, Nouhoum Kone<sup>2</sup>, Paul Antoni<sup>1</sup>, Amadou Nouroudine<sup>1</sup>, Rosunee Ahsveen<sup>1</sup>, Yacouba Koné<sup>2</sup>, Aoua Diarra<sup>2</sup>, Tania Mekuiko Ngeupi<sup>3</sup>, Mamadou Cissoko<sup>2</sup>, Mamadou Mallé<sup>2</sup>, Keïta Kaly<sup>2</sup>, Djibril Sy<sup>2,3</sup>, Djénébou Traoré<sup>2,3</sup>, Didier Mukéba Tshialala<sup>4</sup>, Assétou Soukho Kaya<sup>2,3</sup>, Emmanuel Andres<sup>1</sup>

<sup>1</sup>Internal Medicine Department, Medical Clinic B, University Hospital Center of Strasbourg, Strasbourg, France

<sup>2</sup>Internal Medicine Department, University Hospital Center Point G, Bamako, Mali

<sup>3</sup>Faculty of Medicine and Odontostomatology, University of Sciences, Techniques and Technologies of Bamako, Bamako, Mali

<sup>4</sup>Faculty of Medicine, Pharmacy and Public Health, University of Mbuji-Mayi, Democratic Republic of Congo

Email: \*yromulus8889@gmail.com

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## Abstract

**Introduction:** The severity of Sars-Cov-2 infection is associated with the development of acute respiratory distress syndrome (ARDS). The progression to ARDS appears to be driven by a major inflammatory mechanism potentially sensitive to corticosteroids. **Observation:** This article describes the case of an elderly patient was admitted to emergency departments for intense ashenia, accompanied by motor diarrhoea, dyspnoea with desaturation in ambient air, in a context of strong suspicion of infection linked to COVID-19. The article also reviews the existing literature on the diagnosis and treatment of this severe form of the disease. **Conclusion:** Corticosteroids, and in particular dexamethasone, have been shown to be effective in the management of patients with COVID-19, an oxygen-releasing disease.

## Keywords

COVID-19, Diabetes Mellitus, Elderly person, Corticosteroids, Internal Medicine

## 1. Introduction

Coronavirus disease 2019 (COVID-19) is associated with diffuse lung damage.

Glucocorticoids may modulate inflammation-mediated lung injury and thereby reduce progression to respiratory failure and death [1]. Many studies have established a typology of patients at risk of developing a severe form of COVID-19. The factors that predict severe forms are: advanced age, male gender, comorbidities such as high blood pressure, liver disease, chronic obstructive pulmonary disease, diabetes mellitus, cardiovascular disease, malignant tumors, body mass index  $> 25 - 30 \text{ kg/m}^2$ , increased troponins, high leukocyte count and elevated C-reactive protein [2]. The severity of Sars-Cov-2 infection is linked to the occurrence of acute respiratory distress syndrome (ARDS). The progression towards ARDS appears to respond to a major inflammatory mechanism potentially sensitive to corticosteroids. Very few case reports have been published in elderly vascular patients with severe forms of COVID-19. We thus describe the case of an elderly diabetic patient suffering from severe lung damage. The purpose of this report is to present to you our experience through this clinical case and the particularity in the management of this type of patient.

## 2. Observation

We report the case of a 87-year-old patient of malian nationality, was admitted to the emergency room due to intense asthenia for 5 days, accompanied by motor diarrhea, dyspnea with 85% desaturation in ambient air, in a context of strong suspicion of infection linked to COVID-19, due to the positivity of the test carried out by nasopharyngeal swab on his wife. His medical history included high blood pressure, non-insulin-requiring type 2 diabetes mellitus (DT2) since the age of 40, dyslipidemia, non-clamped aortic stenosis, ventricular extra systole, gastroesophageal reflux disease (GERD) as well as vitamin B12 and substituted iron deficiency (etiology undetermined). His usual treatment included oral antidiabetics with Metformin 1000 mg, Glimepiride 1 mg, antihypertensives with Nitrendipine 10 mg, Ramipril 10 mg, Nebivolol 2.5 mg, Furosemide 40 mg, Atorvastatin 20 mg, and Esomeprazole 40 mg.

His weight was estimated at 76 kg and he measured 1.72 m. His body mass index was  $25.69 \text{ kg/m}^2$ , indicating a slightly overweight patient. He was independent, moved without technical assistance and lived with his wife in an apartment. On arrival, he was hemodynamically stable with an oxygen saturation of 93% on 4 L of oxygen (O<sub>2</sub>), subfebrile at 37.9°. Pulmonary auscultation revealed widespread crackles in the right lung. Note the absence of cough and sputum; absence of signs of respiratory severity. The biological assessment carried out revealed a biological inflammatory syndrome with a C-reactive protein (CRP) at 215.3 mg/L (N < 4 mg/L), without hydro-electrolyte disorders and an alteration of his renal function with clearance of the creatinine at entry at 41 mL/min/1.73m<sup>2</sup>, functional in appearance. Glycated hemoglobin (HbA1c) was 8.3%. A chest CT scan was performed and revealed a ground glass hyperdensity with subpleural peripheral topography of significant bilateral distribution (25% - 50%). In addition, fine arcuate subpleural condensations of the right upper and lower lobe suggestive of organizing pneumonia were found (**Figure 1**).



**Figure 1.** Patient CT-Scan image (Dr Zulfiqar Abrar-Ahmad).

These infectious abnormalities were typical of widespread COVID-19 disease. The patient did not require a visit to the intensive care unit. The SARS-CoV-2 - Gene RdRp RNA nasopharyngeal swab was carried out on admission of the patient returning positive, he was transferred to the specialized Internal Medicine COVID unit. Medical treatment consisted of the implementation of oxygen therapy, preventive anticoagulation with enoxaparin 4000 UI/12h subcutaneously coupled with corticosteroid therapy with dexamethasone 6 mg/day orally (Day 1 to Day 4), following the latest recommendations.

On the clinical and respiratory level, the patient evolved favorably, oxygen weaning was finally achieved gradually after a few days of oxygen therapy; complete weaning was achieved on the 12th day. The diarrhea improved with symptomatic treatment, with a stool culture proving sterile; the patient presented a glycemic imbalance requiring a readjustment of his insulin therapy. Additionally, blood pressure was unstable after temporary discontinuation of Ramipril treatment due to renal insufficiency, but was quickly brought under control. We noted a regression of the inflammatory syndrome with a CRP of 76.4 mg/L on Day 8 reaching 12.2 mg/L on Day 18.

### 3. Discussion

The clinical presentation of COVID-19 infection in the geriatric population mentions an atypical presentation marked by an alteration in general condition, a lower fever threshold, respiratory signs, digestive signs, etc. [3] [4]. This could confuse the diagnostic process in this population and cause a diagnostic delay. In our 87-year-old patient we mainly found significant asthenia, motor diarrhea, fever, dyspnea with desaturation without cough. The notion of a contact case (his positive wife) allowed us to quickly think of a COVID-19 infection. Thus our observation underlines this particularity of the atypical symptoms in the elderly but also the importance of comorbidities in this population. Indeed, comorbidities, particularly cardiovascular ones, expose the elderly patient to more serious forms with admission to intensive care units but also a compromised functional and vital prognosis [5]. For our patient, despite all his comorbidities,

he was not admitted to the intensive care unit following a predictable limited autonomy after a stay in intensive care.

Subjects affected by COVID-19 have been shown to develop inflammatory reactions with the involvement of cytokines and inflammatory biomarkers, leading to lung damage [6]. The full spectrum of COVID-19 infection ranges from asymptomatic disease to mild respiratory tract illness to severe pneumonia, acute respiratory distress syndrome (ARDS), multiorgan failure, and death. Clinical presentation of some critically ill patients with COVID-19 suggest a “Cytokine Storm Syndrome” or hyperinflammatory state in which the immunosuppressive effects of corticosteroids may be beneficial [7]. There is clear evidence that deregulated inflammatory conditions along with coagulation associated with COVID-19 are comparable with that of ARDS, while the capacity of corticosteroid treatment (CST) in decreasing inflammation-coagulation-fibroproliferation and increasing illness improvement has been confirmed [7]. It has been reported that COVID-19 induced an increase in cytokine level evoking less important hemophagocytic lymphohistiocytosis, a situation reactive to CST [6].

National and international studies have shown that the use of corticosteroids could advantageously modulate the host immune response to COVID-19 pneumonia [7] [8]. The international randomized RECOVERY trial showed that treatment with dexamethasone, a synthetic corticosteroid, reduced 4-week mortality by approximately 11% in patients hospitalized for an infection linked to Covid-19, compared to usual treatment. This benefit only seemed to be observed in patients receiving oxygen, and was greater in patients receiving mechanical ventilation, whose relative mortality decreased by almost 30% [9].

Another international study whose results include CAPE-COVID, REMAP-CAP and RECOVERY compiled data from 1703 patients from 12 countries who received either standard care, a placebo combined with standard care, or a corticosteroid (dexamethasone, hydrocortisone or methylprednisolone). Between 3 and 4 weeks after the start of treatment, patients treated with a corticosteroid had a relative risk of mortality lower than 21% compared to patients receiving symptomatic treatment alone or symptomatic treatment combined with placebo. In addition, no side effects specific to corticosteroid treatment have been demonstrated [9]. Moreover, the WHO made a recommendation, the administration of treatment with systemic corticosteroids in patients with a serious or critical form of COVID-19 in 2020 and remains unchanged in 2023 [10].

Corona virus disease 19 (COVID-19) affects especially the respiratory tract, and induces lung injury which may progress to the acute respiratory distress syndrome (ARDS). Corticosteroid therapy is an effective way in the management of COVID-19; it reduces the risk of complications mainly acute lung injury and the development of ARDS. Various treatment options were tried all over the world, corticosteroids had showed beneficial effects. Our elderly patient thus benefited from the use of a synthetic corticosteroid, dexamethasone, which helped improve respiratory symptoms and oxygen withdrawal. Reactive hyperglycemia was observed to be quickly controlled by insulin therapy and quickly

returned to normal. No other side effects had been reported, particularly on the psycho behavioral side.

#### 4. Conclusion

Corticosteroids and in particular dexamethasone have proven their effectiveness in the treatment of patients affected by oxygen-requiring COVID-19. Its use in elderly and very elderly subjects should require the clinician to monitor possible side effects, particularly through their glucocorticoid and mineralocorticoid effects; this must also lead to psycho behavioral monitoring (confusiogenic effect), which is very significant in elderly subjects.

#### Consent

Written informed consent was obtained from the patient to publish this report in accordance with patient consent policies.

#### Authors' Contributions

All authors participated in the evaluation and follow-up of the patient, in the writing and correction of the case report. All the authors of the manuscript have read and agreed to its content.

#### Conflicts of Interest

The authors declare no conflict of interest.

#### References

- [1] RECOVERY Collaborative Group (2021) Dexamethasone in Hospitalized Patients with Covid-19. *The New England Journal of Medicine*, **384**, 693-704. <https://doi.org/10.1056/NEJMoa2021436>
- [2] Muller, M., Bulubas, I. and Vogel, T. (2021) Les facteurs pronostiques dans la Covid-19. *NPG Neurologie—Psychiatrie—Gériatrie*, **21**, 304-312. <https://doi.org/10.1016/j.npg.2021.06.002>
- [3] Nguyen, S., Major, K., Cochet, C., Bizzozzero, T., Barbarossa, L., Bosshard, W., *et al.* (2020) Infection COVID-19 chez les personnes âgées en Suisse Romande: Un état des lieux entre croyances, convictions et certitudes. *Revue Médicale Suisse*, **16**, 835-838. <https://doi.org/10.53738/REVMED.2020.16.691.0835>
- [4] Sacco, G., Brière, O., Asfar, M., Guérin, O., Berrut, G. and Annweiler, C. (2020) Symptômes du Covid-19 chez la personne âgée: Revue systématique de la littérature biomédicale internationale. *Gériatrie et Psychologie Neuropsychiatrie du Vieillessement*, **18**, 135-140. <https://doi.org/10.1684/pnv.2020.0863>
- [5] Boureau, A.S., de Decker, L., Berrut, G. and Hanon, O. (2020) Pathologies cardiovasculaires et Covid-19: Particularités chez les personnes âgées. *Gériatrie et Psychologie Neuropsychiatrie du Vieillessement*, **18**, 141-149. <https://doi.org/10.1684/pnv.2020.0864>
- [6] Mehta, P., McAuley, D.F., Brown, M., Sanchez, E., Tattersall, R.S. and Manson, J.J. (2020) COVID-19: Consider Cytokine Storm Syndromes and Immunosuppression. *Lancet*, **395**, 1033-1034. [https://doi.org/10.1016/S0140-6736\(20\)30628-0](https://doi.org/10.1016/S0140-6736(20)30628-0)

- [7] Sterne, J.A.C., Diaz, J., Villar, J., *et al.* (2020) Corticosteroid Therapy for Critically Ill Patients with COVID-19: A Structured Summary of a Study Protocol for a Prospective Meta-Analysis of Randomized Trials. *BMC*, **21**, Article No. 734.  
<https://doi.org/10.1186/s13063-020-04641-3>
- [8] Villar, J., Ferrando, C., Martínez, D., *et al.* (2020) Dexamethasone Treatment for the Acute Respiratory Distress Syndrome: A Multicentre, Randomised Controlled Trial. *The Lancet Respiratory Medicine*, **8**, 267-276.  
[https://doi.org/10.1016/S2213-2600\(19\)30417-5](https://doi.org/10.1016/S2213-2600(19)30417-5)
- [9] The WHO Rapid Evidence Appraisal for COVID-19 Therapies (REACT) Working Group (2020) Association between Administration of Systemic Corticosteroids and Mortality among Critically Ill Patients with COVID-19: A Meta-Analysis. *JAMA*, **324**, 1330-1341.
- [10] Organisation Mondiale de la Santé (2023) Traitements contre la COVID-19: Orientations évolutives. OMS, Genève.