

# How COVID-19 pandemic has changed haematological care

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# Abstract

**Background :** Datas from China suggest that patients with cancer have more severe outcome in case of covid-19 infection. Patients with haematological disease have often immunosuppression, due to the underlying disease and to their treatment.

**Methods:** We recorded the consecutive patients usually treated in our haematology department diagnosed with COVID-19 infection between March 10th to April 30th. To evaluate the impact of the pandemic, we compare the activity of our department during two twenty working-days periods: March 20th to April 17th (“Covid month”) and February 18th to March 16th 2020 (“Covid-free month”).

**Results:** Fifty patients treated in our haematology department had a COVID-19 infection, diagnosed with PCR or CT-scanner. Half of them were still on chemotherapy treatment, 30% were on survey after treatment and 20% were on a “watch and wait” strategy. Sixteen patients ( 30%) evolved to an acute respiratory syndrome with a fatal outcome in ten cases. (20%).

The severity of the disease prompted us to change the organization of our department to protect our patients. We followed international recommendation and delayed non urgent procedure. this allowed a reduction of 10% of our activity. Moreover, we managed to treat 25% of our patients coming usually in outpatient clinic with tele-health. Thanks to hospital-at-home, these patients could receive their treatment and stay safe at home.

**Conclusion:** This retrospective study give an insight of how covid-19 outbreak will change cancer care.

## Background

On March 11th, 2020, the WHO characterised COVID-19 as a pandemic (1). To limit viral spread, the French Government implemented a lockdown starting on March 16th (2). Haematological physicians had to face a double challenge: protecting their patients from infection, without impairing the prognosis of the haematological disease (3).

The aim of this study is to evaluate the impact of COVID-19 for patients treated in our haematology department during the pandemic outbreak. First, we recorded the cases to better characterize the outcome of the patients. Then we compare our activity during two twenty working-days periods: March 20th to April 17th (“Covid month”) and February 18th to March 16th 2020 (“Covid-free month”). We analysed how we managed to maintain cancer care, thanks to tele-health and hospital-at-home (HAH).

## Methods

### 1. COVID-cases record

Patients were recorded between March 9 and April, 2020. We included all consecutive adult patients with a hematologic disease and a COVID-19 infection. Diagnosis should be based on a on a real-time RT-PCR

assay of a specimen collected on a nasopharyngeal swab, or suspected on a chest CT-scann according to recommendation (4) . Every patients had more than 10 days of follow-up. Demographic feature and outcome were reviewed in medical record. Each patients were given an appropriate information.

## 2. Impact of COVID-19 on our organization

Datas on our activity were collected, based on AGATHE ® software and on medical record.

## 3. Ethics and consent to participate

Each patient gave a verbal informed consent about this retrospective, non-interventional study. According to national regulation, this is a non-opposition procedure, after they receive a written information about the study. The study was approved by our institutional review board CERAPHP5.

# Results

Cochin Hospital is an academic hospital in Paris which receives patients from all Ile-de-France region, much impacted by COVID-19 (5). During “Covid month”, we recorded 80 hematology patients infected by COVID-19 (Table 1). Patients were predominantly men, more than 65 years old.

Table 1  
Patients' characteristics

	<b>N = 50</b>
Age, median (range)	68 (43–91)
Sex ratio (M/F)	1.82
Pathology, N (%)	17 (34%)
Plasma cell disorder	13 (26%)
Indolent lymphoma/CLL	5 (10%)
Hodgkin lymphoma/large B cell lymphoma	9 (18%)
Acute myeloblastic leukemia or MDS	5 (10%)
MPN	1
Acute lymphoblastic leukemia	
Under hematologic treatment, N (%)	25 (50%)
Neutropenia < 1000/mm <sup>3</sup> , N (%)	7 (14%)
Intensive care, N(%)	7 (14%)
Death	10 (20%)

Patients were mostly followed for an haematological malignancy (70%), the most frequent was multiple myeloma (34%). Half of them were currently under treatment but not neutropenic at the time of infection (14%). Half of them were still on chemotherapy treatment, 30% were on survey after treatment and 20% were on a “watch and wait” strategy

Three patients were already hospitalized at the time of diagnosis. Sixteen others patients were hospitalized for covid-19, including nine patients in intensive care unit. Sixteen patients (30%) evolved to an acute respiratory syndrome with a fatal outcome in ten cases. (20%). Among patients who died from COVID-19 infection, the median age was older: 80 years-old (range: 64–90).

Our past experience of flu, and the severity of some cases prompted us to insist on non-pharmaceutical intervention to prevent spread of COVID-19 (6). The organization of haematological ward, consultations and outpatient’s clinic were transformed (Fig. 1), according to recommendation(7).

Regarding the consultations, we performed tele-appointment for the large majority of patients in accordance with social distancing measures (8).

In the inpatients sector, six autologous transplants for multiple myeloma (MM) were postponed and only one was maintained for plasmablastic MM. We maintained all other hospitalizations, but visitors were not allowed to come in hospital.

In the outpatient clinic, we largely modified our organization. In a covid-free period, the outpatient clinic receives about 370 patients a month for immunotherapy or chemotherapy treatment (85%), transfusion (12%) or diagnostic procedure (3%).

Firstly, we postponed bone marrow biopsies and treatment initiations when possible, mainly for low-grade B-cell lymphoma and non-symptomatic MM. We reduced our activity by about 10% in this period.

Secondly, the patients’ journey was adapted to limit the spread of COVID-19 inside the clinic and the risk of nosocomial infection. Patients were not allowed to be accompanied and staff member wore protective equipment (8). Every patient was called two days before by a nurse to document any history of fever, cough or contact with subject affected by COVID-19. Patients were checked again for symptoms and temperature when they arrived and directed straight to their room.

Thirdly, we assessed the risk-benefit of each treatment for each patient. Haematological patients are considered high-risk in this pandemic because of the immunosuppression due to their disease and treatment (9). Specific algorithms have been implemented by cooperative groups to adapt treatment (10). In accordance with these recommendations, we created a weekly staff including doctors, a nurse and a secretary to decide if each treatment should be cancelled or done. If treatment was maintained, we have chosen to treat in the outpatient clinic only patients requiring long parenteral treatment or with a complex decision, which needed a clinical examination. Other patients received treatment outside our outpatient clinic (“beyond the walls”), e.g at home or in another hospital.

Among the 36 patients cancelled for IV/SC treatment, cancellation was related to COVID-19 in 13 patients: 7 were infected, 1 was in contact with a suspected case, and 5 were stranded abroad. In 23 patients, cancellation was planned to avoid immunosuppression. This concerned mainly maintenance treatment for patients in good response: Multiple Myeloma (n = 15) and small B-cell lymphoma (n = 7), acute lymphoblastic leukaemia (n = 1) In 19/36 patients with cancellation, oral treatment was maintained (Imids n = 15, Venetoclax n = 2, Purinethol/Methotrexate n = 1, Ibrutinib n = 1). These medications were sent by the hospital pharmacy to their community pharmacy after a tele-appointment.

Fifty-six patients received their IV/SC treatment “beyond the walls”. The Hospital at Home programme (HAH) usually dispense parental chemotherapy in our patients from the second injection per cycle for subcutaneous or short intravenous treatment. In this period, treatment was done at home from the first injection for 42 patients: 25 patients received subcutaneous 5-Azacitidine for myelodysplasia or acute leukaemia, 14 were treated for MM (subcutaneous Bortezomib n = 8, intravenous Daratumumab n = 2, intravenous Carfilzomib n = 4), 1 received intravenous Brentuximab. Moreover, 2 patients received palliative care at home to avoid hospitalization (11) – which implicates to separate families. The HAH managed to ramp up its activity in this troubled period.

Eleven patients living outside the Ile-de-France region, where HAH was not present, were treated at their local general hospital.

Finally, three COVID-19 positive patients were treated in a COVID-ward.

During “Covid-free month”, we received 386 patients (mean 19.3 patients/day). During “Covid month”, we received 249 patients (12.5/day) but managed 92 additional patients with tele-health: cancellation n = 36, “beyond the walls” n = 56. This resulted in a total of 341 patients (mean 17/day). Every patient with a change in the treatment administration had a tele-appointment with the doctor to check for symptoms, signs of relapse and results of their blood test. The associated oral treatment was prescribed, and the next visit was re-scheduled. Overall, tele-health represented 25% of our outpatient clinic activity. Every staff member had to be mobilized for the continuum of care of the patients.

## Discussion

Our datas on COVID-19 cases are limited because only symptomatic patients were screened for COVID-19 and we probably only collected the most severe cases. However it is concordant with other series (12), and confirmed that COVID-19 is severe for patients treated for a haematological disease. As already described we report a high frequency of patient with multiple myeloma. Haematological department should stay covid-free and social distancing should be strict.

The reorganization of the outpatient clinic have limited our clinical activity during this period. We could face a staff reduction because of quarantaine and also let nurses work in ICU or covid-ward if necessary. However, even if ‘face-to-face “ appointments were reduced and some treatment were cancelled, the organization was time consuming. Everyone was mobilized: caregivers for the patient’s journey,

secretaries for re-scheduling, physician and nurses for treatment and coordination, and pharmacist to deliver most of the treatments home. The home hospitalisation staff managed to increase very quick its activity in this troubled period.

## Conclusion

We present impact of the pandemic on both our organization and our patients. Share of experience from other countries was very important (13). This study gives an insight on how this crisis can modify haematological care: an increasing place for tele-health (14) and a larger reliance on home hospitalisation structures. However it is necessary to have previously developed the administration of anticancer drugs at home, and this not the case in the whole territory.

## Abbreviations

**HAH**: Hospital At Home

**MM**: Multiple Myeloma

## Declarations

**Ethics approval and consent to participate** : Each patient gave a verbal informed consent to participate and for publication. According to national regulation, this is a non-opposition procedure, after they receive a written information about the study. **These patients have not been reported in another submission.**

**Consent for publication**: The patients gave a verbal informed consent for publication

**The study was approved by our institutional review board** : comité d'éthique et de la recherche APHP.5, Université Paris-Descartes)

**Availability of data and material** : All data generated or analysed during this study are included in this published article. Materials are available in patient's medical record

**Competing interests** :The authors have no conflict of interest to declare

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### Author contributions

**Conception and design**: GF, PF, MV

**Patient's management** : GF, PF, JD, CB, DB, LW, BDF, MV

**Coordination and organization** : NL, HI, FA, SB

**Treatment dispensation:** BMM, AZ, JZ

**Collection and assembly of data:** GF, PF, MV

**Data analysis and interpretation:** GF, PF, JD, CB, DB, LW, BDF, MV

**Manuscript writing:** GF, MV

**All authors have read and approved the manuscript**

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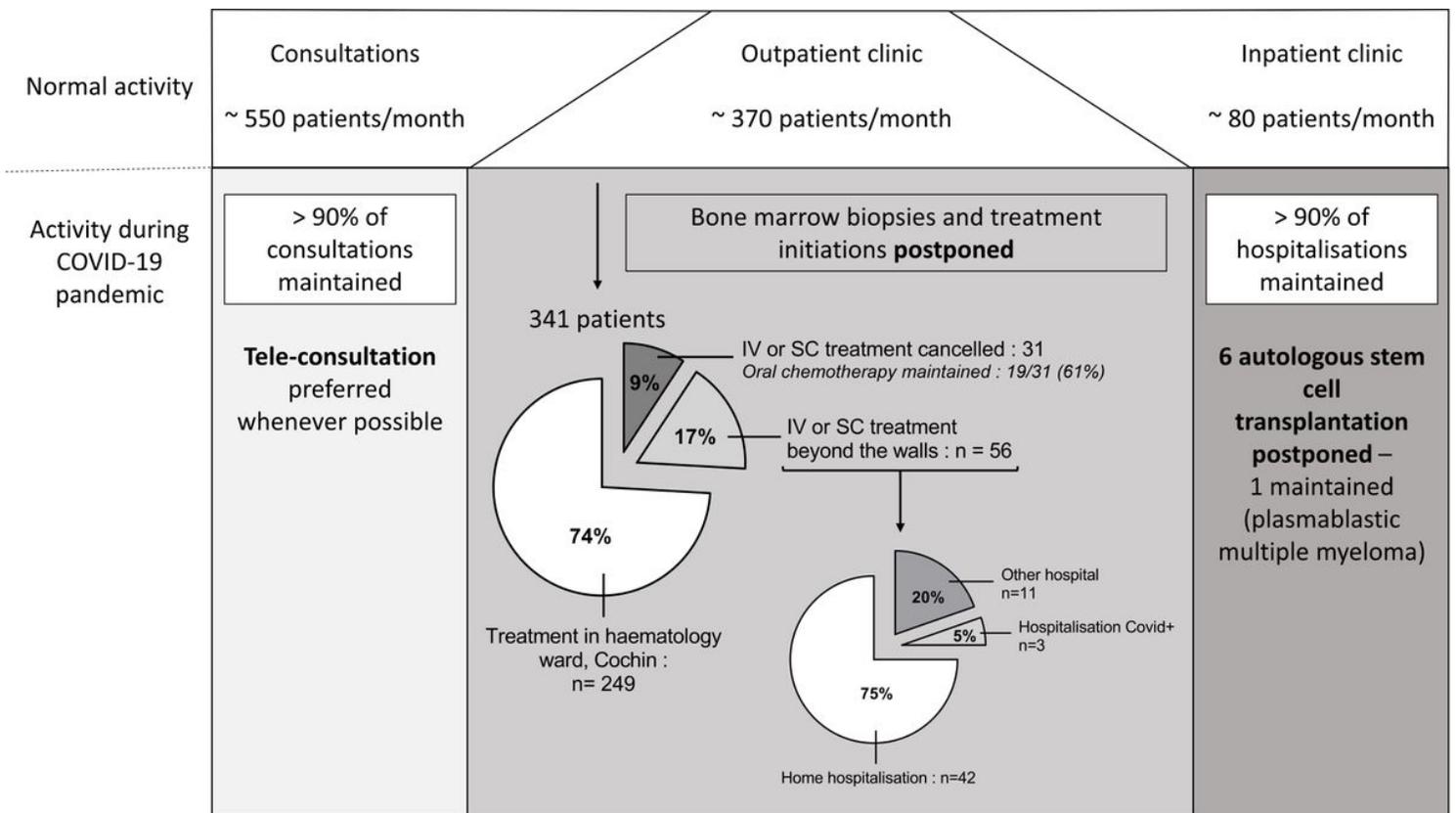
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## Figures



**Figure 1**

How we reorganized our activity during the COVID-19 pandemic