Impact of the first lockdown for the COVID-19 pandemic on the laboratory diagnosis of hematological malignancies

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Objectives: The COVID-19 pandemic affects (early) diagnosis of cancer and follow-up of oncology patients. To slow down the spread of the disease, Belgian faced a first lockdown starting on March 14th 2020. We report the impact of this lockdown on the diagnosis of hematological malignancies based on microscopic examination of bone marrow (BM) aspirates and immunophenotyping of peripheral blood (PB) samples in our center.

Method: Data between February 1st and July 31st 2020 were retrospectively collected. This 6 month timespan was subdivided in 5 intervals based on hospital clinical activities. A 'pre-lockdown phase' (01/02/2020-13/03/2020) with normal hospital activities. The 'lockdown phase' (14/03/2020-10/05/2020) where non-urgent consultations were replaced by tele-/video-consults or postponed. In the '50% activity phase' (11/05/2020-07/06/2020) and '75% activity phase' (08/06/2020-31/06/2020) non-urgent consultations took place again, but limited to 50% and 75% of the full capacity respectively. Finally, a '100% activity phase' (01/07/2020-31/07/2020) with normal activities.

Results: During the 5 phases starting from 'pre-lockdown' to '100% activity', an average of 95.3, 86.5, 101, 100.6 and 106 BM samples per month, respectively, were taken. The decrease during 'lockdown' was not statistically significant. During the 5 intervals, between 62% and 69% BM punctures were taken in follow-up of a known malignancy, 13% to 18% were diagnostic punctures showing a new malignancy, and 16% to 25% of the BM punctures were screenings showing no morphological evidence of a malignancy. During 'lockdown', the highest numbers (69%) of follow-up samples were seen, and 15% showed a new malignancy. However, the differences in the clinical indications between the different phases were not significant (p=0.50). Acute myeloid (AML) and acute lymphoblastic (ALL) leukemia compromised 38% of all new diagnosis in 'lockdown' *versus* 26% in 'pre-lockdown' and 28% in the '50% activity phase' (not significant (p=0.49)). Diagnosis of myeloproliferative neoplasms and plasmacell neoplasms were reduced during 'lockdown' counting for 27% of all new diagnosis, while in all other intervals, this was up to 40% (not significant (p=0.66)).

Mature B-cell malignancies (MBL, CLL and NHL) were diagnosed by flow cytometric immunophenotyping of PB samples. There were 13.3, 5.5, 21, 16, and 14 new B-cell lymphoproliferative disorders per month starting from the 'pre-lockdown' to the '100% activity phase', respectively. These differences were statistically significant (p=0.004) with a pronounced drop in new diagnoses during 'lockdown' followed by an increase when clinical activities were resumed. Reduction in lymphoproliferative diagnosis during lockdown was mainly due to a significant decrease in MBL cases, both low count and high count (p=0.007), while this effect was not seen for CLL and other NHL (p-value not determined due to limited sample size). No clear differences were noted between '50% activity phase', '75% activity phase' and '100% activity phase' for MBL, CLL and other NHL.

Conclusions: Although the COVID-19 pandemic affects early diagnosis of many cancers, we did not see a significant impact on the diagnosis of acute hematological neoplasms (AML and ALL) in our center. However, due to the COVID-19 lockdown, non-acute hematological malignancies involving (asymptomatic) premalignant B-cells disorders, were delayed.