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Acute Myeloid Leukemia during the COVID Pandemic: Impact and the Indian Experience

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The coronavirus (COVID -19) pandemic posed critical challenges for public health, research, diagnosis, and treatment globally. Beyond the existing challenges in the management of Acute Myeloid Leukemia (AML) in India; we hypothesized that the COVID pandemic would lead to a collateral impact on the management of AML in our setting. Identifying with this goal; we analyzed data utilizing the Indian Acute Leukemia research database [INwARD] established in 2018 by the Hematology Cancer Consortium (HCC).

Retrospective analysis of data for adult AML collected from 17 member institutions through a central online data management system was compared through two time periods: the pre-COVID period (1st January 2018 through 31st March 2020) and the COVID pandemic period (1st April 2020 through 31st August 2021). Survival and follow-up data were analyzed as on 31st May 2022.

A total of 2998 patients, were registered (2003 in the pre-COVID period and 995 during the COVID pandemic), Fig 1. The average patient registrations per month were 74 ± 11 and 59 ± 19, $P < 0.05$ respectively. In comparison, 978 (28.7%) patients in the pre-COVID period and 612 (61.5%) patients during the COVID pandemic received treatment. In those who underwent treatment during the pandemic; 357(58.5%) received intensive (7+3 based) induction and 210 (34.4%) received hypomethylating agent-based therapy. They included 165 (26.6%) patients who had concurrent infections needing antibiotics at presentation. 336(54.9%) patients developed febrile neutropenia, with an organism isolated in the blood in 110 (32.7%) patients. Fungal infection was noted in 126 (20.5%) patients; proven in 8(6.3%). There were 87 (14.4%) patients needing admission to an intensive care unit. Inotrope was needed in 57 (9.3%) patients and mechanical ventilation for 38 (6.2%) patients. 172 (28.1%) patients received further consolidation; with

high (3g/m2) dose cytarabine in 127 (73.8%) of them. Additionally, 52 (8.5%) patients underwent a stem cell transplant.

In comparison to patients receiving treatment in the pre-COVID period; the demographic features, rates of documented bloodstream infection, ICU stay, requirements for mechanical ventilation, and use of inotropes were comparable to patients during the pandemic. However, we noted that the differences [pre-COVID vs during the pandemic] in the use of hypomethylating agents [298 (30.4%) vs 210 (34.3%)], targeted drugs [27 (2.7%) vs 43 (7.0%)] febrile neutropenia [621 (63.5%) vs 336 (54.9%)], fungal infections [297 (30.3%) vs 126 (20.5%)], concurrent infection [325 (33.2%) vs 165 (26.6%)] and use of central venous access [598 (61.1%) vs 310 (50.6%)] were statistically significant. Among patients who underwent transplants; the intensity of conditioning, remission status, and GvHD were comparable.

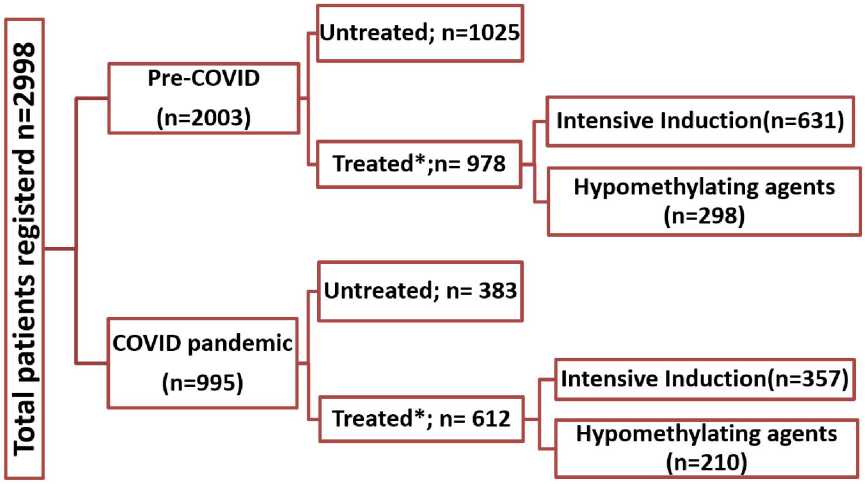
The median overall survival (OS) following diagnosis was 549 days and the median event-free survival (EFS) was 363 days for the entire cohort. The median overall survival (OS) during the pre-COVID period was 552 days and 529 days during the pandemic ($p = 0.952$), Fig 2. The corresponding median EFS was 363 days and 364 days respectively ($p = 0.679$).

In our experience, although delivering care was challenging; the outcomes for patients who received treatment for AML during the COVID pandemic was comparable with the pre-COVID period. Travel disruption or patient reluctance to visit a hospital during the pandemic might have led to the reduction in patient registrations, though a higher proportion of them received treatment. We hypothesize that the universal embracing of general infection control policies targeting COVID-19 might have driven the observed reduction of fungal and concurrent infection.

Our data suggest that continuing standard of care in treatment-emergent AML even during the pandemic is feasible and intensive induction

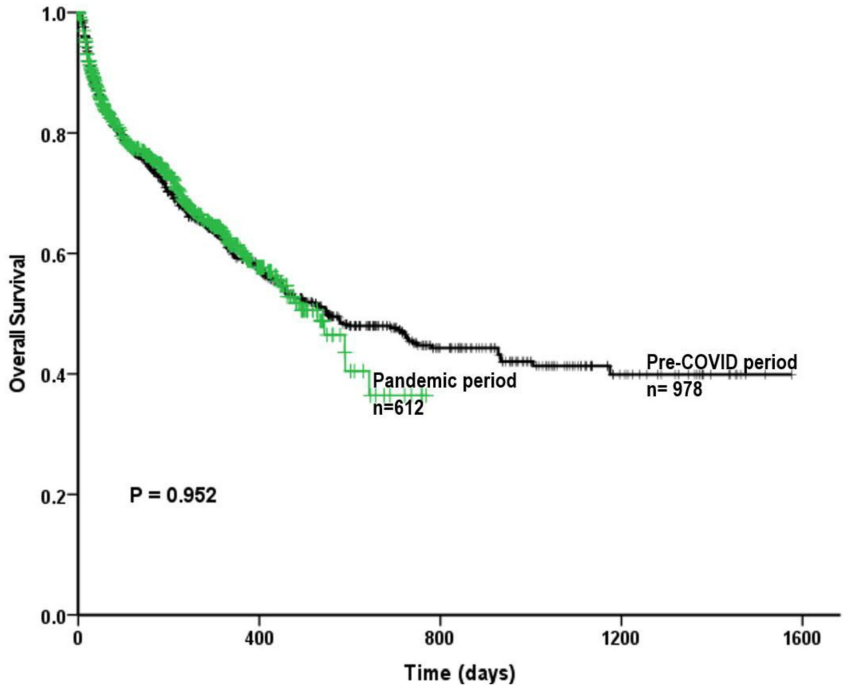
chemotherapy and transplant should still be offered for eligible patients.

Fig 1: Patient distribution



*Treatments also include non-intensive low dose cytosine

Fig 2: Overall Survival in patients undergoing treatment for AML



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