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Acute Myeloid Leukemia: The Race to Diagnosis and Treatment!

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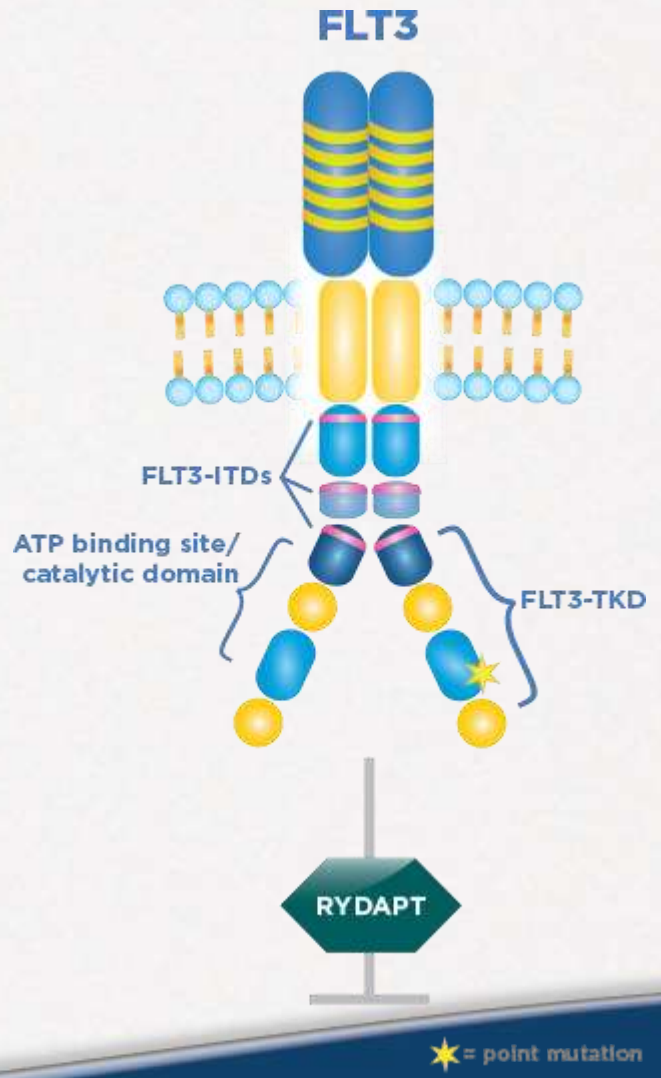
Introduction

Acute myeloid leukemia (AML) is the most common acute leukemia affecting adults and one of the hematologic emergencies that require prompt treatment.

AML is typically categorized based on combinations of mutations and/or altered expression of certain genes

FLT3 mutation is associated poor prognosis and early relapse in AML. Midostaurin is a multi-kinase inhibitor, when added to induction 7+3 chemotherapy starting at day 8-21, improves the response rate and disease-free survival.

Genetic profiling should be performed on newly diagnosed patients with AML. Particularly it is important to get the result of FLT3 mutation before day 8 of induction.



Purpose

- Evaluate our institution efficiency obtaining the appropriate molecular studies in AML cases at the time of diagnosis.
- Time is very sensitive in the management of acute myeloid leukemia. Induction chemotherapy should be administered once morphologic diagnosis is made and usually before the genetic testing results are available
- It requires high collaboration between the hematologist, pathologist and laboratory staff.
- Once molecular studies are available, the need for targeted therapy will be determined. Next generation sequencing (NGS) is fast and comprehensive method in molecular analysis

Methods

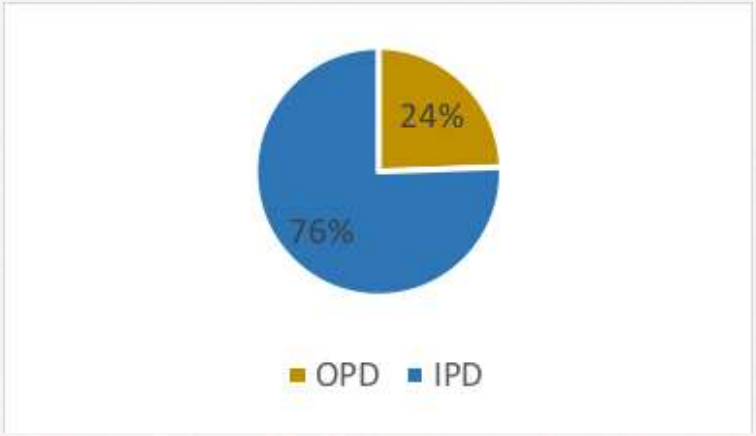
- The electronic medical records were reviewed for all AML cases diagnosed between January 2016 and December 2018.
- Quality measures were defined:
  1. **Average duration between bone marrow biopsy and the morphology results.**
  2. **Average duration between bone marrow biopsy and date of molecular order.**
  3. **Average duration between molecular order and available results.**
  4. **Average duration between induction date and the administering Midostaurin if needed for FLT3 mutated cases.**

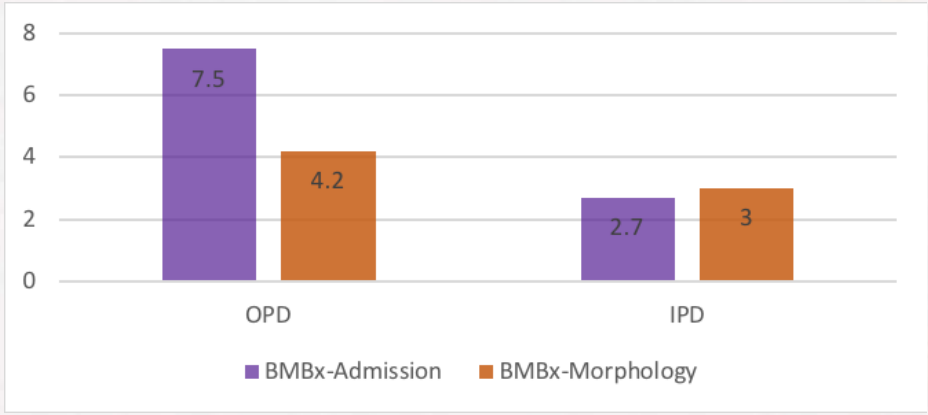
RESULTS

Between January 2016 and December 2018, 86 AML cases were diagnosed and treated in out institution. 76% of cases were diagnosed in the hospital while in 24% diagnosis was in bone marrow biopsy obtained in the clinic.

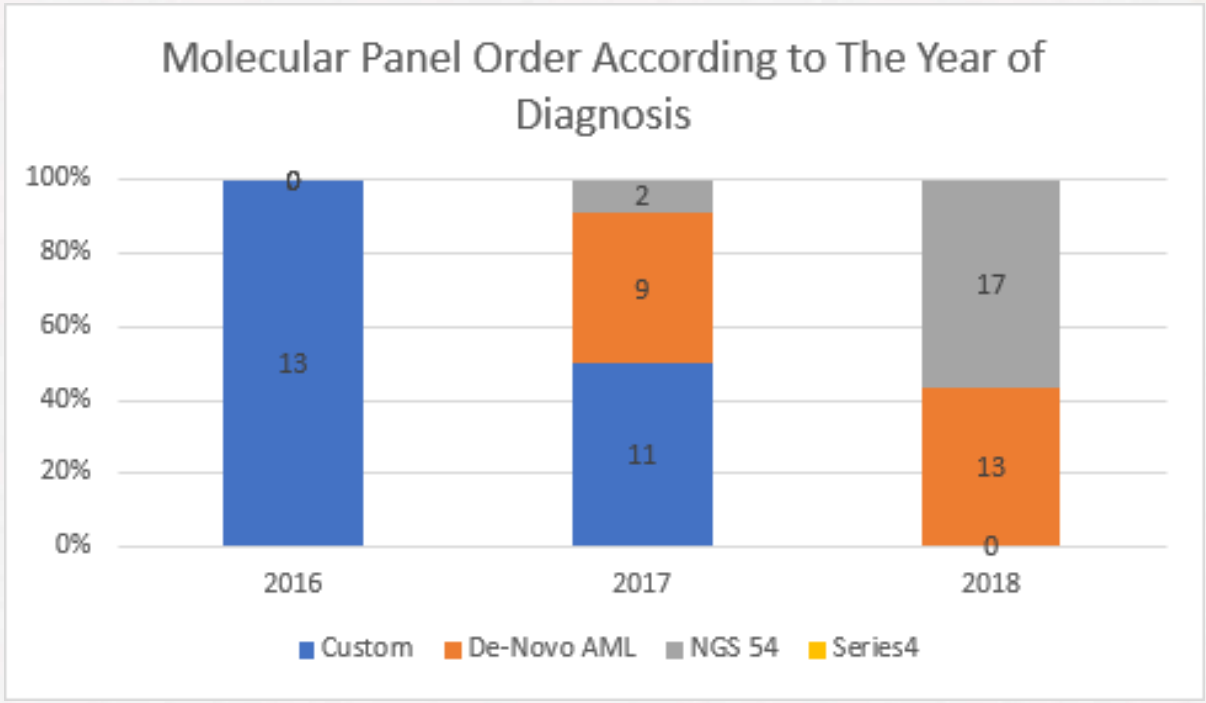
All patients were admitted to the hospital.

Morphology results were reported on average of 3 and 4.2 days in the inpatient and outpatient setting respectively



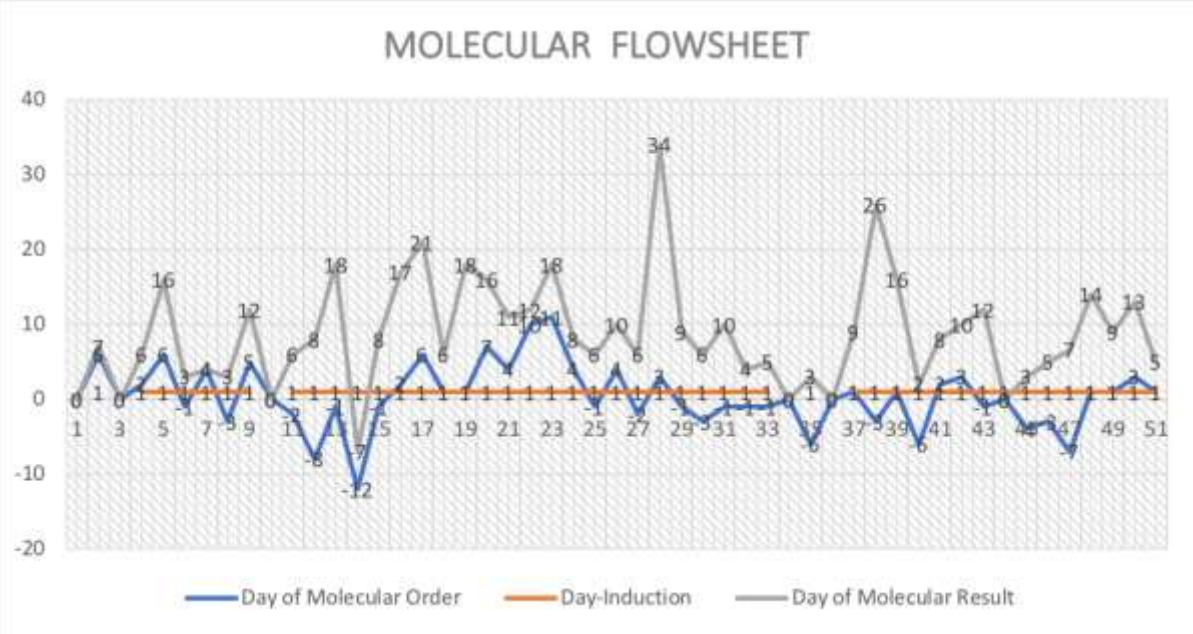


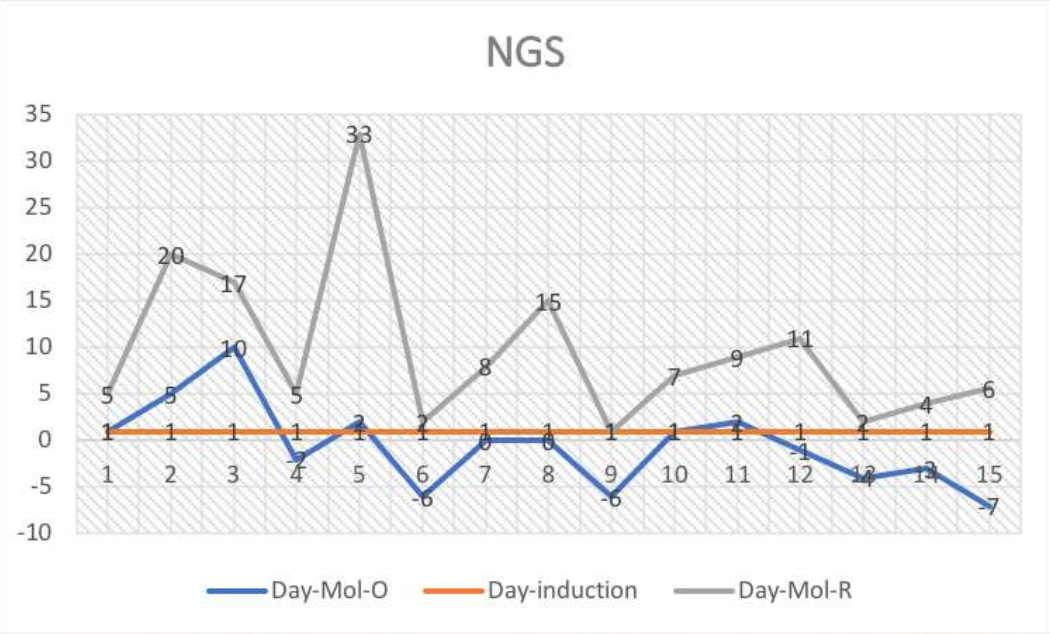
Type of Molecular Study



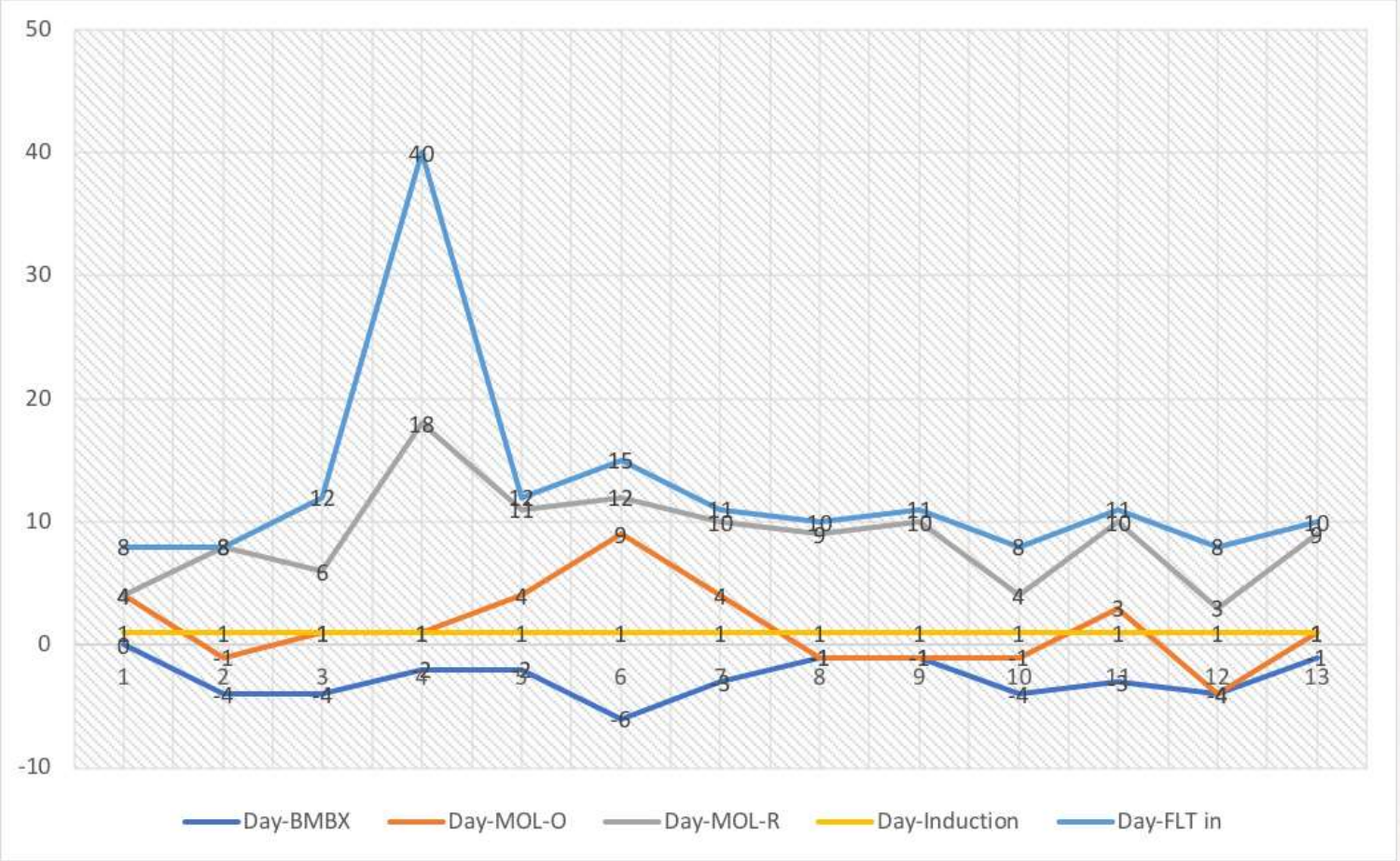
- Molecular studies were obtained in 65 cases
  - NGS panel in 19 cases-
  - De-novo AML in 22 cases
  - Custom in 24 cases

Molecular Study Results Time Range





FLT3 Mutation Positive



- The average time between induction and FLT3 mutation results is 12.38 days
- The average delay in administering the target therapy(midostaurin) is 4.38 days

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Discussion

- Our institution experience has improved in the past 3 years increasing the rate of ordering molecular studies for newly diagnosed AML.
- NGS-54 gene panel is an institutional comprehensive panel includes all gene of interest and includes FLT3 mutation. There has been an increasing rate in ordering this panel; 9 cases in 2017 to 17 cases in 2018
- FLT3 mutation analysis was included in a total of 51 patients over 3 years. However, in 2018, It was included in 29/31 cases which correlates with the clinical use of FLT3 inhibitor

Discussion

- In cases with FLT3 mutation, there is an average 4.38-day delay in administering targeted therapy due to the delay ordering and getting the results in appropriate time manner.
- We suggested the following changes:

  1. Standardize the order by obtaining NGS-54 gene panel on all Leukemia cases at the time of obtaining the bone marrow biopsy

  2. Ongoing discussion between the hematology department and pathology department to improve the communication and ordering pathways

  2. Address the efficacy of these measures in new AML cases diagnosed in 2019.

Conslusion

- Obtaining the genetic profiling is very important prognostic and therapeutic measure in newly diagnosed AML. The presence of FLT3 mutation convey poor prognosis. FLT3 inhibitor, Midostaurin, when added on Day 8 of induction improves the outcomes.
- In our institution experience, there is an average delay of 4.38 days in administering midostaurin in FLT3 mutated AML cases.
- We believe that standardizing the ordering process with obtaining NGS panel on all new leukemia cases will improve and expedite getting the results in appropriate manner

all for you

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