Precipio Spotlight:

Omnia methodology digs deeper to reveal previously undiagnosed CML in patient with a history of CLL to enable targeted TKI treatment, leading to improved patient care

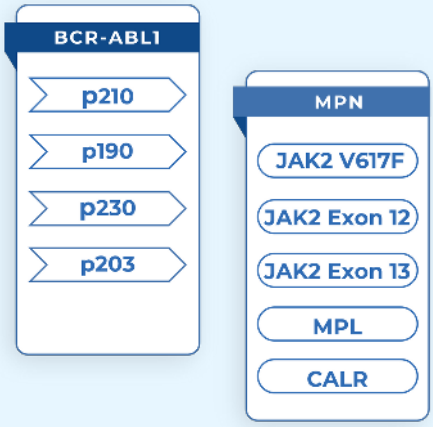
Abstract

This Precipio Spotlight highlights the impact of utilizing Omnia methodology to arrive at an accurate diagnosis. Despite a history of CLL, the presentation of thrombocytosis alongside an elevated WBC raised concerns of an alternative diagnosis, possibly Chronic Myeloid Leukemia (CML). Given the similarities in presentation between CLL and CML, a precise diagnosis was critical for appropriate treatment selection. The expert hematopathology team at Precipio conducted a comprehensive diagnostic workup to elucidate the underlying pathology. Initial assessments included a thorough analysis of blood smear morphology, which revealed features consistent with CML rather than CLL. To confirm the diagnosis, additional testing for CML was initiated. Upon confirmation of CML diagnosis, the patient was promptly initiated on tyrosine kinase inhibitor (TKI) therapy, the standard of care for CML. Regular follow-up assessments were conducted to monitor treatment response.

Case Background

- 75 YO | Female
- History of CLL of B-Cell Type
- Elevated WBC (34K)
- Thrombocytosis unspecified
- Suspicion of CLL relapse

Technology Advantage



Bloodhound BCR::ABL1 and MPN Panels

More Case Studies

Case Work Up and Findings

- **FISH Analysis: Fluorescence in situ hybridization (FISH)** was performed to detect the presence of the Philadelphia chromosome, characteristic of CML. The test results confirmed the presence of the Philadelphia chromosome, supporting a diagnosis of CML.
- **Bloodhound Molecular BCR::ABL1 and ABL1 Resistance Testing:** Molecular testing was conducted to assess the expression of the p.210 breakpoint mutation at 66.804% IS-NCN. The results indicated a high expression level of the mutation, further corroborating the diagnosis of CML.

Follow up and Outcome

- Upon confirmation of CML diagnosis, the patient was promptly initiated on tyrosine kinase inhibitor (TKI) therapy.
- Following TKI therapy initiation, the patient demonstrated a significant reduction in the expression level of p.210 breakpoint mutation to 9.4% IS-NCN upon follow-up evaluation. This substantial decrease in mutation expression indicated the efficacy of the therapy in inhibiting the aberrant signaling pathways associated with CML.

The Precipio Difference:
Through the expertise of Precipio's hematopathology team and the utilization of diagnostic techniques including FISH and advanced molecular testing, the correct diagnosis of CML was established in a patient initially suspected to be experiencing a CLL relapse. This precise diagnosis facilitated the implementation of targeted therapy, leading to significant therapeutic efficacy and improved patient care.

For more information please contact:
contact@precipiodx.com | www.precipiodx.com | Tel: +1.203.787.7888

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203-901-1289

COMPREHENSIVE REPORT

Patient: Jane Doe
DOB/Gender: XX/XX/19XX (75 yrs) - Female
Patient ID/MRN: 12345
Date Collected: XX/XX/20XX XX:XX

Case#: PXX-XXXXX
Status: Final Report
Category:
Neoplastic

Provider: Jane Smith, MD
XYZ Hematology/Oncology
Tel: + 800-123-4567
fax: +800-765-4321

DIAGNOSIS:

Features consistent with chronic myeloid leukemia (CML). See Comment.

COMMENT

Conventional cytogenetic analysis discloses rearrangement involving the long arms of chromosomes 9 and 22, the "Philadelphia chromosome" translocation. FISH with probes specific for CML reveal an abnormal clone with BCR::ABL translocation in 60% of cells analyzed. BCR::ABL1 p210 fusion was detected at 66.804% IS-NCN. A variant mutation of ABL1 is not detected.

All myeloid and lymphoid neoplasms are now classified and named in accordance with the newly revised 2017 version of the WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues.

COMPONENT DIAGNOSES

Biopsy: Hypercellular bone marrow showing features consistent with a myeloproliferative neoplasm (chronic myeloid leukemia CML).

Aspirate: Marked immature (left shifted) granulocytosis, basophilia, atypical megakaryocytic hyperplasia and other features consistent with (stable phase) chronic myeloid leukemia (CML). See Comment.

Flow Cytometry: Aberrant CD56 expression and abnormal pattern of CD11b, CD13, and CD16 expression by granulocytes
No phenotypic evidence of T or B cell lymphoma or increased blasts. See Comment.

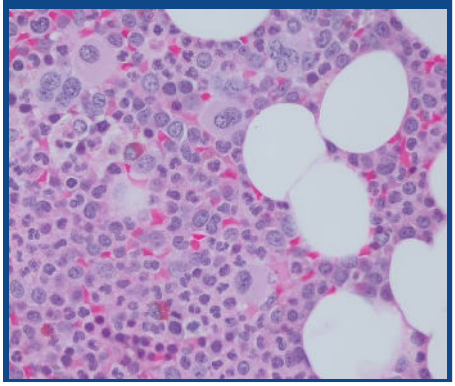
Karyotyping: Abnormal Female Karyotype, see comment.

FISH: Abnormal clone with BCR::ABL translocation in 60% of cells analyzed with probes specific for recurrent abnormalities in Chronic Myelogenous Leukemia (CML)

Molecular: HemeScreen™ MPN results reveal:
- Negative for JAK2 V617F point mutation
- Negative for JAK2 exon 12 mutations
- Negative for JAK2 exon 13 (G571S) mutation
- Negative for MPL W515L/K point mutations
- Negative for CALR exon 9 insertion/deletion mutations

BCR::ABL1:
- BCR::ABL1 p210 fusion was detected at 66.804% IS-NCN
- BCR::ABL1 p190 fusion was detected.
- ABL1 mutation analysis: No variant detected.

Biopsy showing features of CML



CLINICAL DATA

ICD-10: C91.12, D72.829, D75.839, D75.9, Z13.79. Elevated WBC 34K. Chronic lymphocytic leukemia of B-cell type in relapse. Thrombocytosis, unspecified. New diagnosis. New diagnosis.

Received CBC, reported on 04/28/2023: WBC 34.36; RBC 4.40; HGB 12.3; HCT 40.0; MCV 90.9; MCH 28.0; MCHC 30.8; RDW 16.9%; PLT 970; MPV 10.4; LYM 13.4%; GRAN NP; MID NP; MON 2.3%; NEU 64.8%; EOS 1.0%; BAS 4.9%; IMM GRAN 13.6%;(NP = not provided)