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Acute Promyelocytic Leukemia Experience in Kuwait: A 15-Year Nationwide Cohort Study

Nermin Salem MD, Anitha Kunhikrishnan MD, Fatima Khadadah MBBCh FRCPC, Mohan Ram MD, Abdulaziz Hamadah MD, Salem Alshemmari MD, Bilal Alnouri MD, Ahmad Alhuraiji MD.
Kuwait Cancer Control Center, Sabah Health Region Kuwait; [2]Kuwait University, Kuwait

INTRODUCTION

Acute Promyelocytic Leukemia (APML) is a distinct subtype of acute myeloid leukemia characterized by the PML-RARA fusion gene. The introduction of all-trans retinoic acid (ATRA) and arsenic trioxide (ATO) have transformed APML into a highly curable disease, with early mortality now driven mainly by hemorrhagic and treatment related complications .

AIM

To describe the nationwide experience of APML management in Kuwait over 15 years including treatment, complications, remission, relapse, and survival outcomes.

METHOD

Retrospective nationwide cohort of all patients diagnosed with APML in Kuwait between January 2010 and December 2025. Data were obtained from the Kuwait Cancer Control Center and included demographics, clinical presentation, laboratory findings, cytogenetic/molecular confirmation, treatment regimens, complications, response, and survival outcomes. Primary endpoints were overall survival (OS), event-free survival (EFS), and early mortality (within 30 days). Remission was assessed by hematological and molecular response.

CONCLUSIONS

This 15-year nationwide cohort demonstrates excellent outcomes of APML in Kuwait with contemporary ATRA-based therapy. High remission rates, low relapse incidence, and limited early mortality were observed, supporting the effectiveness of current treatment strategies while emphasizing the importance of early recognition and management of treatment-related complications.

RESULTS

Seventy-five patients were identified, including two with prior breast cancer treated with radiotherapy. Median age was 42 years (range 24–77), with a male-to-female ratio of 1.5. Bleeding was the most common presenting feature (66.7%), followed by infection (44%) and symptomatic anemia (36%). Median white blood cell count was 4.53×10⁹/L, hemoglobin 81 g/L, and platelets 20×10⁹/L. Disseminated intravascular coagulation was observed in 18.5%. All patients were positive for t(15;17) by FISH; 97% had detectable PML-RARA by RT-PCR. According to ELN risk stratification, 30.7% were high risk.
All patients received ATRA-based induction: 40% received ATRA-ATO and the remainder ATRA-anthracycline–based regimens. Differentiation syndrome occurred in 40% and induction-related infections in 42.8%. Among evaluable patients, complete hematologic remission was achieved in 98.3%. Early mortality was 6.6%, primarily due to hemorrhage. Relapse occurred in one patient (1.3%). At a median follow-up of 43 months, 68 patients were alive. Median OS was 43 months and EFS 40 months.

Table 1 Baseline characteristics.

Characteristic	Value (N = 75)
Demographics	
Age, years, median (range)	42 (24–77)
Age > 40 years, n (%)	42 (56.0)
Male sex, n (%)	45 (60.0)
Kuwaiti nationality, n (%)	13 (17.3)
Clinical presentation at diagnosis	
Bleeding, n (%)	50 (66.7)
Pulmonary hemorrhage, n (%)	3 (4.0)
Central nervous system hemorrhage, n (%)	1 (1.3)
Infection, n (%)	33 (44.0)
Anemia, n (%)	27 (36.0)
Laboratory parameters, median (range)	
White blood cell count, ×10⁹/L	4.53 (0.4–83)
Hemoglobin, g/L	81 (5–146)
Platelet count, ×10⁹/L	20 (2–148)
Absolute neutrophil count, ×10⁹/L	0.97 (0.04–80)
Prothrombin time, s	18.0 (12.1–26.6)
Activated partial thromboplastin time, s	29.1 (18.5–71.5)
International normalized ratio	1.31 (0.91–2.19)
Fibrinogen, g/L	2.33 (1.03–5.89)
Lactate dehydrogenase, U/L	350 (60–1995)
Risk stratification (Sanz / PETHEMA)	
Low-risk (WBC ≤10 × 10⁹/L, PLT >40 × 10⁹/L), n (%)	10 (13.3)
Intermediate-risk, n (%)	40 (53.3)
High-risk (WBC >10 × 10⁹/L), n (%)	23 (30.7)
Unclassifiable*, n (%)	2 (2.7)
Outcomes	
Differentiation syndrome, n / N evaluable (%)	30 / 71 (40.0)
Significant infection during induction, n / N (%)	32 / 74 (42.7)
Complete remission, n / 67 on standard induction (%)†	64 / 67 (95.5)
Induction mortality on standard induction, n / 67 (%)†	2 / 67 (3.0)
Molecular complete remission, n / 67 (%)†	61 / 67 (91.0)

Figure 1.A OS

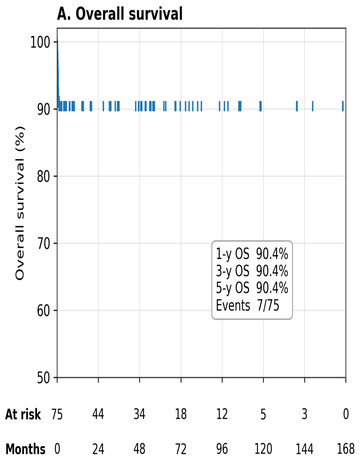
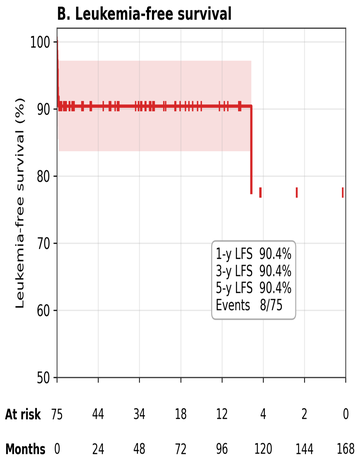


Figure 1. B LFS



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CONTACT INFORMATION

Corresponding author:
Ahmad Alhuraiji, MD MRCP (UK)
Consultant, Department of hematology, Kuwait Cancer Control Center, Sabah Medical District. Tel. no +965 97594447
Email: aalhuraiji@gmail.com

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