THERAPY-RELATED MYELOID NEOPLASMS AFTER RADIOACTIVE IODINE IN THYROID CANCER: A SCOPING REVIEW

Noor A. Aweer[1], Mayss A Dalol[2], Rowan Mesilhy[3] , Ayman Abdullah Dalol[1], Aadhila Abbas Manthiri [4], Abdulrahman F Al-Mashdali[5], Mohammed Abdulgayoom[5], Tareq Abuasab[6], Shehab F Mohamed [5*]

[1]College of Medicine, Qatar University, Doha, Qatar. [2] School of Medicine, The University of Jordan, Amman 11942, Jordan. [3]Internal medicine department, Hamad Medical Corporation, Doha, Qatar. [4] College of Pharmacy, Qatar University, Doha, Qatar. [5]Haematology Department, National Center for Cancer Care and Research (NCCCR), Hamad Medical Corporation, Doha, Qatar. [6]Department of Internal Medicine, Section of Hematology, Baylor College of Medicine, Houston, TX.

INTRODUCTION

Radioactive iodine (RAI) is widely used in differentiated thyroid cancer (DTC), but its leukemogenic potential remains debated. We aimed to characterize the clinical, cytogenetic, and epidemiologic features of therapy-related myeloid neoplasms (t-MN) following RAI exposure.

METHOD

A scoping review was conducted using PRISMA-ScR methodology. PubMed and Embase were searched through October 2025. Case reports, case series, and cohort studies reporting AML/MDS after RAI were included. Data on latency, cumulative dose, cytogenetics, and outcomes were extracted.

CONCLUSIONS

RAI-associated t-MN represents a rare but reproducible clinical entity characterized by early latency, heterogeneous biology, and a dose-dependent risk signal. These findings support risk-adapted use of RAI and long-term hematologic surveillance without compromising its established therapeutic benefit.

RESULTS

Twenty-five studies were included, comprising 19 case reports/series with 28 individual RAI-associated t-MN cases and 6 retrospective cohort studies. Among the 28 individually reported cases, median latency from RAI exposure to t-MN was 2.9 years (range, 0.8–13), with most cases occurring within 5 years. Cumulative RAI doses ranged from 80 to 1730 mCi (median, 261 mCi), with several cases occurring after 100–150 mCi. AML predominated, accounting for 27/28 cases. Cytogenetic findings were heterogeneous and included complex karyotypes, chromosome 5q/7 abnormalities, trisomy 8, t(15;17)/PML::RARA, and inv(16)/CBFB::MYH11. Across the 6 cohort studies, RAI exposure was consistently associated with increased AML/MDS risk compared with non-RAI or expected population rates, with reported effect estimates including HR 1.79–2.21, SIR 2.20, and RR estimates up to 3.3. Dose-response evidence was strongest in the Korean cohort, where leukemia risk became significant from ≥3.7 GBq (~100 mCi) and increased linearly with cumulative exposure.

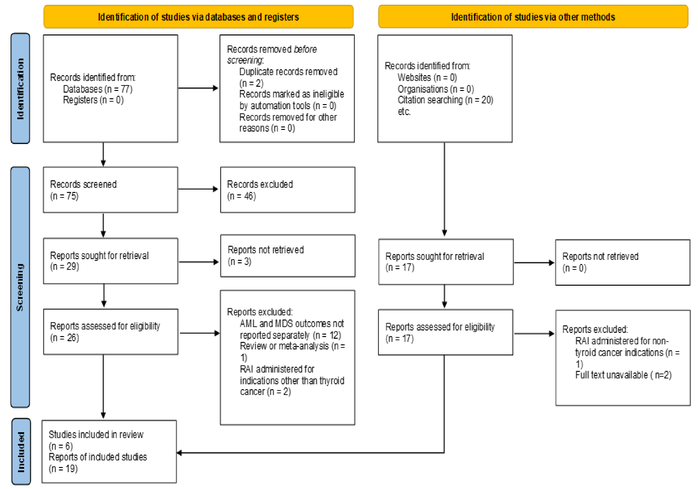

Figure 1: PRISMA Flowchart

CONTACT INFORMATION

Tareq Abuasab;
Department of Internal Medicine, Section of Hematology, Baylor College of Medicine, Houston, TX.

Tareq.abuasab@bcm.edu

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