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THROMBOSIS IN ACUTE LYMPHOBLASTIC LEUKEMIA: IDENTIFYING RISK FACTORS IN ADULTS

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INTRODUCTION

Acute lymphoblastic leukemia (ALL) has historically been associated with an **increased risk for venous thrombotic events** (VTE)[1]. Risk factors have been studied and defined for pediatric populations with this disease[2,3], however, information about risk factors for adults remains limited.

With the increased use of **asparaginase** in adults after the adoption of pediatric-inspired regimens (PIR), the depletion of antithrombin represents a risk of thrombosis[4]. Its role as an independent risk factor for thrombosis in adults has yet to be determined.

AIM

The primary objective of our study was to identify **risk factors for thrombosis** in a cohort of **adult patients with ALL**.

We also aimed to determine the clinical characteristics of patients with ALL and thrombosis.

METHOD

We conducted a retrospective, single-cohort, nested case–control study in a Mexican tertiary care hospital of adults with diagnosis of ALL between April 2005 and September 2023.

We divided our patient population among those who developed VTE and those who did not. We compared baseline characteristics among both groups, determine risk factors and cumulative incidence of thrombosis by Kaplan-Meier curves and determined the associated factors by Cox regression (univariate and multivariate analysis.

RESULTS

A total of 364 patients were enrolled, with a median age at diagnosis of 31 years (16-79). The most common comorbidities were diabetes mellitus (15.7%) and hypertension (13.2%).

The incidence of venous thromboembolism (VTE) was 7.97%, with **deep vein thrombosis (DVT)/pulmonary embolism (PE)** being the most frequent subtype (54.8%) [Figure 1]. The independent risk factors for VTE were previous cancer history (OR 3.84 [95% CI 1.14-12.09], p=0.0395), port catheter use (OR 31.93 [95% CI 3.02-337.8], p=0.004), and invasive mechanical ventilation (OR 2.36 [95% CI 1.06-5.28], p=0.037).

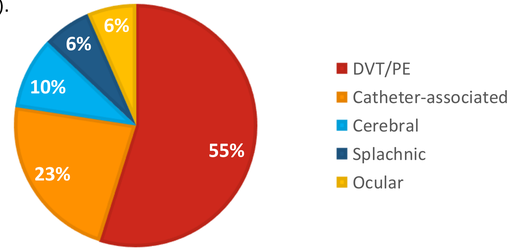


Figure 1. Distribution of thrombosis sites

Although the use of asparaginase was not significantly associated with a higher risk of VTE (OR 1.54; 95% CI, 0.70-3.40), all splanchnic and 2 of the 3 cerebral thromboses occurred in patients receiving asparaginase.

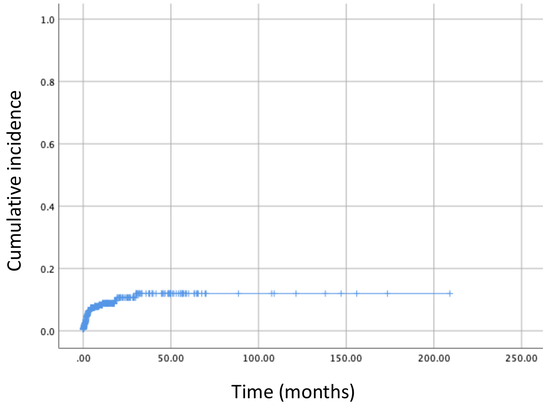


Figure 2. Cumulative incidence of thrombosis among patients with ALL

The cumulative incidence of thrombosis is shown in Figure 2.

Median time from diagnosis to thrombosis was 1.8 months (95% CI, 0-29.9), and 69% of VTE events occurred within the first 3 months after diagnosis [Figure 2].

The factors associated with a higher cumulative incidence of thrombosis are shown in Table 1.

Factor	Univariate (HR, CI 95%)	Multivariate (HR, CI 95%)
Overweight or Obesity	2.18 (0.94-5.06), p=0.079	1.91 (0.80-4.57), p=0.145
Cancer History	3.413 (1.05-11.06), p=0.054	3.84 (1.14-12.09), p=0.03
Port catheter	38.54 (3.87-383.65), p=0.002	31.93 (3.02-337.8), p=0.004
Invasive Mechanical Ventilation	2.39 (1.11-5.15), p=0.032	2.36 (1.06-5.28), p=0.037

Table 1. Cox Regression Hazard Ratios of prognostic factors associated with accumulated incidence of thrombosis.

CONCLUSIONS

- Our results indicate that a history of cancer, use of a port catheter, and invasive mechanical ventilation are associated with an increased risk of thrombosis in adult ALL patients.
- Most thrombotic events occur early after diagnosis (median 1.8 months).
- Asparaginase use was not associated with a higher incidence of VTE.
- Additional prospective studies are needed to determine the role of thromboprophylaxis in ALL patients with risk factors for thrombosis.

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