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Introdução: As Síndromes Mielodisplásicas (SMD) são doenças hematológicas clonais da medula óssea, caracterizadas por produção inadequada de células sanguíneas e alterações na medula óssea. O prognóstico das SMD é influenciado por fatores como anomalias cromossômicas e a presença de células blásticas, além das características individuais dos pacientes. Cerca de 20% a 25% dos casos podem evoluir para Leucemia Mieloide Aguda (LMA). **Relato de caso:** Paciente, sexo masculino, 75 anos, previamente hipertenso em uso de losartana e hidroclorotiazida procurou atendimento devido a astenia, indisposição, fadiga, inapetência e febre vespertina associada a um quadro de bicitopenia (Anemia + Leucopenia) há 6 meses. Exames: 20/08/2022: Hemácias 2,07; Hemoglobina 7,1; Hematócrito 21,7; VCM 104; RDW 16,5; Leucócitos 5830 (53% Segmentados, 47% de linfócitos); plaquetas 48.000. Foi extensamente investigado, sorologias (hepatite B, C, HIV, HTLV, VDRL) negativas. Função tireoidiana normal. FAN não reagente. Fator reumatoide não reagente. Eletroforese de proteínas sem pico monoclonal. Realizado mielograma com seguinte resultado: displasia multilinhagem com 4% de blastos e presença de sideroblastos em anel. Cariótipo hematológico: 46,XY,del(5)(q11.2),del(7)(q11.2q32),+8,add(8 (q24.3), der(10)t(10;12)(q22;q15),-12,add(15) (q22),del(16)? (q12-13),add (17)(p11.2)[6]/44, idem,-3,-add(8)[4]/45,idem,-3,-add(8),+mar [1]/45, idem,-3,-add(8),+? 22[1]/47,XY,+8,t(8;13) (p11.2;q12)[1]/ 46,XY,t(2;14)(p11.2;q32)[1]/ 46,XY[6]. Biópsia de medula óssea compatível com mielodisplasia. Realizado painel genético para neoplasia mieloide (NGS) e identificado mutação TP53. Iniciado quimioterapia com Decitabina. Paciente evoluiu com melhora das citopenias, sem novos episódios de febre. Hemograma após 5 ciclos: 20/03/2023: Hemácias 2,97; Hemoglobina 8; Hematócrito 24; VCM 81; RDW 12; Leucócitos 4400 (Segmentados 38%, Eosinófilos 2%, Linfócitos 57%, Monócitos 3%); Plaquetas 66.000. Em outubro de 2023, o paciente apresentou piora clínica, com novos episódios de febre, disfunção renal, queda da hemoglobina e contagem de plaquetas. Realizado novo mielograma com imunofenotipagem com resultado de 78,3% de blastos mieloides (CD45++ / MPO- / CD34-/ +(23%) / CD117+ /HLADR++ / CD13-/++ / CD33+ / CD71- / CD7+ + / CD19- / CD11b- / CD16- /CD64- / CD14- / CD35- / IREM-2- / CD36- / CD10- / CD105- / cCD79a- /cCD3- / CD3-) compatível com LMA. Paciente evoluiu com piora rápida, rebaixamento sensório com necessidade de intubação orotraqueal e terapia de substituição renal com óbito 1 semana após o diagnóstico. **Discussão:** A LMA secundária é frequentemente associada a um cariótipo complexo e mutações genéticas específicas, como a TP53, de modo a refletir em uma instabilidade genômica além de fornecer insights sobre a evolução clonal da doença. O cariótipo complexo é uma característica comum em LMA secundária a SMD e é definido por mais de três anomalias cromossômicas. Tais anomalias estão associadas a um pior prognóstico, como evidenciado nesse relato. **Conclusão:** Este relato de caso ilustra os desafios no tratamento da LMA secundária a SMD, exacerbados por um cariótipo complexo e mutação TP53. Essas características genéticas complicaram o diagnóstico e tratamento, oferecendo insights sobre a agressividade da doença e a necessidade de abordagens terapêuticas personalizadas. Os achados reforçam a importância da avaliação genética e do desenvolvimento de estratégias de tratamento específicas.

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INFECTIOUS COMPLICATIONS IN PATIENTS WITH MYELODYSPLASTIC SYNDROMES AND CORRELATED MYELOID NEOPLASM TREATED WITH AZACITIDINE: AN UNICENTRIC COHORT

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Introduction: Although the survival benefit of azacitidine in patients with high-risk myelodysplastic syndrome (MDS), oligoblastic acute myeloid leukemia (AML), and chronic myelomonocytic leukemia (CMML) has been proven, few studies on infections have been published. This study aims to analyze infectious complications in patients with MDS, oligoblastic AML, and CMML treated with azacitidine. **Objectives:** Evaluate infectious complications in MDS and correlated myeloid neoplasms (MN) patients treated with azacitidine. **Material and methods:** Retrospective analysis of infectious complications in patients over 18 with MDS and related MN (de novo or therapy-related) treated with azacitidine at a single clinic from 2009 to 2021. Data were collected from REDCap medical records. Survival was analyzed by Kaplan-Meier, and univariate and multivariate analyses were conducted using Cox regression. **Results:** A total 72 patients were included: 57 MDS (79%), 7 AML (9.7%), and 8 CMML (11%); 63% males, median age 62 years-old, 48 high/very high risk IPSS-R. Sixty nine patients were on antibiotics, mainly levofloxacin. Twenty-three (32%) patients had severe infection (SI), 15 (21%) mild/moderate infection (MI), and 34 (47%) no infection (NI). Univariate analysis showed higher proportions of SI (74%) and MI (80%) in high/very high-risk IPSS-R patients compared to NI (56%). Severe neutropenia and thrombocytopenia, and higher ferritin levels were associated with SI risk in the univariate analysis and thrombocytopenia marginally at multivariate analysis ($p = 0.069$). There were 72 infectious episodes over 739 cycles, 96% with antibacterial prophylaxis. Infection incidence was highest in the first four cycles, peaking at 26% in the second cycle and decreasing to 2.8% by the eighth cycle. Eight percent of patients required dose reductions, and 29% had cycle delays due to infections. Of the infections, 52% were severe and 48% mild/moderate (CTCAE 5.0); 8.4% were microbiologically defined, 47.2% clinically defined and 44.4% fever of unknown origin. The cumulative infection incidence was 47% at 6 months and 68% at 1 year. Event-free survival was 1.26 years, median overall survival (OS) of 38.43, 16.75 and 11.14 months in NI, MI and SI patients, respectively.

Infections were the cause of death in 9.8% of patients and in 39% of those with severe infections ($p < 0.001$). **Discussion:** Infectious complications were associated with decreased OS of patients treated with azacitidine. Infection rates in the first three cycles were consistent with existing literature. Despite bacterial prophylaxis, no bacterial resistance was found. Thrombocytopenia was the main variable associated with higher infection risk, as previously described in previous studies. **Conclusion:** In this unicentric outpatient study, patients with MDS and thrombocytopenia are at greater risk of developing infection, especially in the first cycles and should be monitored cautiously. Although infection is associated with reduced survival, death generally occurs due to other causes, such as disease progression.

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NOVEL KEY VARIABLES IN THE SURVIVAL OF PATIENTS WITH MYELODYSPLASTIC NEOPLASMS: A PRACTICAL APPROACH USING MACHINE LEARNING

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Introduction: Prognostic models like the IPSS-R play a crucial role in assessing outcomes for patients with myelodysplastic neoplasms (MDS). However, recent advancements in machine learning (ML) offer the potential to uncover novel predictive variables and enhance prognostic accuracy. Models like ElasticNet are particularly adept at handling multidimensional data, thereby expanding the scope beyond the variables considered in IPSS-R. **Objectives:** Assessing the performance of ML in predicting overall survival in MDS patients by incorporating clinical and hematological variables not traditionally included in prognostic models. **Methods:** We conducted a retrospective cohort study at a single reference center involving patients diagnosed with MDS between 2004 and 2024. We included patients with available clinical outcomes, missing data was handled using the 'cart' multiple imputation, following confirmation of non-random missingness through Little's test. The dataset was then randomly split into a training group (70%) and a testing group (30%). Utilizing group elastic net machine learning, an artificial intelligence model capable of selecting relevant variables and assessing their discriminative power, we constructed 3 receiver operating characteristic (ROC) curves to predict 1, 3, and 5-year survival, extracting the area under the curve (AUC) and identifying variables with non-zero coefficients. Based on these coefficients, we categorized our dataset into "High Risk" and "Low Risk" groups. Subsequently, we conducted a multivariate Cox proportional hazard regression analysis, adjusting for the new risk variable, age at diagnosis, sex, and transfusion burden. All statistical analyses were performed using R, with the involvement of packages such as 'mice', 'gpreg', 'gplasso', and 'survfit'. **Results:** 162 patients were included in this study. Using the group ElasticNet model, we identified 10 critical variables with notable predictive power: hemoglobin count, mean corpuscular volume, platelet count, presence of dysgranulopoiesis, presence of dysmegakaryopoiesis, serum iron, transferrin saturation, bone marrow cellularity, percentage of blasts in bone marrow, and percentage of ring sideroblasts. ROC curve analysis utilizing these variables'coefficients yielded AUCs of 0.863, 0.822, and 0.719 for predicting 1-year, 3-year, and 5-year survival, respectively. The coefficients were then extracted and used for risk stratification. 5-year survival rates were 24.3% for the High Risk group and 70.4% for the Low Risk group ($p < 0.001$, log-rank test). In multivariable Cox regression analysis, the risk group variable was the most discriminative predictor ($HR = 3.56$, $p < 0.001$), with sex, age at diagnosis, and transfusion burden also being significant ($p = 0.01$, 0.009, and 0.002, respectively). **Discussion:** The strong performance of the model, as evidenced by the ROC curve analysis, suggests that the selected variables offer substantial discriminative power. ML models offer more refined risk stratification than traditional methods, which may be useful in identifying occult relationships between variables. Validation in independent datasets may be necessary to strengthen the relationships herein exhibited. **Conclusion:** ML is a valuable tool for risk classification and survival prediction, offering significant insights for clinical decision-making and patient management that may be overlooked by other methods.

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BLASTING BEYOND THE OBVIOUS: IDENTIFICATION OF OVERLOOKED PREDICTIVE FACTORS FOR LEUKEMIC CONVERSION IN MYELODYSPLASTIC NEOPLASMS

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Introduction: Myelodysplastic neoplasms (MDS) are a group of clonal hematopoietic disorders characterized by dysplasia in one or more myeloid cell lines, ineffective hematopoiesis, and an increased risk of progression to acute myeloid leukemia (AML). The transition from MDS to AML is a pivotal event that significantly impacts patient outcomes. While the blast