

Urgencies in hematology: a guidance for patient referral in the Brazilian National Health System

Urgências hematológicas: guia de orientação para encaminhamento de pacientes no Sistema Único de Saúde

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ABSTRACT

Introduction: Some hematological conditions have high morbidity and mortality rates and require urgent diagnosis and treatment. However, few studies have proposed a referral approach for these conditions directed at health care professionals in primary care settings, emergency departments, and general hospitals. **Objective:** The objective of this article is to describe the hematological conditions that need urgent medical intervention and to guide referral to a specialized hematology service by health units, emergency care units, and general hospitals. **Method:** We initially selected a working group (WG) of hematologists attending in public hospitals of the Unified Health System of Belo Horizonte, Minas Gerais, Brazil. The WG selected the topics by consensus based on the hematological conditions requiring urgent diagnosis and treatment. **Results:** We selected seven urgent hematological conditions: hematological neoplasms, bone marrow failure, urgencies related to sickle cell disease, thrombocytosis, polycythemia, bleeding and thrombotic coagulopathies. We then described their signs, symptoms and routine laboratory tests needed to raise suspicion and required for referral. We also described the initial measures for a prompt diagnosis and appropriate treatment of the patients. **Conclusion:** We produced a guidance focused on a prompt diagnosis and appropriate treatment/referral of patients with urgent hematological conditions directed to health care professionals working in basic and emergency care units and general hospitals. The implementation of this guidance may reduce the burden of these conditions and mitigate morbidity and mortality.

Keywords: Hematology; Urgency; Access to health care.

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RESUMO

Introdução: Embora algumas condições hematológicas apresentem alta morbimortalidade e demandem diagnóstico e tratamento urgentes, poucos estudos propuseram uma abordagem de referenciamento direcionada para profissionais de saúde atuantes em unidades básicas, pronto atendimento e hospitais gerais. **Objetivo:** O objetivo deste artigo é descrever as condições hematológicas que necessitam de intervenção médica urgente e orientar o encaminhamento a um serviço especializado de hematologia por unidades de saúde, unidades de atendimento de emergência e hospitais gerais. **Método:** Inicialmente, selecionamos um grupo de trabalho (GT) de hematologistas que atendem em hospitais públicos do Sistema Único de Saúde de Belo Horizonte, Minas Gerais, Brasil. O GT selecionou os tópicos por consenso com base nas condições hematológicas que exigiam diagnóstico e tratamento urgentes. **Resultados:** Selecionamos sete condições hematológicas urgentes: neoplasias hematológicas, falências medulares, urgências relacionadas à doença falciforme, trombocitose, policitemia, sangramento e coagulopatias trombóticas. Em seguida, descrevemos os sinais, sintomas e exames laboratoriais de rotina necessários para a suspeita e o encaminhamento. Também descrevemos as medidas iniciais para um diagnóstico imediato e tratamento adequado dos pacientes. **Conclusão:** Produzimos um guia voltado para a suspeita e o tratamento/referência adequados de pacientes com condições hematológicas urgentes, dirigida aos profissionais de saúde que trabalham em unidades de atendimento básico e de emergência e em hospitais gerais. A implementação deste guia tem a intenção de reduzir o ônus dessas condições com impacto na redução da morbidade e mortalidade.

Palavras-chave: Hematologia; Urgência; Sistema único de saúde.

Funding statement:

CLS received a grant from the constitutional congress fund number IRR038FIU24.

Conflict of interest disclosure:

The authors declare no conflicts of interest.

Received on: September 24, 2025

Approved on: November 2, 2025

Publication Date: April 30, 2026

DOI: 10.5935/2238-3182.2026e36202-en

INTRODUCTION

Hematological diseases refer to conditions that affect the production and/or functioning of blood, bone marrow, and lymphatic system, such as red blood cells, leukocytes, platelets and plasma. Examples of these diseases include anemia, lymphoma, leukemia, monoclonal gammopathies, as well as hemorrhagic and thrombotic disorders¹.

According to data presented by the National Cancer Institute (INCA), with information from the Ministry of Health, the estimated number of new cases of leukemia (acute and chronic) and non-Hodgkin's lymphoma (NHL), for each year of the three-year period from 2023 to 2025, is 11,540 and 12,040 cases, respectively. This estimate corresponds to an incidence of 5.33 and 5.57 per 100,000 inhabitants per year, respectively². In 2020, there were 6,738 and 4,357 deaths from leukemia (acute and chronic) and lymphoma in Brazil, corresponding to 3.18 and 2.06 deaths per 100,000 inhabitants, respectively². With regard to multiple myeloma, between 2013 and 2019, approximately

2,600 cases were diagnosed per year, with an estimated incidence of 1.24 cases per 100,000 inhabitants². Cancers diagnosed in emergency departments account for 11% to 29% of new incidental cases. These cases have a lower survival rate at one-year, a greater need for hospitalization and a lower quality of life when compared to cancers detected in primary care³.

With regard to non-neoplastic, benign hematological urgencies, it is estimated that aplastic anemia occurs with an incidence of approximately 2 cases per million per year in Brazil⁴. Between 2000 and 2018, there were 35,523 deaths resulting from this disease, of which 38.4% were caused directly by the disease and 61.6% resulted from clinical complications⁵. With regard to sickle cell disease, the mortality rate varies between 0.12 and 0.54 per 100,000 individuals per year in Brazil. This figure could be reduced by prompt diagnosis and timely treatment of its complications. It is estimated that there are 3,000 births of children with sickle cell disease every year in Brazil⁶. The average life expectancy of patients with sickle cell disease in Brazil is

approximately 20 years lower compared with the remaining Brazilian population without the disease⁷.

OBJECTIVE

Although some hematological conditions have a high morbidity and mortality rate and require urgent diagnosis and treatment, few studies have proposed a referral approach aimed at health professionals working in basic health units, emergency services and general hospitals^{8,9}. The aim of this document is, therefore, to describe the hematological conditions that require medical attention and urgent referral to a hematology service and to guide the approach to these diseases. Its content lends itself to describe these conditions, listed by clinical syndromes, i.e., by the symptoms, clinical signs and main laboratory alterations that lead to clinical suspicion of hematological urgencies.

This article is not intended to discuss the referral of non-urgent hematological diseases. The article is organized into topics for each of the urgent hematological conditions, such as hematological neoplasms, bone marrow failure, sickle cell disease thrombocytosis, polycythemia, bleeding and thrombotic coagulopathies.

METHOD

This document is the result of a consensus among hematologists practicing in the Unified Health System of Public Hospitals of Belo Horizonte, Minas Gerais, Brazil: Hospital das Clínicas da Universidade Federal de Minas Gerais, Hospital Luxemburgo - Instituto Mario Penna and Santa Casa de Belo Horizonte. Hematologists working in these hospitals were selected because these are the referral hospitals of the municipality for the public health care of hematological disorders.

The document was formulated in response to the group's identification of a need to provide guidance to primary and secondary care health professionals on the imperative of expeditious diagnosis and referral of urgent hematological conditions

RESULTS

HEMATOLOGICAL URGENCIES

Urgencies are defined as health problems that present with potential risk of death and therefore require immediate medical attention⁹. Conversely, an emergency is defined as an imminent risk to life or intense suffering and therefore requires immediate treatment. Hematological conditions (malignant or benign) can progress to acute critical illness, requiring immediate recognition and treatment¹⁰.

HEMATOLOGICAL NEOPLASMS

Hematological neoplasms (NH) are a group of malignant diseases that affect immature and mature hematopoietic cells¹¹. Examples of hematological neoplasms that often present as urgencies include acute leukemia, high-grade

lymphoma and multiple myeloma. These are hematological urgencies, since the interval between diagnosis and treatment is a strong predictor of patient survival¹². Acute promyelocytic leukemia is a classic example of a hematological neoplasm that demands an acute sense of urgency. The suspicion of acute promyelocytic leukemia requires immediate initiation of transretinoic acid therapy and interventions to manage coagulopathy, which can be fatal if not promptly recognized and treated¹². Box 1 describes the signs and symptoms that should prompt suspicion of hematologic neoplasms.

Box 1. Signs and symptoms suggestive of hematologic neoplasms.

At what point should a hematological neoplasm be suspected?

The presence of constitutional symptoms*, bleeding, generalized fatigue, weakness, pallor, recurrent infections, bone pain, pruritus, splenomegaly, and/or lymphadenopathy not explained by an acute infectious condition, observed in the presence of bicytopenia or pancytopenia.

* Unexplained fever, with a body temperature above 38.0°C, severe night sweats, and unintentional weight loss of more than 10% of the patient's usual weight over a period of six months.

Source: Prepared by the authors, based on Telessaúde RS-UFRGS (2016)⁸.

IMPORTANT: the conditions below require immediate and urgent care and HIGH PRIORITY FOR REFERRAL TO A HOSPITAL WITH AN ONCOHEMATOLOGY SERVICE ("priority of priority"):

- Leukocytosis greater than $100 \times 10^9/L$, accompanied by anemia, thrombocytopenia and the presence of blasts in the peripheral blood, associated with organ dysfunction;
- Suspected acute promyelocytic leukemia: presence of young cells (mainly promyelocytes and blasts) in the blood cell count/blood cell film, or pancytopenia, in conjunction with bleeding and/or thrombotic disorder, which typically presents acutely.
- Leukocytosis and the presence of symptoms suggestive of leukocytosis (characterized by headache, visual changes, mental confusion, drowsiness, priapism and thromboembolic events);
- The presence of tumor lysis syndrome (either biochemical or clinical**) or severe compressive symptoms (such as dyspnea with substantial pleural or pericardial effusion, superior vena cava syndrome, Horner's syndrome and spinal cord compression).

** Biochemical tumor lysis syndrome is defined by an alteration in two or more of the following tests: uric acid ≥ 8 mg/dL, potassium ≥ 6 mEq/L, phosphorus ≥ 1.45 mmol/L in adults, calcium ≤ 7 mg/dL (or an alteration of the patient's baseline value by 25% for any of these tests). The alteration must be present three days before or seven days after chemotherapy, even after adequate hydration and use

of medications to decrease urate (e.g. allopurinol). Clinical tumor lysis syndrome is characterized by the presence of biochemical tumor lysis syndrome associated with one or more of the following criteria: an increase in creatinine to a level that is at least 1.5 times the upper normal value, the occurrence of cardiac arrhythmia, sudden death or seizure¹³.

Patients who present with one or more of the findings described below, whether or not associated with a suspected hematological disorder, should be referred to urgent/emergency services with hematologist support whenever possible:

- The presence of blast cells or immature leucocytes (myelocytes, promyelocytes and metamyelocytes) in the peripheral blood;
- Severe cytopenias: hemoglobin < 7 g/dL; and/or neutrophils < 500 cells/mm³; and/or platelets < 50 × 10⁹/L;
- Severe cytopenia (hemoglobin < 7 g/dL; and/or neutrophils < 500 cells/mm³; and/or platelets < 50 × 10⁹/L) associated with lymph node enlargement and/or splenomegaly not explained by an acute infectious condition;
- Hyperleukocytosis (leucocytes > 50 × 10⁹/L), after ruling out infectious causes that justify the diagnosis of a leukemoid reaction;
- Suspicion of tumor lysis syndrome (symptoms such as nausea, vomiting, diarrhea, lethargy, cramps, arrhythmia) or compressive symptoms (such as dyspnea, superior vena cava syndrome, Horner's syndrome, spinal cord compression) in people with large lymph node masses;
- Suspected multiple myeloma (presence of CRAB symptoms, i.e. hypercalcemia, renal dysfunction, anemia and bone lesions) with urgency for treatment as characterized by symptomatic hypercalcemia, renal dysfunction (creatinine > 2.0 mg/dL and/or creatinine clearance < 40 mL/min), neurological symptoms with spinal cord compression or hyperviscosity syndrome*¹⁴.

*Signs and symptoms of hyperviscosity: mental confusion, headache, visual disturbances, dyspnea, bleeding and thrombosis¹⁴.

BONE MARROW FAILURE

Bone Marrow failure is defined as the failure of the bone marrow to produce one or more hematopoietic lineages (erythroid, megakaryocytic, granulocytic or monocytic). Among the causes, aplastic anemia stands out¹⁵.

Aplastic anemia is a rare and heterogeneous disease, with peaks in the 10-25 and 60 years age groups¹⁶. It constitutes a hematological urgency, given that the interval between diagnosis and treatment is a strong predictor of patient

survival¹⁷. Box 2 describes the signs and symptoms that should prompt suspicion of aplastic anemia.

Box 2. Signs and symptoms suggestive of aplastic anemia.

When to suspect bone marrow aplasia?

Presence of pancytopenia*, associated with bleeding (petechiae, ecchymoses, mucosal bleeding, and others), generalized fatigue, weakness, pallor, and recurrent infections.

*Pancytopenia is defined as hemoglobin <10 g/dL, platelets < 50 × 10⁹/L, and neutrophils <1.5 × 10⁹/L.

Source: Prepared by the authors, based on TelessaúdeRS-UFRGS (2016)⁸ and Kulasekararaj et al. (2024)¹⁶.

IMPORTANT: the condition below requires immediate and urgent attention and HIGH PRIORITY REFERRAL TO A HOSPITAL WITH A HEMATOLOGY SERVICE ('priority of priority').

- The presence of suspected severe bone marrow aplasia is indicated by 2 or 3 of the following findings: neutrophil count of less than 0.5 × 10⁹/L, platelet count below 20 × 10⁹/L, or reticulocyte count of less than 50 × 10⁹/L^{16,17}.

Patients who present with one or more of the findings described below, whether or not associated with a suspected hematological disorder, should be referred to urgent/emergency services with hematologist support whenever possible:

- Severe neutropenia (< 0.5 × 10⁹/L) accompanied by fever;
- Severe cytopenias: hemoglobin < 7 g/dL; and/or neutrophils < 0.5 × 10⁹/L; and/or platelets < 50 × 10⁹/L.

Note: Whenever possible, in the differential diagnosis of isolated cytopenia and pancytopenia, the diagnoses of B12 and folate deficiency should be considered.

URGENCIES RELATED TO SICKLE CELL DISEASE

Sickle cell disease is the most prevalent genetic and hereditary disease in Brazil and worldwide¹⁸. The clinical severity of the disease varies, but a significant number of patients have the chronic and severe forms of the disease, exacerbated by so-called 'crises'. The morbidity and mortality rates are attributable to a number of factors, including but not limited to infections, hemolytic anemia and microinfarcts resulting from diffuse microvascular vaso-occlusion. These complications are frequently exacerbated by discrimination associated with the stigma of dependency and structural racism^{19,20}. Pain in sickle cell disease requires immediate medical intervention and should be treated appropriately, starting with strong analgesics with slow weaning after satisfactory control. Box 3 describes

the signs and symptoms that should prompt suspicion of urgent conditions related to sickle cell disease.

Box 3. Signs and symptoms suggestive of urgent conditions related to sickle cell disease.

When to suspect urgent conditions related to sickle cell disease?

Patient reported as having sickle cell disease, accompanied by acute pain in any location, whether or not accompanied by fever, dyspnea, desaturation, cough or tachypnoea.

Source: Prepared by the authors.

Patients who present one or more of the findings described below, whether or not associated with suspected sickle cell disease, should be referred to urgent/emergency services with hematological support whenever possible:

- The presence of a pain crisis or other indications of severity, such as high fever, priapism, dyspnea, chest pain, abdominal pain that is difficult to manage, acute neurological changes and an abrupt decrease in hemoglobin level >2 g/dL⁸.

THROMBOCYTOSIS

Thrombocytosis is defined as a platelet count equal to or greater than $450 \times 10^9/L$ (box 4), and can occur reactively (in most cases), such as in the presence of infections, malignancies, inflammatory diseases, smoking, iron deficiency anemia, post-splenectomy, among others; or primarily, as in essential thrombocythemia and other chronic myeloproliferative neoplasms²¹. Box 4 describes the criteria that should prompt suspicion of thrombocytosis.

Box 4. Suspicion of thrombocytosis.

When to suspect thrombocytosis?

Platelet count equal to or greater than $450 \times 10^9/L$

Source: Prepared by the authors, based on Almanaseer et al. (2024)¹⁷.

Patients who present one or more of the findings described below, whether or not associated with suspected thrombocytosis, should be referred to urgent/emergency services with hematological support whenever possible:

- Thrombocytosis with a platelet count of more than $1,000 \times 10^9/L$ associated with bleeding and/or thrombosis⁸.

POLYCYTHEMIA

Polycythemia, otherwise known as erythrocytosis, is defined as an increase in Hb and/or hematocrit (Ht) above the reference values²². This condition can result from either a reduction in plasma volume (relative erythrocytosis) or an increase in erythrocyte mass (absolute erythrocytosis)²³.

Absolute polycythemia can be categorized as either acquired, which is predominantly driven by conditions associated with hypoxemia, such as chronic obstructive pulmonary disease and obstructive sleep apnea, or primary, which is named polycythemia vera. Box 5 describes the criteria that should prompt suspicion of polycythemia.

Box 5. Criteria for suspicion of polycythemia.

When to suspect polycythaemia?

Hb above 16.5 g/dL in men or above 16.0 g/dL in women; or Ht greater than 49% in men or greater than 48% in women.

Source: Prepared by the authors, based on Swerdlow et al. (2017)²².

Patients who present one or more of the findings described below, whether or not associated with the suspected polycythemia, should be referred to urgent/emergency services with hematological support whenever possible:

- Ht above 60% with bleeding, thrombosis or signs and symptoms of hyperviscosity syndrome, which is characterized paresthesia, headache, visual clouding and dizziness²⁴.

BLEEDING COAGULOPATHY

A bleeding coagulopathy is defined as a condition resulting from an impaired ability of the blood to clot, which can lead to excessive bleeding or hemorrhage. Hemorrhage may or may not be related to a hematological disorder. Among the hematological disorders, most conditions result from the deficiency or consumption of coagulation factors, which can be either inherited (hemophilia, von Willebrand disease and others) or acquired (acquired inhibitor or amyloidosis with factor X deficiency), in addition to abnormalities in platelet count or function^{25,26}.

Hemorrhage is defined as acute blood loss and can manifest itself in various ways, depending on the underlying mechanism and anatomical location. It is a common and potentially serious medical emergency that requires early detection and appropriate intervention²⁵. Box 6 describes the manifestations that should prompt suspicion of severe or potentially urgent hemorrhage.

Box 6. Manifestations suggestive of severe or potentially urgent hemorrhage.

When to suspect serious or potentially urgent bleeding due to hematological conditions?

The presence of active bleeding, whether external or internal, and/or signs suggestive of voluminous bleeding with clinical repercussions, such as hypotension, tachycardia, mental confusion or organ dysfunction and compression syndrome, may indicate a bleeding coagulopathy.

Source: Prepared by the authors.

Patients who present one or more of the findings described below, associated with a suspected or known bleeding disorder, should be referred to urgent/emergency services with hematological support whenever possible:

- The presence of symptomatic bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, retroperitoneal, intraarticular or pericardial, or intramuscular with compartment syndrome, and/or
- The presence of bleeding leading to a drop in the hemoglobin level of 2 g/dL or more or requiring transfusion of two or more units of whole blood or red blood cells²⁶.

THROMBOTIC COAGULOPATHY

Thrombosis is a complex pathological process leading to total or partial obstruction of the vascular tree. It involves alterations of the coagulation, anticoagulation or fibrinolysis pathways, endothelial dysfunction and/or the interaction between platelets, leukocytes and plasma components²⁸. Among the thrombotic conditions that require urgent care in hematology, we highlight the thrombotic microangiopathies, which comprise a group of diseases characterized by micro- and/or macrovascular occlusions, microangiopathic hemolytic anemia and thrombocytopenia²⁹. Box 7 describes the findings that should prompt suspicion of urgent thrombotic conditions.

Box 7. Findings suggestive of urgent thrombotic conditions.

When to suspect urgent thrombotic conditions?
The presence of microangiopathic hemolytic anemia (characterized by reticulocytosis, indirect hyperbilirubinemia, a reduction in haptoglobin and an increase in LDH, with a description of schistocytes on blood film and a negative direct antiglobulin test — or direct Coombs test*) and thrombocytopenia with or without rapidly evolving thrombosis, associated with rapid clinical deterioration. In some cases, these conditions may also present with neurological changes, gastrointestinal symptoms as well as renal and cardiac dysfunction ²⁹ .
* The direct Coombs test may yield a positive result, and some of the tests suggestive of haemolysis may not be altered due to the interference of other factors.

Source: Prepared by the authors, based on Scully et al. (2023)²⁹.

Patients presenting with one or more of the aforementioned findings should be referred to urgent/emergency services with the support of a hematologist, whenever possible, since the management of microangiopathic anemias and thrombotic thrombocytopenias, such as: microangiopathic hemolytic anemia, hemolytic-uremic syndrome, thrombotic thrombocytopenic purpura, heparin-induced thrombocytopenia, immune thrombotic thrombocytopenia, and catastrophic antiphospholipid antibody syndrome.

It is imperative that these rare hematological conditions of high severity and mortality be diagnosed and treated

expeditiously. In the event of suspected thrombotic thrombocytopenic purpura, while awaiting a transfer slot, the case must be discussed with a hemotherapist (if available) and plasma transfusion should be considered. Transfer should be made to a hospital with the capacity to carry out plasmapheresis.

Information that must be described in the transfer request documents or be available for discussion with the hematologist

1. Signs and symptoms (constitutional symptoms, complete physical examination including abdominal examination, presence or absence of lymph node enlargement and other relevant changes on physical examination);
2. Full blood count result with reticulocyte count whenever available (describing differential of leukocytes and blood film, if present) and platelet count, with date;
3. If there is lymph node enlargement, describe the characteristics of the lymph nodes (location, size, consistency and attachment to deep planes);
4. Results of tests carried out, with date, to exclude secondary causes. If available, describe tests for hepatitis B and C viruses, human immunodeficiency virus, aminotransferases, creatinine, albumin, gamma glutamyl transferase, prothrombin time, activated partial thromboplastin time, fibrinogen, total proteins and fractions, thyroid stimulating hormone, vitamin B12 and lactate dehydrogenase;
5. Attach results of imaging tests, preferably, or describe their results in full, with date (if carried out);
6. List all medicines in use with dose, posology and administration interval;
7. List all comorbidities;
8. For sickle cell-related urgencies, describe the results of hemolysis tests (reticulocytes, LDH, bilirubin) where available, with date; and the results of hemoglobin electrophoresis with date, if available;
9. For erythrocytosis and thrombocytosis, report the presence or absence of constitutional symptoms, bleeding, vasomotor symptoms, previous thrombosis, presence or absence of splenomegaly. Report whether the patient has a history compatible with a secondary cause of erythrocytosis (cardiorespiratory disease, neoplasm, smoking, COPD, sleep apnea, heart disease). Report iron kinetics, if available, for thrombocytosis;
10. For coagulopathies, describe the history of hemorrhagic manifestations - presence of menorrhagia, melena/hematemesis, ecchymosis, petechiae, with frequency and triggering situations. Describe whether the patient uses anticoagulants and/or antiplatelet agents. Report personal and family history of bleeding disorders (yes or no). If yes, indicate the disorder, severity and degree of kinship;
11. For diseases involving thrombosis, describe a history of infections, autoimmune diseases, pregnancy, cancer, heparin use, vaccination and recent surgery⁸.

DISCUSSION

Hematological urgencies are situations that require immediate assessment and hospital admission in a center with hematological care for prompt diagnosis and treatment. The aim of this manuscript was to provide guidance to health professionals working in basic health units, emergency care units and general hospitals to suspect the conditions related to hematological urgencies and proceed with the initial measures, aiming for prompt diagnosis and appropriate treatment of these conditions.

This study was justified by the demand for urgent care for some hematological diseases, which take a long time to reach tertiary care, with a detriment to patient survival. We selected seven urgent hematological conditions elected by a team of hematologists with expertise in the diagnosis and treatment of hematological disorders in the public health system. We provided a list of signs, symptoms and routine laboratory tests to guide the diagnosis of such disorders and the prompt approach to treatment and referral.

Some of the conditions approached in this article were previously discussed in the Protocol of Adult Hematology Outpatient Regulation of the Federal University of Rio Grande Sul, which broadly addressed hematologic conditions, including alterations that can be evaluated electively at outpatients' settings. Presenting a different approach, the present study focuses on urgent hematological conditions⁸.

A review of the literature revealed some articles addressing hematological urgencies mainly from a theoretical standpoint³⁰⁻³². Spring and Munshi (2022)³² have addressed the management of critical hematological illness requiring admission in the intensive care unit, mainly focusing in malignant hematological conditions. Halfdanarson et al. (2017)³¹ published a review addressing the most common oncological emergencies (including hematological malignancies) and provided practical guidance for initial management of the patients bearing these disorders.

Finally, one Brazilian article, published more than 20 years ago also discussed the management of patients with hematological urgencies within the Brazilian context³⁰. However, beyond focusing predominantly on oncological conditions, these reviews did not provide practical guidance to the diagnosis and referral of patients with suspected hematological urgencies.

CONCLUSION

Hematological emergencies and urgencies, both in the context of suspected neoplasms and non-oncohematological diseases, represent a spectrum of complex diseases which need prompt management. Although these conditions are not often seen day-to-day in the public health system, it is essential that they be promptly recognized, allowing for the immediate implementation of support measures and referral to specialized care as soon as possible. This article provides

a guidance of suspected hematological urgencies for health care professionals working in basic and emergency care units, and general hospitals.

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AUTHORS' CONTRIBUTIONS:

We describe contributions to the papers using the taxonomy (CRediT) provide above:

Conceptualization, Investigation, Methodology, Visualization & Writing—review & editing: SM Rezende; AFDA Pinto. *Project administration, Supervision & Writing—original draft:* SM Rezende; AFDA Pinto. *Validation & Software:* Not applicable. *Resources & Funding acquisition:* SM Rezende. *Data curation & Formal Analysis:* SM Rezende; AVDA Pinto; CL Sena; FN Lisboa; ABF Glória; RO de Paula e Silva; RE Emídio; EM Fagundes; PC Bastos. *All authors read and approved the final version of the paper.*

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