Case Report

Catastrophic Arterial Thromboembolism in Acute Myeloid Leukemia: Case Report and Comprehensive Literature Review

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Abstract

BACKGROUND: Large-vessel arterial thromboembolism is a rare initial presentation of acute myelogenous leukemia (AML). Aortoiliac occlusion is exceptionally uncommon and has not been previously reported in association with acute myelomonocytic leukemia (AML-M4).

CASE PRESENTATION: We present the first documented case of a 55-year-old female with AML-M4 who initially presented with recurrent respiratory infections and acute left leg ischemia, which responded to intravenous heparinization and femoropopliteal thromboembolectomy. However, progressive bilateral lower extremity ischemia revealed extensive thromboembolism involving the aortoiliac and bilateral femoropopliteal regions, requiring repeat thromboembolectomy and retrograde kissing balloon aortic angioplasty. Flow cytometry confirmed AML-M4 with CD13, CD33, CD11C and myeloperoxidase positivity. Her condition deteriorated due to multiple acute cerebrovascular infarcts, acute coronary thrombosis and sepsis, leading to her demise.

METHODS: A literature search of PubMed and Google Scholar (1980–2025) identified 51 cases of arterial thrombosis in AML.

RESULTS: Most patients were male (66%), with lower limb vessels (44%) as the most frequently affected sites. Acute promyelocytic leukemia (AML-M3) was the most common subtype. Management varied, including chemotherapy, anticoagulation and surgical or endovascular interventions.

CONCLUSION: The management of arterial thrombosis in AML is complex due to the competing risks of thrombosis, hemorrhage and infection. Early leukemia identification and timely chemotherapy initiation must be carefully balanced against the risks of cytopenias and immunosuppression in these critically ill patients.

KEYWORDS: Arterial thrombosis, acute myeloid leukemia, coronary, cerebrovascular, limb ischemia, aorta

INTRODUCTION

Case Report

A 55-year-old Filipino, female with a previous history of hypertension presented in the emergency department with an 11-day history of cyanosis of her left (Lt) toe, coolness and cramping pain on her Lt leg. This was associated with easy bruisability, gum bleeding, dyspnea and chest pain. Initial outpatient blood count showed leukocytosis (121 x 10^9/L), anemia (hemoglobin [Hgb] 71 g/L) and thrombocytopenia (118 x 10^9/L) treated with hydroxyurea 500 mg twice daily. She was referred to our institution for severe Lt leg pain persistent at rest,

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Figure 1. (A) Dorsal aspect of the feet at the emergency room. This shows darkening on the first toe on her left foot. (B) Ventral aspect of the feet at the emergency room. This shows the clear demarcation of the darkening at the base of her left first toe. There is also cyanosis on the rest of her left toes. (C) Second postoperative day status post embolectomy after left femoropopliteal embolectomy. This photo shows pallor and cyanosis on her mid to distal left leg. (D) Ventral aspect of her right foot also shows cyanosis of her mid-distal foot, most prominent on the 4th digit.

darkening of her Lt toe and numbness of the distal midfoot (See Figure 1).

Initial vital signs were as follows: blood pressure of 140/100 mmHg, heart rate of 102 beats/min, respiratory rate of 19/min, oxygen saturations of 96% on room air. Pertinent physical examination noted were oral thrush, petechiae all over her trunk, a dark violaceous left toe with surrounding erythema, 80% sensation on the distal forefoot and 0% sensation on the first digit. Normal pulses were noted on both brachial and femoral and right popliteal arteries. She had a faint pulse on the left popliteal artery and absent pulses on the left dorsalis pedis and posterior tibial arteries. The ankle-brachial index (ABI) of the right (Rt) was 0.47 (70 mmHg/150 mmHg) and 0 on her left.

Initial diagnostics revealed anemia (109 g/L), thrombocytopenia (74 x 10^9/L) and leukocytosis (white blood count 31.4 x 10^9/L) with 96% blasts, absolute neutrophil count 0 cells/µl, elevated D-dimer 3090 ng/ml (NV: <500 mg/ml), and elevated fibrinogen levels 689 mg/dl (NV: 200-400 ng/ml). Peripheral blood smear showed normocytic normochromic erythrocytes, codocytes, platelets occurring singly (8-10 per oil immersion field) and a predominant population of medium to large mononuclear cells with fine chromatin, some with prominent nucleoli, with very scanty granular cytoplasm signifying blasts (see Figure 2). She was started on targeted unfractionated heparin drip and underwent emergent Lt extremity embolectomy under intraoperative angiographic guidance, with a 50-mm white clot retrieved at the femoral and popliteal arteries (see figures 3).

Two days after, she complained of sudden pain in both legs, with cyanosis on the fourth digit of the right foot and left leg, and absent Doppler signals on the left popliteal, posterior tibial and bilateral dorsalis pedis arteries (See Figure 1). Aortography showed occlusion on the aortoiliac, femoral and popliteal regions. Repeat embolectomy of the aorta and bilateral iliac arteries with angioplasty using a retrograde kissing balloon technique together with left above-knee amputation due to irreversible limb loss was performed (see Figure 4). Postoperatively, there was resolution of cyanosis on the right foot with improvement in the ABI to 1.0.

Fifteen hours postoperatively, she had disorientation, aphasia and right-sided hemiparesis. Cranial computed tomography (CT) revealed an acute infarct on the left posterior cerebral artery territory (see Supplementary Appendix). She was intubated for hypoxemia and started on piperacillin-tazobactam for hospital-acquired pneumonia and gram-negative bacteremia. Therapeutic anticoagulation was achieved with heparin (partial thromboplastin time PTT range 83.5-87.9 seconds). Minimal bleeding was noted per orem. The 12-lead electrocardiogram showed left ventricular hypertrophy and transthoracic echocardiography showed multisegmental wall motion abnormalities with severely depressed systolic function (ejection fraction 27% by Simpson's), and no note of thrombus or vegetations. She had worsening anemia (hemoglobin 67 g/L) and thrombocytopenia (25 x 10^3), and multiple infections *Acinetobacter lwolfii* ventilator-associated pneumonia, *Burkholderia cepacia* bacteremia and *Klebsiella pneumoniae* catheter-associated urinary tract infection. Taking all these into consideration, with scarcity of blood products, these precluded heparinization,

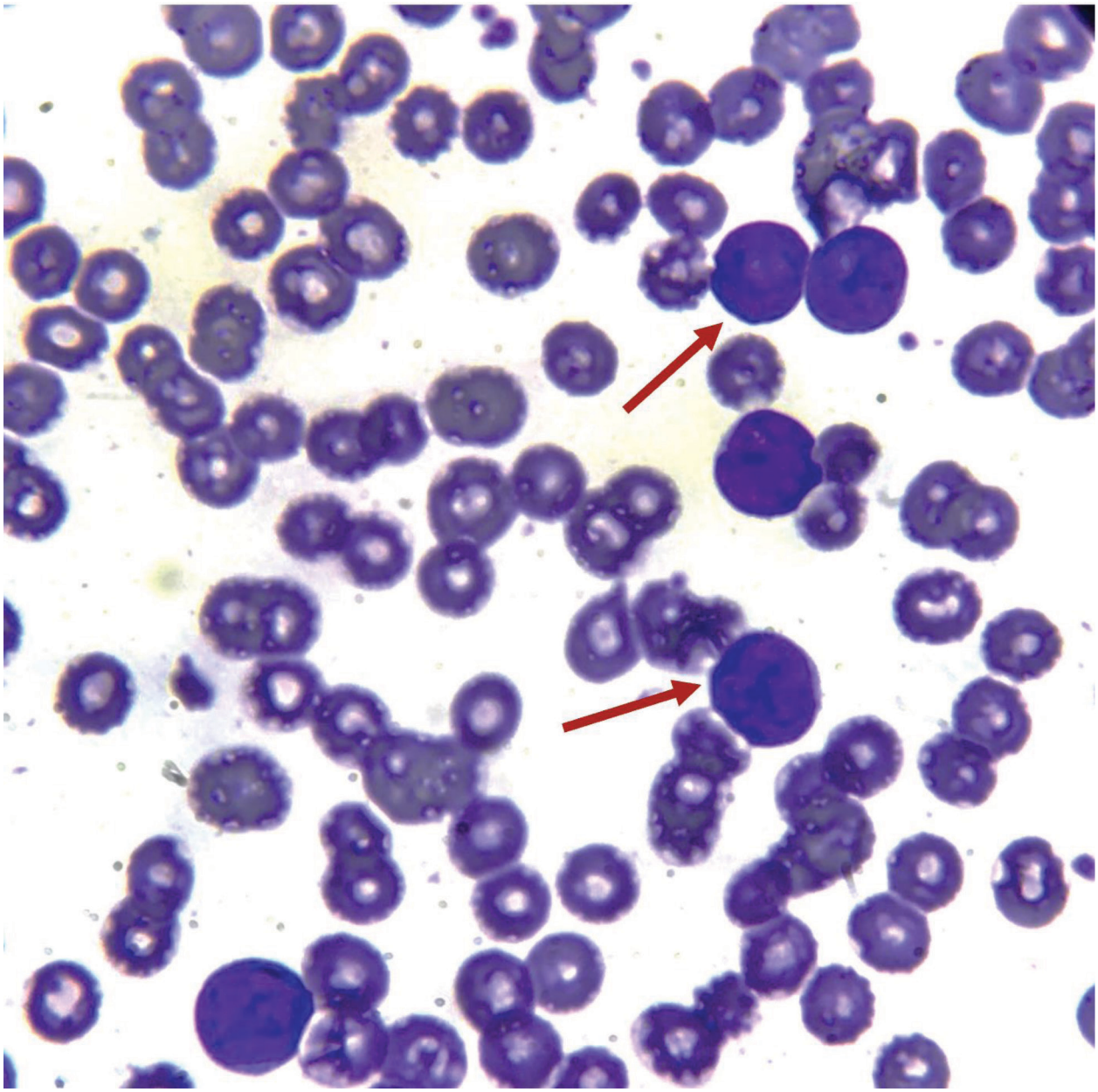

Figure 2. Oil-immersion field of the peripheral blood smear with hematoxylin-eosin stain which shows normocytic, normochromic erythrocytes, anisopoikilocytosis and few platelets. There were noted medium to large mononuclear cells with fine chromatin some with prominent nucleoli, with very scanty granular cytoplasm which signified blast cells (red arrows). No Auer rods were visualized.

coronary angiography and cytoreductive chemotherapy for the provisional diagnosis of acute myeloid leukemia. Antibiotics were shifted to meropenem and colistin.

The immunophenotypic analysis of peripheral blood flow cytometry was consistent with acute myelomonocytic leukemia (AML-M4). Peripheral blood flow cytometry demonstrated CD13, CD33, CD11C and myeloperoxidase positivity that confirmed the diagnosis of AML-M4. Although other etiologies were considered, imaging studies also did not show vessel wall thickening indicative of vasculitides nor did it show beading pattern indicative of possible fibromuscular dysplasia. Antinuclear antibody was negative, however, other autoimmune serologies was not done. Moreover, the histopathology showing a white clot (see Supplementary Appendix 1) was highly indicative of a leukemic process causing the hypercoagulable state.

The patient's condition deteriorated further with development of upper gastrointestinal bleeding and septic shock which led to the patient's demise.

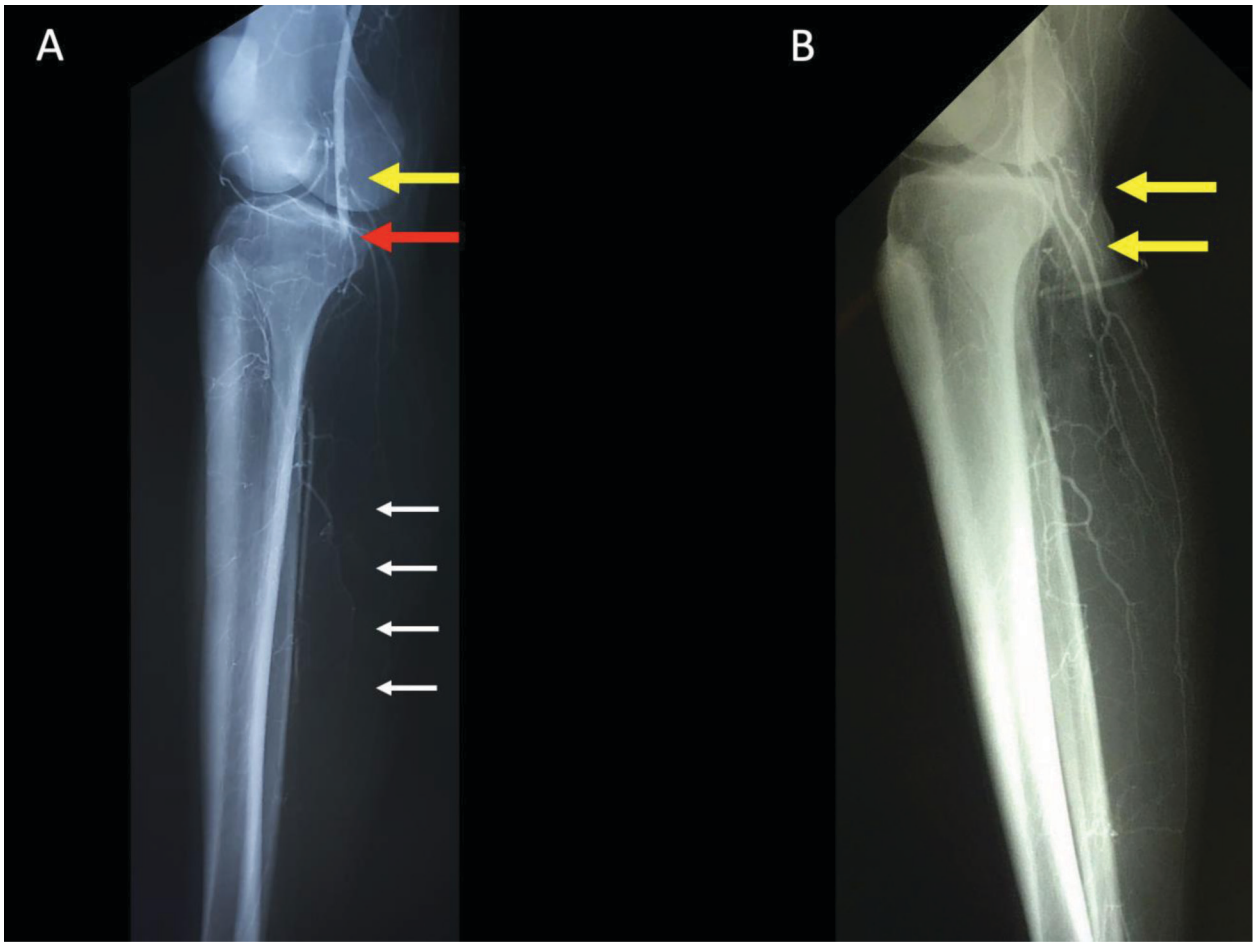

Figure 3. Angiographic radiographs of the left extremity. (A) Anteroposterior view. This shows a partial filling defect at distal SFA (yellow arrow) with cutoff of contrast enhancement at the left infrageniculate popliteal artery (red arrow) with minimal reconstitution at posterior tibial and peroneal arteries (small white arrows) (B) Lateral view. This shows the contrast enhancement from multiple collaterals from popliteal area (yellow arrows)

METHODS

Literature Review

We conducted a literature search for manuscripts and poster presentations on PubMed and Google Scholar from all available dates (1980 to February 2025) using the following search terms: "acute myeloid leukemia/leukaemia", "acute myelogenous leukemia/leukaemia", "ischemia/ischaemia", "arterial thrombosis", "thromboembolism", "aortic occlusion", "femoral", "popliteal", "infarction", "promyelocytic leukemia/leukaemia", "arterial occlusion", "lower extremity", "upper extremity", "stroke", and "myocardial infarction". Cases from a retrospective cohort study by Mitrovic, et al. was not included since we were not able to stratify treatment modalities. In summary, we found a total of 51 unique English language publications with a total of 51 cases (see Figure 5).

Limitations

We had limited our search to papers with available full-text since our goal was to stratify the AML French-American-British (FAB) classification, severity of hyperleukocytosis, clot histopathology, treatment modalities and outcomes. Thus, we may have not reported all cases of arterial thrombosis and acute myeloid leukemia in literature. Nevertheless, this extensive case search provides useful information on the characterization and trends in practice for this rare and challenging clinical presentation.

RESULTS AND DISCUSSION

Arterial thrombosis in AML

Acute myeloid leukemia (AML) refers to a group of aggressive hematopoietic malignancies that involves the clonal proliferation of myeloid lineage (erythroid, granulocytic, monocytic and megakaryocytic). The FAB classification categorizes the AML subtypes based on their degree of maturation and lineage differentiation.[1] It has been reported that the incidence of thrombosis in AML ranges from 3.4% to 6.3%.[2-3] Arterial thromboembolism of large-sized vessels is a well-known, but rare initial manifestation of AML. Several cohort studies suggest that thrombotic events are more common in acute promyelocytic leukemia (APL) than in non-M3 AML.[2-4] It is not yet well-established whether non-M3 AML confers the same risks for thrombosis and leukostasis.

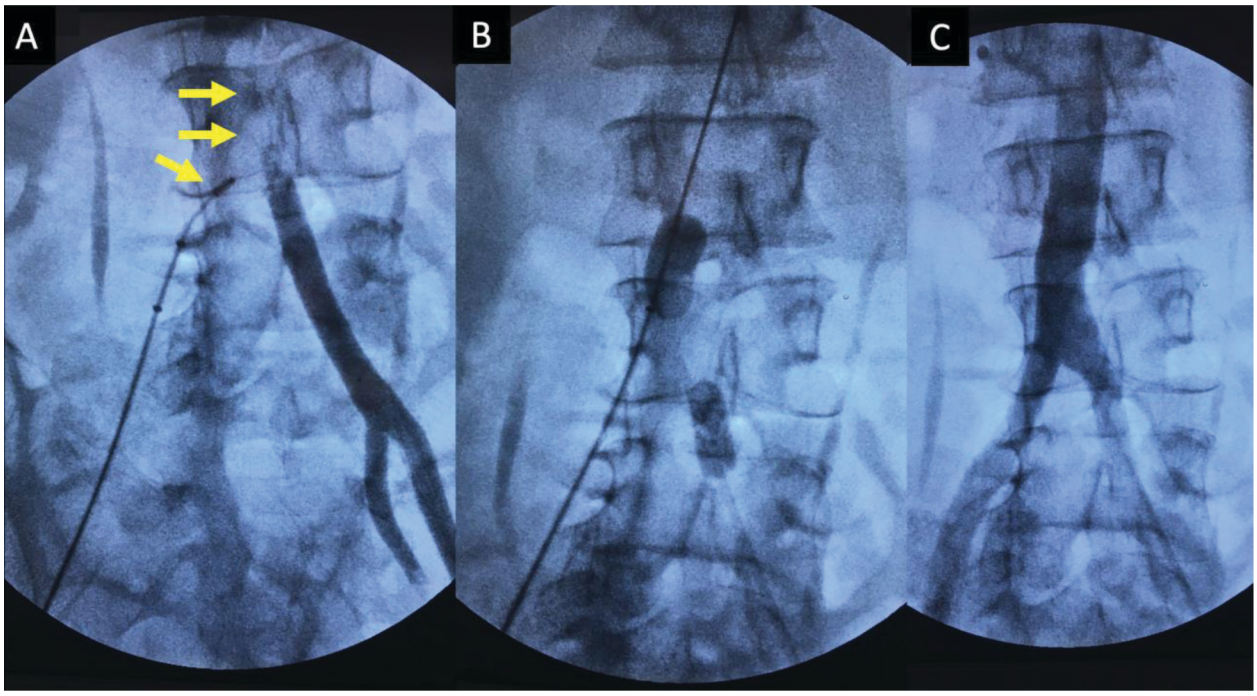

Figure 4. Images taken during the aortography and embolectomy. (A) The left common iliac artery (CIA) was patent. There was total occlusion at the right proximal CIA and near total occlusion of the infrarenal abdominal aorta (yellow arrows) (B) Retrograde kissing balloon embolectomy was done. (C) After retrograde embolectomy, good flow was restored across the aortoiliac vessels. The photo shows good contrast enhancement of the infrarenal abdominal aorta with distal runoff into bilateral common iliac arteries.

Pathophysiology of arterial thrombosis in AML

The occurrence of thrombosis in AML is multifactorial. First, hyperleukocytosis, arbitrarily defined as white blood count greater than 100 x 10^9 cells/L, entails a poor prognosis and increased risk for tumor lysis syndrome, hyperviscosity, leukostasis and sedimentation of leukemic cells that may lead to vessel occlusion.[5-7] The reduced pliability of immature leukemic myeloblasts also contributes to mechanical vessel obstruction.[8] It is important to note that neither hyperleukocytosis nor leukemic thrombus is a necessary feature for development of thrombotic complications. On our review of cases, among 18 cases of arterial clots sent for histopathology, leukemic cells were detected on 83% (15/18) of cases while 17% (3/18) had no evidence of leukemic blasts.[9-25] Hyperleukocytosis was present in only 22% (11/50) of cases.[10,12,14,16,20,26-31] This alludes to alternative pathophysiologic mechanisms involving an interplay of leukemic cells, platelets, coagulation cascade and vascular endothelium. Additional properties of leukemic cells that lead to leukostasis include: (1) increased expression of tissue factor and cancer procoagulant which leads to activation of platelets and coagulation cascade; (2) increased expression of adhesion molecules that respond to endothelial chemotactic cytokines and promote cell adhesion and migration; (3) release of proinflammatory cytokines (TNF-alpha and IL-1β) that induce tissue factor expression in vascular endothelium; and (4) release of matrix-metalloproteinases (MMPs) that disrupt endothelial integrity and promote leukemic blast extravasation.[6,8,32-35] Extrinsic factors such as sepsis, disseminated intravascular coagulation, chemotherapeutic agents, dehydration, indwelling catheters and surgical interventions could also contribute to the predisposition for thrombosis in AML patients.[4,6,8,36,37] Most of the pathophysiologic mechanisms outlined above are based on studies done on AML-M3 population. The exact mechanisms for arterial thrombosis in non-M3 AML subtypes are still unknown.

Clinical presentation of arterial thrombosis

Arterial thrombosis in AML albeit rarely can affect virtually any arterial vessel. The clinical presentation will depend on the vascular bed involved.

Based on our literature search which included 51 AML cases, arterial thrombosis most commonly involved the lower limb vessels (44%), followed by the coronary (26%), cerebrovascular (22%), aorta (8%), internal carotid artery (6%), abdominal visceral vasculature (6%) and upper limb vessels (4%) [See Table 1]. The patient's age ranged from 10-75 years old. The most common FAB class was APL (42%), followed by AML without maturation M1 (16%), AML with maturation M2 (12%), AML subtype unspecified (12%), acute monoblastic monocytic leukemia M5 (10%) and acute myelomonocytic leukemia M4 (8%). Involvement of two or more vascular beds occurred in only 14% of cases.[10,13,16,21,25,38,39] Our case is unique as this is the first documented case of acute myelomonocytic leukemia (AML-M4) with an initial presentation of left lower extremity artery involvement that then progressed to aortoiliac occlusion,

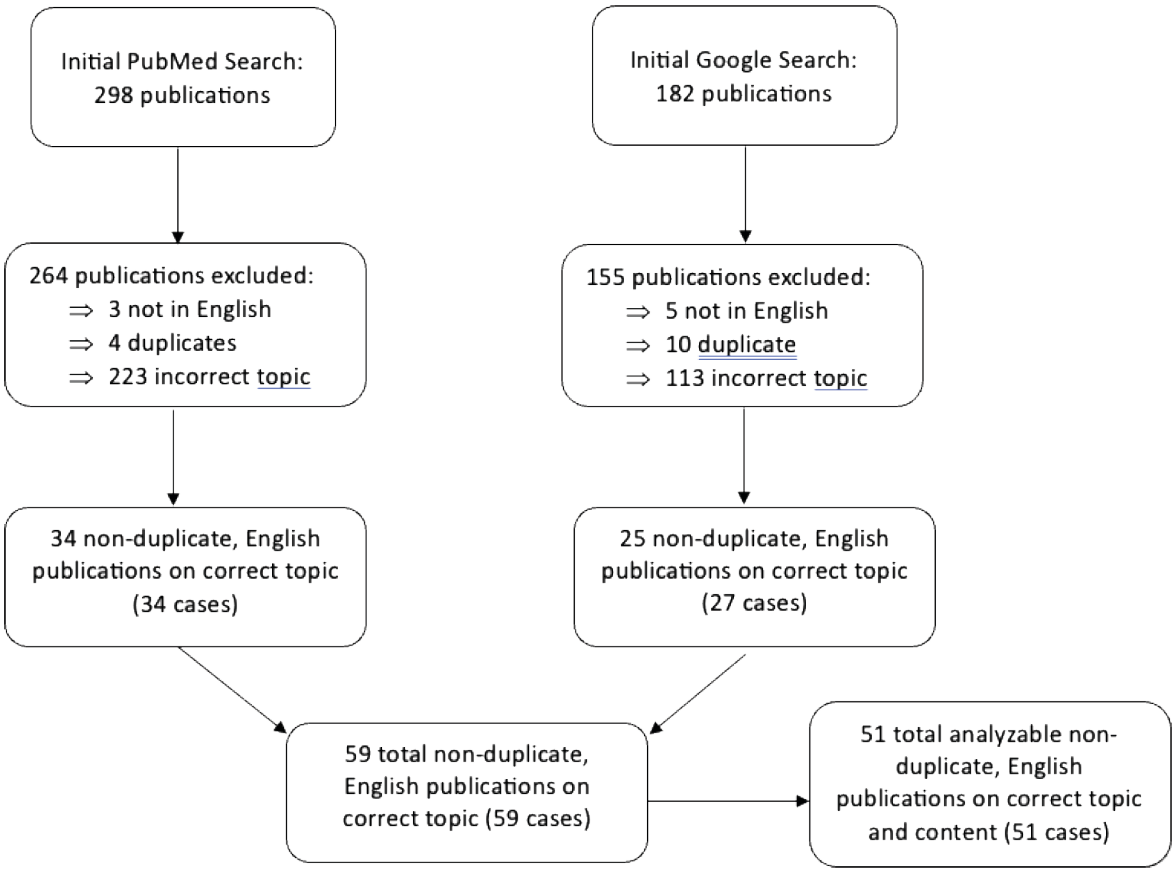

Figure 5. Flowchart including articles found in PubMed and Google search using the search terms: "acute myeloid leukemia/leukaemia", "acute myelogenous leukemia/leukaemia", "ischemia/ischaemia", "arterial thrombosis", "thromboembolism", "aortic occlusion", "femoral", "popliteal", "infarction", "promyelocytic leukemia/leukaemia", "arterial occlusion", "lower extremity", "upper extremity", "stroke" and "myocardial infarction". This resulted in a total of 50 manuscripts and cases. Nine manuscripts were excluded as they did not have full text, written in a different language and had inappropriate content.

and further down involved the left posterior cerebral artery and coronary vascular beds.

Management options

Management of AML with multiple arterial thrombosis necessitates a multidisciplinary approach. It entails initiating the appropriate chemotherapeutic regimen and/or cytoreductive therapy, balancing the need to anticoagulation with increased risks for disseminated intravascular coagulation and bleeding, and curtailing the revascularization strategy depending on the vascular bed affected.

Revascularization strategies and medical therapy in the context of vascular bed involvement

Revascularization of the threatened organ or limb usually takes precedence due to the repercussions of possible limb loss, disability, or death. Here we outline the revascularization strategies utilized in literature based on the arterial vessels affected (See Supplementary Appendix).

Limb vessels

Strategies for revascularization may vary from catheter-directed thrombolysis, thrombo-aspiration, endovascular/surgical thromboembolectomy and bypass. This is in line with recommendations from the updated guidelines for management of peripheral arterial disease.[40,41]Thrombosis of the lower extremity vessels (44%) appears to be more common than upper extremity vessels (4%) in our case review. Multiple thrombectomies were necessary to establish adequate revascularization in 3.8% (9/24).[5,9,11-13,15,17,20,24] Amputation was done in 10% (5/55) of cases for irreversible ischemia of the affected limb.[11,12,17,19,25,42] Upper limb vessel occlusion occurred in only two cases and involved the axillary and subclavian arteries.[38,43] Both cases were started on heparinization and underwent surgical revascularization.

Aorta

There are only four reported cases of aortic thrombosis among patients with AML, all of which involved the infrarenal abdominal aorta with extension into one or both common iliac arteries

distally.[10,13,18,28]. Hyperleukocytosis was found in only 50% (2/4) of cases.[10,28] Revascularization of aortic thrombosis involved either endovascular or open thrombectomy. Anticoagulation with heparin (75%) and induction chemotherapy (100%) were initiated for most cases. Out of these, only one patient survived with a combination of chemotherapy, anticoagulation and thromboembolectomy.[28]

For our case, the aortoiliac thrombosis and recurrent thrombosis proved to be challenging because of subsequent involvement of other vascular beds and subsequent repeated revascularization despite receiving therapeutic anticoagulation.

Coronary vessels

The presentation of coronary vessel thrombosis was acute ST-elevation myocardial infarction (STEMI) in most cases (10/15, 67%).[36,44-47]. The decreasing order of coronary vessel involvement were as follows: right coronary artery (40%) and left anterior descending artery (40%), followed by left circumflex artery (13%) and ostial left main coronary artery (7%).[21,22,36,44-46,48-53] Coronary artery thrombosis was not angiographically documented in three cases because of sudden death, concurrent acute stroke and no consent to catheterization.[36,44-46,52]. It is worth noting that STEMI in the context of AML can also occur even with angiographically normal coronaries alluding to an alternative pathophysiologic process, specifically myopericarditis.[54]

Percutaneous transluminal coronary angioplasty (PTCA) with stenting was the most common reperfusion strategy utilized (33%, 5/15).[44,48,49,53] Other revascularization modalities used were catheter-directed intracoronary thrombolysis with streptokinase (7%, 1/15), PTCA with balloon dilatation (13%, 2/15), PTCA with thrombus aspiration (20%, 3/15) and coronary artery bypass grafting (7%, 1/15).[21-23,47,50] Adjunctive medical therapy included the use of antiplatelets, anticoagulation, nitrates, statins, beta-blockers and/or ACE-inhibitors. Due to the increased risk for hemorrhage, systemic thrombolysis was deferred in most cases. Dual antiplatelet therapy (combination of aspirin plus clopidogrel or prasugrel) was given in 35% of patients, while single antiplatelet was given in 21% of patients.

Cerebrovascular vessels

The middle cerebral (72%) and posterior cerebral arteries (18%) were the most common vascular territories affected.[16,19,25,31,38,39,46,55-58] Concomitant internal carotid artery thrombosis was seen in 27% (3/11) of patients.[39,56,58] Among the 11 AML patients we reviewed with concomitant cerebrovascular accident, only one underwent cerebral embolectomy.[58] The other cases were managed medically with single antiplatelets and chemotherapy initiation. Anticoagulation was only given for indications of another concomitant thrombosis.[31,38,39,46]

Chemotherapy and cytoreductive treatment

Early recognition of AML is the key to address the underlying etiology. Index of suspicion should be high, especially with the presence of hematologic abnormalities and recurrent infections on clinical presentation. A hematology consult should be sought for prompt decision-making on chemotherapy or use of leukopheresis in cases of high leukocyte burden. On our review of cases, chemotherapy was initiated in 74% (37/50) of patients. The most used induction regimen was a combination of anthracycline (daunorubicin, idarubicin), cytarabine, etoposide, hydroxyurea, and/or thioguanine.[6,9,11,12,14,15,17,24–26,42,57,59–62] In cases of AML-M3, all-trans retinoic acid (ATRA) was also given.[5,13,42,43,57,59,60] It is worth taking note that prompt administration of chemotherapeutic regimen and/or cytoreductive therapy does not ensure survival. This can be attributed to the high mortality associated with AML and concomitant disease conditions (ARDS, bleeding, sepsis).[5,6,10,13,17,24,38,61] In addition, a study of 94 cases of thrombosis in AML revealed that 41% of thrombosis occurred after initiation of chemotherapy. This could be attributed to lysis of leukemic cells that leads to release of prothrombotic blast products and chemotherapeutic agents (anthracyclines, ATRA) that have procoagulant effects.[63] Challenges encountered in our case that hindered prompt administration of chemotherapeutic regimen was the overwhelming sepsis associated with multiple infections, lack of blood products, major bleeding and delay with identification of the immunophenotypic classification of AML because the flow cytometry was sourced externally.

CONCLUSION

Though arterial thrombosis in AML is rare, it can occur in the absence of hyperleukocytosis and can lead to serious complications – including limb loss, disability and death. Early recognition coupled with a multidisciplinary approach cannot be emphasized enough. The most appropriate treatment strategy consists of a combination of urgent revascularization, chemotherapy, cytoreductive therapy and adjunctive medical therapy. To our knowledge this is the first reported case of acute myelomonocytic leukemia (AML-M4), presenting with acute aortoiliac thrombosis, acute cerebrovascular infarct and coronary artery involvement.

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
1981	**Jetha, et al.**	25	F	AML (M3)	Recurrent thrombosis of CFA; SFA; PopA.	White thrombus with leukemic cells	-	Chemotherapy (unspecified)	-	Multiple thrombectomies; AKA	Fatal Sepsis DIC
1986	**Kootte, et al.**	42	F	AML (M2)	Occlusion of aorta, Rt. CIA; Leukemic thromboemboli in lungs, spleen and kidney	Myeloid blasts on clot	130	Leukapheresis	-	Arteriotomy, aortic thrombectomy	Fatal
1986	**Solomons, et al.**	32	M	AML (M3)	Occlusion of LAD	**No blasts on clot**	1.5	Etoposide, cytarabine	CDT streptokinase UFH	-	Fatal DIC
1992	**Fass, et al.**	10	M	AML (M3)	Recurrent thrombosis of CFA; SFA; PopA	White thrombus with leukemic cells	31.7	Cytarabine, daunorubicin	UFH Nifedipine Xanthinol nicotinate	Lt. iliofemoral thrombectomy; Transfemoral and transpopliteal thrombectomy of Lt. CFA, Lt. AKA; rethrombectomy of Lt. iliofemoral arteries; Right lumbar sympathectomy	Nonfatal Limb loss, ARDS
1994	**Campbell & Mitchell, et al.**	74	M	AML (M2)	SFA stenosis, occlusion	N/A	225 [83%]	Initial: mitoxantrone and cytosine arabinoside; reinduction: daunorubicin, etoposide, cytarabine	-	-	Nonfatal
1996	**Mataix, et al.**	42	M	AML (M2)	Rt. PopA thrombosis	Leukocyte thrombi	150 [95%]	cytarabine, daunorubicin, thioguanine, hydroxyurea	CDT streptokinase	Multiple thromboembolectomies; Rt. AKA; Bone marrow transplant	Fatal Limb loss DAH
1998	**Malnick, et al.**	40	F	AML (M5)	Recurrent Rt. femoral artery thrombosis.	**Blood clot with no leukemic cells**	2.6	Induction: cytarabine, daunorubicin; Consolidation: High-dose cytarabine, mitoxantrone, etoposide	LMWH, warfarin	Multiple thrombectomies Rt. CFA	Nonfatal

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
1998	**Rolston, et al.**	16	M	AML (M3)	Occlusion of Lt. EIA; PE	-	-	ATRA, Chemotherapy (unspecified)	-	Surgical thrombectomy, toe amputation	Nonfatal
1999	**DiGiovanni, et al.**	16	M	AML (M3)	Lt. SFA; pulmonary venous infarction	White clot with **no histopath**	2.9	ATRA	UFH, warfarin	Lt. femoral embolectomy	Nonfatal Complete Remission
2001	**Jachmann-Jan, et al.**	42	M	AML (M2)	Thrombotic occlusion of LAD	N/A	45.4	Induction: cytarabine, thioguanine, etoposide Consolidation: cytarabine, mitoxantrone	Aspirin, ACEi, BB, statin	PTCA with LAD stenting	Nonfatal
2003	**Chang, et al.**	46	M	AML (no subtype)	Lt. ATA, PTA thrombosis; gangrenous lt. 5th toe, TIA	Thrombosis with **no leukemic cells**	47.7 [32%]	Plateletpheresis; induction: idarubicin, cytarabine, hydroxyurea Subsequent: daunorubicin and cytarabine	Aspirin, interferon, CDT urokinase	Lt. BKA, Lt. knee disarticulation	Fatal Sepsis
2002	**Cohen, et al.**	56	F	AML (M1)	Occlusion RCA, LAD	-	316	Leukapheresis; Induction: cytarabine Reinduction: cytarabine, etoposide) Salvage: High-dose cytarabine, mitoxantrone, fludarabine, anti-CD33 antibody, idarubicin	-	-	Fatal
2002	**Miyoshi, et al.**	71	M	AML (M3)	Lacunar infarct rt. lenticular nucleus	-	10.4 [90%]	ATRA, cytarabine	Methylprednisolone, gabexate mesylate	-	Nonfatal DIC
2003	**Kalk, et al.**	47	F	AML (M3)	Occlusion Lt. PopA	-	4.4	ATRA; Induction: daunorubicin, cytarabine, thioguanine	-	Toe amputation	Nonfatal

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
2003	**Pervez, et al.**	54	M	AML (M4)	STEMI inferior lateral (RCA)	-	9.4 (20%)	-	Aspirin, nitrates, ACEi, BB	-	Nonfatal
2003	**Posacioglu, et al.**	39	M	AML (M3)	Lt. CIA total occlusion; Aortoiliac occlusion; necrotic lt. big toe.	White clot with mononuclear blasts	19.2	ATRA; Induction: cytarabine, idarubicin	UFH	Open multiple thrombectomies; aorto-bi-iliac trouser graft interposition.	Fatal, UGIB, sepsis
2006	**Lou, et al.**	41	M	AML (M3)	Thrombosis proximal LAD	-	5.4 [60%]	ATRA	Aspirin, clopidogrel, LMWH, nitrates	PTCA with LAD stenting	Nonfatal Complete remission
2007	**Kafetzakis, et al.**	57	M	AML (M5)	Occlusion of rt. CIA bifurcation	White thrombus with leukemic blasts	120.3 [95%]	Leukapheresis; Induction: idarubucin, cytarabine	UFH	Rt. iliofemoral and femoral-popliteal arterial thromboembolectomy	Nonfatal Complete remission
2007	**Reisch, et al.**	39	F	AML (M1)	Recurrent occlusion of rt. CIA, EIA; lt. CFA, PFA, SFA, ATA; rt. leg compartment syndrome	White thrombus with leukemic blasts	9.7	Induction: cytarabine, thioguanine, daunorubicin	UFH, tirofiban	Multiple thrombectomies; fasciotomy, rt. thigh amputation	Nonfatal Limb loss Complete remission
2008	**Chang, et al.**	40	F	AML (M1)	Inferior wall STEMI; rt. dural sinus thrombosis	-	11 [83%]	Induction: cytarabine, etoposide	Aspirin, clopidogrel, LMWH, warfarin, BB	-	Nonfatal Complete remission
2008	**Liu, et al.**	56	M	AML (M4)	Thrombosis of superior mesenteric artery	-	5.77	Induction: cytarabine, idarubicin Subsequent: Fludarabine, cytarabine, etoposide, mitoxantrone	UFH	Bone marrow transplantation	Fatal
2009	**Belizna, et al.**	51	M	AML (M3)	Lt. femoral, popA and peroneal artery; lt. foot gangrene	-	8.4 [43%]	Chemotherapy (unspecified)	UFH	Surgical thromboembolectomy; lt. leg amputation	Fatal Limb loss DIC

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
2010	**Carella, et al.**	49	M	AML (M3)	Cortical-subcortical infarct rt. insula and rt. frontal lobe	-	6.94	ATRA; idarubicin	Dexamethasone, LMWH		Nonfatal
2012	**Muniz**	76	M	AML (no subtype)	Thrombosis of rt. MCA, myocardial infarction	Leukemic cells in visceral organs	358 [94%]	-	-	-	Fatal
2012	**Overton, et al.**	57	F	AML (M1)	Occlusion of bilateral CIA, lt. popliteal	Leukemic cells in clot	68.8 [>90%]	Daunorubicin, cytarabine, aspirin, clopidogrel, UFH	UFH, aspirin, clopidogrel	Bilateral femoral embolectomies, lt. popliteal thromboembolectomy, lt. femoral–popliteal bypass graft, lt. AKA	Fatal, Sepsis
2012	**Sargsyan, et al.**	51	M	AML (M3)	Thrombosis ostial left main, LAD, LCX, ascending aorta; left atrial thrombus	-	3.1	-	Aspirin, prasugrel	PTCA with LAD stenting, IABP, CABG	Fatal
2013	**Mar, et al.**	63	F	AML (M5)	Near total occlusion infrarenal aorta	Leukemic blasts in aortic thrombus	14.4	Induction: cytarabine, idarubicin	UFH	Aortic thrombectomy	Fatal
2013	**Sharma, et al.**	35	F	AML (M3)	Rt. frontoparietal infarct, narrowing of rt. ICA	-	3	ATRA	-	-	Nonfatal
2014	**Trottier-Tellier, et al.**	52	F	AML (M3)	Thrombosis of lt. axillary artery, lt. subclavian, Embolus lt. distal ulnar artery; PE, recent DVT	-	-	ATRA, Arsenic	UFH, IV argatroban, SC fondaparinux, LMWH for long-term anticoagulation; multiple CDT	open thrombectomy; Lt. carotidohumeral bypass;	Nonfatal
2015	**Elghazaly, et al.**	48	M	AML (M5)	acute lt. PCA infarction	-	74.6 [73%]	ATRA, chemotherapy (unspecified)	-	-	Unknown

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
2015	**Hela, et al.**	55	M	AML (M1)	Thrombosis of lt. subclavian; vertebral basilar ischemic lesions	**White clot with no histopath**	-		UFH	Lt. subclavian embolectomy	Fatal ARDS
2015	**Li, et al.**	33	F	AML (M3)	Acute infarct lt. frontoparietal lobe, STEMI inferior wall	-	3.9	ATRA, arsenic, idarubicin	Aspirin, clopidogrel, LMWH	-	Nonfatal
2016	**Chotai, et al.**	75	F	AML (M3)	Recurrent arterial thrombosis Rt. CIA; Occlusion of femoro-femoral bypass	**White clot in CFA and bypass graft, no histopath**	43.5 [90%]	ATRA	UFH	Multiple thrombectomies, femoro-femoral bypass with patching of bilateral common femoral arteries; resection of rt. CFA with dacron interposition grafting, and bovine pericardial patch angioplasty of the lt. CFA.	Fatal
2016	**D'Angelo, et al.**	16	M	AML (M1)	Occlusion of rt. EIA and rt. CFA	Lard-like clot with neoplastic tissue	92.0 [90%]	induction: idarubicin, cytarabine and etoposide	UFH, CDT urokinase, prostaglandin	Surgical thromboembolectomy of rt. EIA and rt. CFA, rt. AKA	Complete remission; Limb loss
2016	**Kharwar, et al.**	50	M	AML [M2}	Partial occlusion infrarenal aorta before bifurcation; complete thrombotic occlusion of lt. CIA; left ventricle apical thrombus	-	240 [95%]	Chemotherapy (unspecified)	UFH	Aortic with left ileo-femoral thromboembolectomy	Nonfatal
2017	**Jia, et al.**	66	M	AML (M2)	Thrombosis in the left CIA, IIA and EIA	-	6.9	Induction: cytarabine, idarubicin	UFH; nadroparin calcium; alprostadil; CDT	Lt. balloon catheter thrombectomy lt. iliac artery	Fatal
2018	**Carnevale, et al.**	78	F	AML (M3)	Occlusion lt. CFA, SFA, ATA, DPA	Blast cell thrombus	172 [54%]	Induction: high-dose cytarabine	-	Open SFA thrombectomy, CFA endarterectomy, patch angioplasty, percutaneous ATA embolectomy	Nonfatal

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
2018	**Li, et al.**	40	M	AML (M4)	Occlusion proximal RCA	Thrombus with blasts and coagulative necrosis	81.9	Cytarabine, idarubicin	-	PTCA with thrombus aspiration, balloon dilatation RCA	Fatal Sepsis
2018	**Manea, et al.**	59	M	AML (M3)	Multiple infarcts rt. frontal-subcortical lacunar, rt. fronto-insular, parietal, lt. temporal	-	642 [88%]	ATRA, idarubicin	-	-	Nonfatal Complete remission
2018	**Skalidis, et al.**	61	M	AML (M4)	Thrombosis RCA	Yellow-colored material with mononuclear blasts				PTCA with thrombus aspiration RCA	Nonfatal
2020	**Chavez, et al.**	71	M	AML (M3)	Occlusion bilateral SFA, PopA (stents); STEMI	-	4.6 [30%]	ATRA	UFH	PTCA with balloon angioplasty RCA	Fatal
2020	**Liang et al.**	70	M	AML (M1)	STEMI inferior wall as a result of RCA embolism; acute PE	-	26.9 [29%]	-	Warfarin, nadoparin calcium, clopidogrel	-	Fatal Bleed
2020	**Baldacini, et al.**	62	F	AML (M3)	Infarct lt. ICA, lt. MCA, lt. PCA rt. ICA and basilar trunk	-	20.7 [71%]	ATRA, hydroxyurea	-	Multiple cerebral thrombectomies	Fatal
2021	**MacDougall, et al.**	50	M	AML (M3)	Small punctate acute infarcts bilateral cerebellar hemisphere, rt. frontal lobe subacute infarct; splenic infarct; bilateral renal infarct; bilateral segmental lower lobe PE	-	4.4	ATRA, arsenic	LMWH, apixaban, aspirin	-	Nonfatal

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
2022	**Ferrel, et al.**	59	F	AML (no subtype)	STEMI anterolateral; rt. segmental PE; thrombotic infarcts in spleen, bilateral kidneys, rt. lung, and liver;	-	79 [95%]	ATRA, hydroxyurea	UFH, prednisone	-	Fatal
2022	**Bontinis, et al.**	56	M	AML (no subtype)	Occlusion bilateral CIA, EIA, CFA, lt. SFA, Near total occlusion R SFA	White thrombus with leukemic cells	47.6	hydroxyurea	UFH, LMWH,	Thromboembolectomy	Fatal ARDS
2023	**Hirata, et al.**	49	M	AML (no subtype)	Bilateral adrenal infarction	-	3.5	-	Aspirin, hydrocortisone, allopurinol	-	Nonfatal
2023	**Ni, et al.**	13	M	AML (M1)	Thrombosis rt. DPA, rt. femoral vein	-	174 [95%]	Leukapheresis; Induction: cytarabine, daunorubicin, homoharringtonine, sorafenib; Subsequent: cladribine, cytarabine, mitoxantrone, sorafenib	LMWH, alprostadil, diosmin	Bone marrow transplantation	Nonfatal Complete remission
2023	**Zheng, et al.**	67	M	AML (no subtype)	Partial occlusion LCX, LAD, RCA; PE lt. upper and bilateral lower lobar	-	8.51	-	Aspirin, clopidogrel, enoxaparin, rivaroxaban, atorvastatin	PTCA with LCX stenting	Fatal Bleed HIT
2023	**Pankaj,, et al.**	58	F	AML (M5)	Rt. MCA and lt. parietal lobe infarct	-	156.6 [90%]	Cytarabine, hydroxyurea	UFH	-	Fatal

Continued

Table 1. Related Case Reports of Acute Myeloid Leukemia Presenting With Acute Arterial Thrombosis (continued)

YEAR	AUTHORS	AGE	SEX	FAB CLASS	VASCULAR DIAGNOSIS	Clot histopath	WBC (X10^9/L) [%BLASTS]	CHEMOTHERAPY & CYTOREDUCTIVE TX	OTHER MEDICAL TX	SURGICAL THERAPY	OUTCOME
2024	Santos,, et al. (Our case)	55	F	AML (M4)	Infrarenal aortoiliac occlusion, white clot lt. SFA and PopA; lt. posterior cerebral artery infarct; multisegmental hypokinesia and diminished systolic function on echocardiography	White thrombus with no leukemic cells	31.4 [96%]	-	UFH, LMWH, Fondaparinux	Lt. SFA and PopA embolectomy; aortography with bilateral femoral run-off, embolectomy of aorta and iliac arteries (kissing balloon retrograde), lt. AKA	Fatal, bleed, sepsis
2024	Kamoga, et al.	56	M	AML (no subtype)	STEMI anterior (LAD)	-	1.7 [90%]	Azacitidine	-	Angiojet thrombectomy, PTCA with LAD stenting	Fatal

ARDS – Acute respiratory distress syndrome; ACEi – Angiotensin converting enzyme inhibitor; AKA – above knee amputation; AML – acute myelogenous leukemia; ATA – anterior tibial artery; ATRA – all-trans retinoic acid; BB – beta-blocker; CABG – coronary artery bypass grafting; CIA – common iliac artery; CDT – Catheter-directed thrombolysis; CFA – common femoral artery; DAH – diffuse alveolar hemorrhage; DIC – disseminated intravascular coagulation; DVT – deep venous thrombosis; EIA – external iliac artery; HIT – heparin-induced thrombocytopenia; IABP – intra-aortic balloon pump; ICA – internal carotid artery; IIA – internal iliac artery; LAD – left anterior descending coronary artery; LCX – left circumflex artery; LMWH – low molecular weight heparin; Lt – Left; MCA – middle cerebral artery; PCA – posterior cerebral artery; PE – pulmonary embolism; PFA – profunda femoris artery; PopA – Popliteal artery; PTA – posterior tibial artery; PTCA – percutaneous transluminal coronary angioplasty; RCA – right coronary artery; Rt – Right; SFA – superficial femoral artery; STEMI – ST-elevation myocardial infarction; TIA – transient ischemic attack; UGIB – upper gastrointestinal bleeding; UFH – unfractionated heparin

REFERENCES

1. Angelescu S, Berbec NM, Colita A, Barbu D, Lupu AR. Value of multifaced approach diagnosis and classification of acute leukemias. *Maedica (Bucur)*. 2012 Sep;7(3):254–60.
2. De Stefano V, Sorà F, Rossi E, Chiusolo P, Laurenti L, Fianchi L, et al. The risk of thrombosis in patients with acute leukemia: occurrence of thrombosis at diagnosis and during treatment. *Journal of Thrombosis and Haemostasis*. 2005 Sep;3(9):1985–92.
3. Mitrovic M, Suvajdzic N, Elezovic I, Bogdanovic A, Djordjevic V, Miljic P, et al. Thrombotic events in acute promyelocytic leukemia. *Thromb Res*. 2015 Apr 1;135(4):588–93.
4. Crespo-Solís E. Thrombosis and acute leukemia. *Hematology*. 2012 Apr;17(1):169-73.
5. Chotai PN, Kasangana K, Chandra AB, Rao AS. Recurrent arterial thrombosis as a presenting feature of a variant M3-acute promyelocytic leukemia. *Vasc Specialist Int*. 2016 Jun 30;32(2):65–71.
6. Jia Y. Thromboembolism in lower extremity arteries as the initial symptom of acute leukemia: a case report and review of literature. *Hematology & Transfusion International Journal*. 2018 Jan 12;6(1).
7. Feng S, Zhou L, Zhang X, Tang B, Zhu X, Liu H, et al. Impact of ELN risk stratification, induction chemotherapy regimens and hematopoietic stem cell transplantation on outcomes in hyperleukocytic acute myeloid leukemia with initial white blood cell count more than 100 × 109/L. *Cancer Manag Res*. 2019 Nov;11:9495–503.
8. Bewersdorf JP, Zeidan AM. Hyperleukocytosis and leukostasis in acute myeloid leukemia: can a better understanding of the underlying molecular pathophysiology lead to novel treatments? *Cells*. 2020 Oct 17;9(10):2310.
9. Jetha N. Promyelocytic leukemia with multiorgan infarctions and large-vessel thrombosis. *Arch Pathol Lab Med*. 1981 Dec;105(12):683–4.
10. Kootte AMM, Thompson J, Bruijn JA. Acute myelocytic leukemia with acute aortic occlusion as presenting symptom. *Acta Haematol* [Internet]. 1986;75(2):120–1. Available from: https://www.karger.com/Article/FullText/206100
11. Fass R, Haddad M, Zaizov R, Sandbank Y, Yaniv I, Cohen IJ, et al. Recurrent peripheral arterial occlusion by leukemic cells sedimentation in acute promyelocytic leukemia. *J Pediatr Surg* [Internet]. 1992 May;27(5):665–7. Available from: https://linkinghub.elsevier.com/retrieve/pii/002234689290475M
12. Mataix R, Gómez-Casares MT, Campo C, Jiménez S, Malcorra JJ. Acute leg ischaemia as a presentation of hyperleukocytosis syndrome in acute myeloid leukaemia. *Am J Hematol*. 1996 Mar;51(3):250.
13. Posacioglu H, Apaydin AZ, Buyukkececi F, Soydan S, Durmaz J. Recurrent peripheral arterial occlusion in acute promyelocytic leukemia. *EJVES Extra*. 2003;6(5):100–2.
14. Kafetzakis A, Foundoulakis A, Ioannou CV, Stavroulaki E, Koutsopoulos A, Katsamouris AN. Acute lower limb ischemia as the initial symptom of acute myeloid leukemia. *Vascular Medicine* [Internet]. 2007 Aug 30;12(3):199–202. Available from: http://journals.sagepub.com/doi/10.1177/1358863X07080630
15. Reisch N, Roehnisch T, Sadeghi M, Greiner L, Regenbogen C, Rieger J, et al. AML M1 presenting with recurrent acute large arterial vessel thromboembolism. *Leuk Res*. 2007 Jun;31(6):869–71.
16. Muñiz AE. Myocardial infarction and stroke as the presenting symptoms of acute myeloid leukemia. *J Emerg Med*. 2012 Jun;42(6):651–4.
17. Overton J, Nicklin A, Eleftheriou P, Frith D, Gravante G, Sapsford W. Recurrent acute lower-limb ischemia with multiple organ infarctions secondary to acute myeloid leukaemia M1. *Ann Vasc Surg*. 2012;26(8):1128.e1-1128.e5.
18. Mar N, Gorgan MA, Dailey ME, Vredenburgh JJ. Blue toes and a new pair of shoes—Challenges in diagnosis and treatment of acute myelogenous leukemia. *Am J Hematol*. 2013 Dec 22;88(12):1090–3.
19. Carella A, Antonucci G, Conte M, Pumpo M, Antonucci E, Ponziano E. A case of ischemic stroke in acute promyelocytic leukemia at initial presentation: relevance of all-trans retinoic acid treatment. *Cardiovascular & Hematological Disorders-Drug Targets*. 2010 Mar 1;10(1):1–6.
20. Carnevale ML, Phair J, Yau P, Garg K. Blast cell arterial embolus in acute myelogenous leukemia. *Ann Vasc Surg*. 2019 Apr;56:351.e9-351.e11.
21. Li J, Dong L, Li C Ling, Liu Y Bin, Feng L Jun. Myocardial infarction caused by leukemic clot: a case report. *The Anatolian Journal of Cardiology*. 2018; 304-5
22. Skalidis E, Anastasiou I, Konstantinou I, Petousis S, Papadaki E, Drakos E, et al. Leukemic blast clot causing ST-segment elevation myocardial infarction. *JACC Cardiovasc Interv*. 2018 Aug;11(16):1656–7.
23. Solomons HD, Stanley A, King PC, Pienaar N, Atkinson PM. Acute promyelocytic leukaemia associated with acute myocardial infarction. A case report. *South African Medical Journal*. 1986 Jul 19;70(2):117–8.
24. Malnick SD, Ben-David D, Shtalrid M, Leichman I, Schwartz H, Sthoeger ZM. Acute femoral artery thrombosis associated with functional protein C deficiency as the presenting manifestation of acute monocytic leukemia. *South Med J*. 1998 Jul;91(7):663–4.
25. Chang VT, Aviv H, Howard LM, Padberg F. Acute myelogenous leukemia associated with extreme symptomatic thrombocytosis and chromosome 3q translocation: Case report and review of literature. *Am J Hematol*. 2003 Jan;72(1):20–6.
26. Campbell J, Mitchell CA. Acute leg ischaemia as a manifestation of the hyperleukocytosis syndrome in acute myeloid leukaemia. *Am J Hematol*. 1994 Jun;46(2):167
27. Cohen Y, Amir G, Da'as N, Gillis S, Rund D, Polliack A. Acute myocardial infarction as the presenting symptom of acute myeloblastic leukemia with extreme hyperleukocytosis. *Am J Hematol*. 2002 Sep;71(1):47–9.
28. Kharwar RB, Sharma K, Jain S. Acute myeloid leukemia with intracardiac thrombus presenting as acute limb ischemia. *J Cardiovasc Ultrasound*. 2016;24(2):174.

29. Manea MM, Dobri AM, Dragoş D, Borsaru G, Tuţă S. Multiple acute ischemic strokes as the onset manifestation of acute promyelocytic leukemia. *Romanian Journal of Internal Medicine*. 2018 Dec 1;56(4):265–8
30. Ni J, Chen M, Su Y, Gao Q, Liu L, Lu X. Right femoral vein and right dorsal artery thrombosis in childhood acute myeloid leukemia: A case report. *Medicine*. 2023 Oct 13;102(41):e35121.
31. Pankaj P, Panda CK, Karim HMR, Bala S, Bidwaikar A. Ischemic stroke as the presenting feature for non-acute promyelocytic leukemia variant of acute myeloid leukemia: A case report. *Cureus*. 2023 Jun 28; 15(6):e41083
32. Porcu P, Cripe LD, Ng EW, Bhatia S, Danielson CM, Orazi A, et al. Hyperleukocytic leukemias and leukostasis: A review of pathophysiology, clinical presentation and management. *Leuk Lymphoma*. 2000 Jan;39(1–2):1–18.
33. Reikvam H, Hatfield KJ, Øyan AM, Kalland KH, Kittang AO, Bruserud Ø. Primary human acute myelogenous leukemia cells release matrix metalloproteases and their inhibitors: release profile and pharmacological modulation. *Eur J Haematol*. 2010 Mar;84(3):239–51.
34. Cavenagh JD, Gordon-Smith EC, Gibson FM, Gordon MY. Acute myeloid leukaemia blast cells bind to human endothelium in vitro utilizing E-selectin and vascular cell adhesion molecule-1 (VCAM-1). *Br J Haematol*. 1993 Oct;85(2):285–91.
35. Röllig C, Ehninger G. How I treat hyperleukocytosis in acute myeloid leukemia. *Blood*. 2015 May 21;125(21):3246–52.
36. Chang H, Lin TL, Ho WJ, Hsu LA. Acute myeloid leukemia associated with acute myocardial infarction and dural sinus thrombosis: The possible role of leukemia-related hyperhomocysteinemia. *Journal of the Chinese Medical Association*. 2008 Aug;71(8):416–20.
37. Martí-Carvajal AJ, Anand V, Solà I. Treatment for disseminated intravascular coagulation in patients with acute and chronic leukemia. *Cochrane Database of Systematic Reviews*. 2015 Jun 24;2015(6)CD008562.
38. Hela BJ, Sayda M. Recurrent ischemic cerebrovascular accidents with recurrent acute ischemia of the left upper limb revealing acute myeloid leukemia. *J Vasc Med Surg*. 2015;03(04):1-3.
39. MacDougall K, Chukkalore D, Rehan M, Kashi M, Bershadskiy A. Acute promyelocytic leukemia presenting as recurrent venous and arterial thrombotic events: a case report and review of the literature. *J Community Hosp Intern Med Perspect*. 2021 Nov 2;11(6):832–8.
40. Gerhard-Herman MD, Gornik HL, Barrett C, Barshes NR, Corriere MA, Drachman DE, et al. 2016 AHA/ACC guideline on the management of patients with lower extremity peripheral artery disease: Executive summary: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2017 Mar 21;135(12).
41. Aboyans V, Ricco JB, Bartelink MLEL, Björck M, Brodmann M, Cohnert T, et al. 2017 ESC guidelines on the diagnosis and treatment of peripheral arterial diseases, in collaboration with the European Society for Vascular Surgery (ESVS). *Eur Heart J*. 2018 Mar 1;39(9):763–816.
42. Kalk E, Goede A, Rose P. Acute arterial thrombosis in acute promyelocytic leukaemia. *Clin Lab Haematol* [Internet]. 2003 Aug;25(4):267–70. Available from: http://doi.wiley.com/10.1046/j.1365-2257.2003.00526.x
43. Trottier-Tellier. Recurrent arterial and venous thromboemboli as initial presentation of acute promyelocytic leukemia. *J Clin Med Res*. 2014 Jul 28 28;6(5):388–91
44. Jachmann-Jahn U, Cornely OA, Laufs U, Hopp HW, Meuthen I, Krakau M, et al. Acute anterior myocardial infarction as first manifestation of acute myeloid leukemia. *Ann Hematol*. 2001 Nov 1;80(11):677–81.
45. Pervez H, Potti A, Mehdi SA. Simultaneous presentation of acute myelogenous leukemia and acute myocardial infarction. *Journal of Clinical Oncology*. 2003 Apr 1;21(7):1416–7.
46. Li Y, Suo S, Mao L, Wang L, Yang C, Xu W, et al. Acute myocardial/cerebral infarction as first/relapse manifestation in one acute promyelocytic leukemia patient. *Int J Clin Exp Med*. 2015;8(8):14210–3.
47. Kamoga D, Desikan S, Desikan R, Musuuza J. Acute myocardial infarction in an untreated patient with acute myeloid leukemia. *Clin Case Rep*. 2024 Mar 13;12(3):e8601.
48. Lou Y, Mai W, Jin J. Simultaneous presentation of acute myocardial infarction and acute promyelocytic leukemia. *Ann Hematol*. 2006 Jun 24;85(6):409–10.
49. Sargsyan Z, Higgins C, Alexandrescu S, Ott DA, Jain SK. Acute promyelocytic leukemia as a cause of intracoronary drug-eluting-stent thrombosis. *Tex Heart Inst J*. 2012;39(3):416–9.
50. Chavez MA, Heidari B, Thacker S, Samuel LL, Ogbonna M. Acute promyelocytic leukemia presenting as bilateral acute limb ischemia and ST elevation myocardial infarction: a case report. *Cureus*. 2020 Jun 7;12(6):e8495
51. Liang H, Ba M, Li C, Li H, Guo Z, He P, et al. A case of acute myelogenous leukemia characterized by arterial and venous thrombosis. *Cardiovasc Diagn Ther*. 2020 Oct;10(5):1332–40.
52. Ferrel MN, Ryan JJ, Han FT. Acute myeloid leukemia causing acute thrombosis of the coronary arteries: a case report. *J Med Case Rep*. 2022 Dec 12;16(1):149.
53. Zheng S, Luo S, Luo Y, Liu D, Zheng W, Peng Q. Acute pulmonary embolism combined with acute myocardial infarction as the first manifestation of acute leukemia: a case report. *Front Cardiovasc Med*. 2023 Sep 13;10:1259548.
54. Manogna D, Sham R. Acute myocardial infarction as initial manifestation of acute myeloid leukemia: a rare manifestation of leukostasis. *Cureus*. 2020 Aug 4;12(8):e9551.
55. Miyoshi T, Otsuki T, Omine K, Kirito K, Nagai T, Izumi T, et al. Acute promyelocytic leukemia accompanied by retinoic acid syndrome with complications of acute myocardial infarction and cerebral infarction during treatment with all-trans retinoic acid. *Rinsho Ketsueki*. 2002 Oct;43(10):954–9.
56. Sharma JB, Gupta SK. Acute thrombotic occlusion of internal carotid artery: A rare neurological presentation

of acute promyelocytic leukaemia. *Neurol India*. 2013;61(6):662.
57. Elghazaly AA, Ibrahim MH, AlGwaiz LA. Brain infarction and blasts with bilobed nuclei in a patient with monocytic acute myeloid leukemia mimicking acute promyelocytic leukemia. *Hematology/Oncology and Stem Cell Therapy*. 2016;9(3):116–7.
58. Baldacini M, Pop R, Sattler L, Mauvieux L, Bilger K, Gantzer J, et al. Concomitant haemorrhagic syndrome and recurrent extensive arterial thrombosis in a patient with COVID–19 and acute promyelocytic leukaemia. *Br J Haematol*. 2020 Jun 26;189(6):1054–6.
59. Rolston DDK, Rubin S, Topolsky D, Styler M, Crilley P. Arterial occlusions as a presenting feature of acute promyelocytic leukemia. *Am J Clin Oncol*. 1998 Oct;21(5):436–7.
60. Digiovanni RJ, Crilley P, Kerstein MD. Peripheral arterial occlusion in acute promyelocytic leukemia. *Cardiovascular Surgery*. 1999 Mar;7(2):258-60.
61. Belizna C, Pistorius MA, Planchon B. Lethal limb ischaemia in leukaemia. Case report and review of the literature. *J Thromb Thrombolysis*. 2009;28(3):354–7.
62. D'Angelo P, Taormina C, Mosa C, Di Marco F, Valentino F, Trizzino A, et al. Severe lower limb ischemia by massive arterial thrombosis revealing an acute myeloid leukemia needing for leg amputation: Clinical and emotional aspects related to the communication with the patient and his family. *Pediatr Rep*. 2016;8(4):71–3.
63. Rashidi A, Silverberg ML, Conkling PR, Fisher SI. Thrombosis in acute promyelocytic leukemia. *Thromb Res*. 2013 Apr;131(4):281–9.