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Case Report

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Pancytopenia Revealing Visceral Leishmaniasis in A Renal Transplant Recipient: A Case Report and Literature Review

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Abstract:

Visceral leishmaniasis is a severe parasitic infection endemic in several regions of Algeria including Kabylie, the High Plateaus, and the Biskra region. In renal transplant recipients, chronic immunosuppression promotes the reactivation or acquisition of this infection, whose clinical presentation can be atypical, dominated by pancytopenia, hepatosplenomegaly, and fever. We report the case of a 24-year-old female renal transplant recipient from Kabylie, hospitalized for investigation of profound pancytopenia. The diagnosis was confirmed by histopathological examination of bone marrow biopsy, which revealed the presence of Leishmania amastigotes. The patient underwent a transient reduction of her immunosuppressive therapy and received specific anti-leishmanial treatment. The outcome was marked by a recurrence and progressive deterioration of graft function over four years. This case illustrates the diagnostic and therapeutic challenges of visceral leishmaniasis in transplant recipients, highlighting the importance of considering this diagnosis in any unexplained pancytopenia in patients from endemic areas, and the need for a multidisciplinary approach.

Key words: visceral leishmaniasis; kidney transplantation; pancytopenia; immunosuppression; kabylie; algeria; bone marrow biopsy

Introduction:

Leishmaniasis is a parasitic disease caused by protozoa of the genus Leishmania, transmitted by the bite of infected female phlebotomine sandflies [1]. Algeria is one of the most affected countries worldwide, ranking second after Afghanistan for the incidence of cutaneous leishmaniasis [2]. The disease is endemic in 98 countries, with Algeria recognized as a major hotspot [1].

In Algeria, leishmaniasis presents in two main clinical forms: cutaneous leishmaniasis, which is highly endemic, and visceral leishmaniasis, which is the most severe form and can be fatal without treatment [1,3]. The causative agents identified in Algeria are Leishmania major, Leishmania infantum, and Leishmania tropica [1]. Visceral leishmaniasis is caused by L. infantum, with dogs serving as the main reservoir [1, 4].

In immunocompetent patients, visceral leishmaniasis may remain asymptomatic or present with fever, hepatosplenomegaly, and pancytopenia [5]. In renal transplant recipients, however, chronic immunosuppression can lead to reactivation of latent infection or more severe primary infection [5, 6]. The presentation may be atypical, dominated by pancytopenia and fever, which can be confused with other post-transplant complications such as viral infections, drug side effects, or graft rejection [5, 7].

We report the case of a young renal transplant recipient from Kabylie who developed visceral leishmaniasis revealed by pancytopenia. This clinical case provides an opportunity to discuss the epidemiological, diagnostic, and therapeutic features of this infection in renal transplant recipients in Algeria.

Case Report:

Patient History and Context:

A 24-year-old woman, originally from Mischler in Kabylie, a region endemic for visceral leishmaniasis [1, 2], was admitted to our department for diagnostic work-up of pancytopenia. She was a renal transplant recipient without professional activity.

Her medical history revealed a malformative nephropathy of childhood that led to dialysis at the age of 10 years. She underwent kidney transplantation 14 years ago (at the age of 10 years) with a graft from her mother, a living donor. The pre-transplant cross-match was negative. Her immunosuppressive treatment initially consisted of corticosteroids and Imurel (Azathioprine) 100 mg/day, currently relayed by corticosteroids at 10 mg/day and Imurel.

Clinical Examination on Admission:

On admission, the patient was afebrile with normal blood pressure. Gynecological examination revealed normal menstrual cycles. Physical examination was notable for hepatosplenomegaly. Initial graft function was preserved with normal creatinine levels.

Laboratory Investigations and Complementary Explorations:

The hematological work-up revealed pancytopenia. The peripheral blood smear was normal with no morphological abnormalities. All standard hematological and infectious etiological work-ups were negative. A bone marrow biopsy was performed. Histopathological examination of the bone marrow biopsy revealed the presence of Leishmania amastigotes within macrophages, confirming the diagnosis of visceral leishmaniasis. The diagnosis was therefore established by the pathology department.

Diagnosis:

The diagnosis of visceral leishmaniasis revealed by pancytopenia was established in this renal transplant patient residing in an endemic area (Kabylie). The diagnosis was confirmed by histopathological examination of bone marrow biopsy showing Leishmania amastigotes.

Therapeutic Management and Outcome:

The patient underwent a transient reduction of her immunosuppressive regimen (discontinuation then controlled reintroduction) under medical coverage. Specific anti-leishmanial treatment was initiated but proved partially ineffective, with a recurrence. Four years after diagnosis, the patient experienced a progressive deterioration of renal function, requiring close graft surveillance.

Discussion:

Visceral Leishmaniasis in Kidney Transplant Recipients:

Visceral leishmaniasis is an opportunistic infection that can occur in renal transplant recipients, either through de novo infection or reactivation of a latent infection due to immunosuppression [5]. Busutti and colleagues reported a case of visceral leishmaniasis in a kidney transplant recipient where retrospective serology confirmed the presence of anti-Leishmania IgG before transplantation, suggesting reactivation of a latent infection [5].

Immunosuppressive agents essential for preventing graft rejection facilitate the symptomatic manifestation of the infection [5, 6]. Diagnosis can be delayed because the classic symptoms of fever, pancytopenia, and hepatosplenomegaly may be absent or attributed to other post-transplant causes [5, 8].

An integrative review of 32 articles found that renal function impairment was reported in 64% of patients, with an associated mortality rate of 15% [6]. Post-treatment relapse occurred in 10% to 37.5% of patients [6]. Among kidney transplant candidates, 13.9% were seropositive for Leishmania spp [6].

Endemic Regions in Algeria:

Algeria is a major hotspot for leishmaniasis, with both cutaneous and visceral forms being endemic [1, 3]. Visceral leishmaniasis is prevalent throughout the northern part of Algeria, but its distribution extends to semiarid and arid regions, such as the wilayas of M'Sila, Batna, and Biskra, which are primarily known for the presence of cutaneous leishmaniasis [1].

A systematic review and meta-analysis found a visceral leishmaniasis prevalence of 25.8%, peaking at 92.3% in Oran [3]. The same study reported cutaneous leishmaniasis with an estimated prevalence of 46.65%, highlighting the significant regional disparities in disease distribution [3]. Giemsa-stained smear microscopy was the most frequently used diagnostic method (84.6%), while PCR techniques were employed in a minority of studies [3].

In Algeria, only L. infantum is responsible for visceral leishmaniasis. The first case was reported by Lemaire in 1911, in a child from Kabylie [1, 9]. In 1984, Belazzoug confirmed the role of L. infantum as the causative agent of human VL in Algeria using MLEE of 12 enzymes [1] [He also demonstrated a dog-to-human parasite transfer by finding the same species in dogs, thereby irrefutably confirming the reservoir role of this animal [1].

Between 2010 and 2021, the disease has spread to other departments where it occurs sympatrically with cutaneous leishmaniasis, including Tebessa, Jijel, Oum El Bouaghi, Relizane, Setif, and Mila [1]. Additionally, cases continue to be reported in the Hoggar and Tassili N'Ajjar regions in the far south of Algeria [1].

The Reservoir: Canine Leishmaniasis in Algeria:

The dog is the primary reservoir of visceral leishmaniasis caused by L. infantum in the Mediterranean region [1]. In Algeria, canine leishmaniasis is endemic, with significant prevalence reported [1]. The first reported prevalence was 11.7%, documented in the Kabylie region and associated with a VL incidence of 2.6 cases per 100,000 inhabitants [1]. Investigations performed between 1910 and 2020 revealed fluctuating rates ranging from 2.52% to 74.44% [1].

The seroprevalence of L. infantum infection in eastern Algeria was assessed between 2021 and 2025 in domestic dogs from Batna, Oum El Bouaghi, and Biskra, with an overall seroprevalence of 10.37% [4]. Among seropositive dogs, 33.3% were asymptomatic, while 66.6% exhibited clinical signs, with

emaciation being the most frequently observed symptom. A study in the Guelma region found an overall seroprevalence rate of 58.2%, with 1.6% of dog blood samples positive for L. infantum at molecular screening .The transmission of L. infantum occurs through the bites of female Phlebotomus perniciosus and Phlebotomus longicuspis [1].

Diagnostic Challenges:

The diagnosis of visceral leishmaniasis in transplant recipients is often difficult because of the atypical presentation [5, 7]. Pancytopenia is a classic manifestation but may be attributed to drug toxicity (mycophenolate mofetil, azathioprine) or viral infections (cytomegalovirus) [5, 7]

The reference diagnostic method is the demonstration of amastigotes in tissue samples, most commonly bone marrow biopsy [5] [Busutti et al., 2023]. In our case, peripheral blood smear examination by the hematologist was normal. It was the histopathological examination of the bone marrow biopsy that revealed the presence of Leishmania amastigotes, confirming the diagnosis. This highlights the crucial role of bone marrow biopsy and pathology examination in the diagnosis of visceral leishmaniasis in immunocompromised patients.

Molecular tests such as quantitative polymerase chain reaction on peripheral blood have shown high sensitivity and can be used for diagnosis and monitoring of treatment response.[5] Serology (immunofluorescence, ELISA, rK39 rapid test) is less sensitive in immunocompromised patients [5].

Therapeutic Management:

The treatment of visceral leishmaniasis in transplant recipients is challenging [5, 6]. Liposomal amphotericin B is the drug of choice due to its favorable efficacy and safety profile, particularly in patients with renal impairment [5]. Pentavalent antimonials, although effective, carry a significant risk of nephrotoxicity [5].

A reduction of immunosuppression is often recommended to allow the host immune system to control the infection [5]. This must be weighed against the risk of graft rejection. Close monitoring of renal function is essential throughout treatment [5].

Implications for Clinical Practice:

Visceral leishmaniasis should be considered in any renal transplant patient from an endemic area presenting with pancytopenia, even without fever [5, 7]. The diagnosis relies on histopathological examination of tissue biopsies, particularly bone marrow biopsy, which may reveal Leishmania amastigotes even when peripheral blood smear is normal [5] Liposomal amphotericin B is the treatment of choice [5]. Reduction of immunosuppression should be individualized [5]. Long-term follow-up is necessary because of the risk of recurrence [6].

Conclusion:

Visceral leishmaniasis is a serious opportunistic infection that can complicate the course of renal transplantation in patients from endemic areas. This case illustrates the diagnostic and therapeutic challenges of this infection, highlighting the importance of histopathological examination of bone marrow biopsy in establishing the diagnosis when peripheral blood smear is normal. Clinicians should be aware of this diagnosis in any renal transplant patient with unexplained pancytopenia, especially those residing in or traveling to endemic regions such as Kabylie, the High Plateaus, and Biskra.

Conflict of Interest:

The authors declare no conflicts of interest.

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