INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH AND INNOVATIVE STUDIES
ISSN: 2820-7157
www.ijsrisjournal.com

December 2024 **Volume 3** **Number 6** **Pages 82-85**

Received Date: November 05, 2024 **Accepted Date:** November 26, 2024 **Published Date:** December 01, 2024

Available Online at https://www.ijsrisjournal.com/index.php/ojsfiles/article/view/263

https://doi.org/10.5281/zenodo.14270442

Visceral Leishmaniasis: A Comprehensive Review

Wala Ahmed Al Nasser[1], Hanadi Mohammed Al Ibrahim [2], Mohannad Mouse Al Atieah[2], Rabab Al Saydhussain A Ameen[3], Meaad Sadiq Albeladi[4], Saeed Abdullah Alshahrani[5], Safa Hamad Abdultiaf Alabdultiaf[6], Ali Hussain Al Daihnayn[7], Hussein Ali Al-Awami[8], Khadijah Ali Abuqurain[9], Hameedah Abdullah Alharbi [10], Noha Joher Ahmad Al-Qatari[11], Hashem Abdullah Al Musallam[12], Rami Saeed Alzaki[13], Zaki Hussain Bu Shehab[14]

1.Oyun city hospital, health information technology
2.Oyun city hospital
3.Al- saira general hospital
4.Psychiatric hospital
5.Maternity and Children's Hospital in Al-Ahsa
6.MCH
7.KFGH
8.Qatif Central Hospital, Pharmacy technician
9.Al-Nairiyah General Hospital, Anesthesia technician
10.King Abdulaziz Hospital
11.King fahad hospital hofuf
12.King FAHAD hospital
13.Alkhobar health network
14.Prince sultan cardiac center hospital

ABSTRACT

Visceral leishmaniasis (VL), also known as kala-azar, is a life-threatening parasitic disease caused by *Leishmania donovani* and *Leishmania infantum*. Transmitted through the bites of infected female *Phlebotomus* or *Lutzomyia* sandflies, VL predominantly affects individuals in tropical and subtropical regions, particularly in South Asia, East Africa, and South America. The disease presents with systemic symptoms such as prolonged fever, weight loss, hepatosplenomegaly, and pancytopenia. Untreated cases often result in death. This review explores the epidemiology, pathophysiology, clinical features, diagnostic approaches, treatment options, and prevention strategies for visceral leishmaniasis, with a focus on recent advancements and challenges in its management.

Key words: Leishmaniasis , therapy , leishmania

1. Introduction

Visceral leishmaniasis (VL), or kala-azar, is a protozoan disease that, second only to malaria in numbers of fatalities, afflicts millions of people worldwide(1). VL is primarily distributed in East Africa, South Asia, South America, and Mediterranean Region, with an estimated 50,000 to 90,000 new VL cases each year. Ninety percent of reported VL cases occur in Brazil, Ethiopia, India, Kenya, Somalia, South Sudan, and Sudan(2). In 2015 the World Health Organization (WHO) classified VL as a neglected tropical disease (NTD) due to relatively minimal granted attention from the public, resulting in high mortality rates (more than 20,000 in 2015), and endemic spreading in poverty-stricken regions around the world (3,4).

VL is one of the most widespread human diseases, with more than 20 *Leishmania* species identified worldwide(5). Unlike other common forms of leishmaniasis, such as cutaneous leishmaniasis (CL), mucocutaneous leishmaniasis (ML), and post-kala-azar dermal leishmaniasis (PKDL), VL symptoms usually occur internally [1], meaning VL is more difficult to detect and cure than other leishmaniasis. Based on different kinds of susceptible species, VL can be classified as anthroponotic visceral leishmaniasis (AVL) or zoonotic visceral leishmaniasis (ZVL). AVL, which is transmitted between humans via vector carriers, is primarily caused by *L. donovani* throughout East Africa and the Middle East, especially Sudan, Somalia, Yemen, and Saudi Arabia.

2. Etiology and Transmission

VL is caused by protozoan parasites of the *Leishmania* genus, primarily *L. donovani* (Old World) and *L. infantum*/*L. chagasi* (New World).

- **Vector:** Female sandflies of the genera *Phlebotomus* (Old World) and *Lutzomyia* (New World) serve as the primary vectors.
- **Reservoirs:** Humans, domestic dogs, and wild animals act as reservoirs for the parasite.
- **Transmission:** The disease is transmitted when an infected sandfly bites a host, injecting promastigotes that are phagocytized by macrophages, where they transform into amastigotes and multiply intracellularly.

3. Epidemiology

VL is endemic in over 75 countries, with significant variations in disease burden.

- **South Asia (India, Nepal, Bangladesh):** Accounts for the majority of cases, with anthroponotic transmission.
- **East Africa (Sudan, Ethiopia, Kenya):** High prevalence, often associated with malnutrition and conflict zones.
- **South America (Brazil):** Zoonotic transmission, with dogs as major reservoirs.
- **HIV Co-infection:** HIV-infected individuals are at higher risk of developing VL, complicating treatment and increasing mortality.

4. Pathophysiology

Once inside the host, *Leishmania* parasites evade the immune system by surviving and replicating within macrophages. This leads to systemic immune dysregulation, characterized by:

- Suppression of cell-mediated immunity.
- Hyperactivation of B cells, causing hypergammaglobulinemia.
- Organ-specific damage, particularly in the spleen, liver, and bone marrow, leading to hepatosplenomegaly and pancytopenia.

5. Clinical Features

The incubation period ranges from weeks to months. Key symptoms and signs include:

- **Systemic Symptoms:** Persistent fever, fatigue, and significant weight loss.
- **Hepatosplenomegaly:** Massive enlargement of the spleen and liver.
- **Pancytopenia:** Anemia, leukopenia, and thrombocytopenia, leading to fatigue, recurrent infections, and bleeding tendencies.
- **Hyperpigmentation:** Commonly observed in South Asian patients, hence the name "kala-azar" (black fever).
- **Post-Kala-Azar Dermal Leishmaniasis (PKDL):** A chronic sequela characterized by hypopigmented macules or nodules, often occurring months after treatment.

6. Diagnosis

6.1. Parasitological Methods

- Microscopic examination of bone marrow, splenic aspirates, or lymph node biopsies to detect *Leishmania* amastigotes.
- Culture of aspirates for parasite growth.

6.2. Serological Tests

- **rK39 Antigen Test:** Rapid diagnostic test with high sensitivity and specificity in endemic regions.
- **Direct Agglutination Test (DAT):** Useful for confirming VL in resource-limited settings.

6.3. Molecular Techniques

- Polymerase chain reaction (PCR) is highly sensitive for detecting *Leishmania* DNA, especially in cases with low parasitic loads(6).

6.4. Imaging

- Ultrasound to assess hepatosplenomegaly.

7. Treatment

7.1. First-Line Drugs

- **Liposomal Amphotericin B:** Highly effective and safe, recommended by WHO as the first-line therapy in many regions.
- **Miltefosine:** The first oral drug for VL, though resistance and teratogenicity are concerns.
- **Pentavalent Antimonials (Sodium Stibogluconate):** Still used in some regions but associated with significant toxicity and resistance(7,8).

7.2. Combination Therapy

Combining amphotericin B with miltefosine or antimonials reduces treatment duration, cost, and the risk of resistance(9).

7.3. Supportive Care

- Nutritional support and management of secondary infections are essential for improving outcomes.

8. Prevention and Control

8.1. Vector Control

- Insecticide-treated bed nets and indoor residual spraying.
- Environmental management to reduce sandfly breeding sites.

8.2. Vaccination

- Efforts to develop a vaccine are ongoing, though no licensed vaccine is available yet.

8.3. Surveillance and Case Detection

- Active case detection in endemic regions is critical for early treatment and reducing transmission.

9. Challenges and Future Directions

9.1. Drug Resistance

Emerging resistance to antimonials and miltefosine poses a significant challenge, necessitating new therapeutic options.

9.2. Co-Infections

HIV-VL co-infection complicates diagnosis and treatment, requiring integrated management strategies.

9.3. Novel Therapies

Research into immunomodulators, vaccine development, and combination therapies holds promise for more effective management of VL.

10. Conclusion

Visceral leishmaniasis remains a major public health challenge, particularly in resource-limited settings. Advances in diagnostic tools, treatment modalities, and vector control strategies have significantly reduced disease burden in some regions. However, ongoing challenges such as drug resistance, co-infections, and healthcare infrastructure gaps require sustained efforts to achieve elimination goals.

References

1.Al-Salem W, Herricks JR, Hotez PJ. A review of visceral leishmaniasis during the conflict in South Sudan and the consequences for East African countries. Vol. 9, Parasites and Vectors. 2016.

2.Alvar J, Yactayo S, Bern C. Leishmaniasis and poverty. Trends Parasitol. 2006;22(12).

3.Postigo JAR. Leishmaniasis in the World Health Organization Eastern Mediterranean Region. Int J Antimicrob Agents. 2010;36(SUPPL. 1).

4.World Health Organization. First WHO report on neglected tropical diseases 2010: Working to overcome the global impact of neglected tropical diseases. World Health. 2007;

5.Oryan A, Akbari M. Worldwide risk factors in leishmaniasis. Vol. 9, Asian Pacific Journal of Tropical Medicine. 2016.

6.ingh OP, Sundar S. Developments in diagnosis of visceral leishmaniasis in the elimination era. Vol. 2015, Journal of Parasitology Research. 2015.

7.Mishra J, Saxena A, Singh S. Chemotherapy of Leishmaniasis: Past, Present and Future. Curr Med Chem. 2007;14(10).

8.Mishra J, Saxena A, Singh S. Chemotherapy of Leishmaniasis: Past, Present and Future. In: Frontiers in Medicinal Chemistry. 2012.

9.Sundar S, Chakravarty J. Leishmaniasis: An update of current pharmacotherapy. Vol. 14, Expert Opinion on Pharmacotherapy. 2013.