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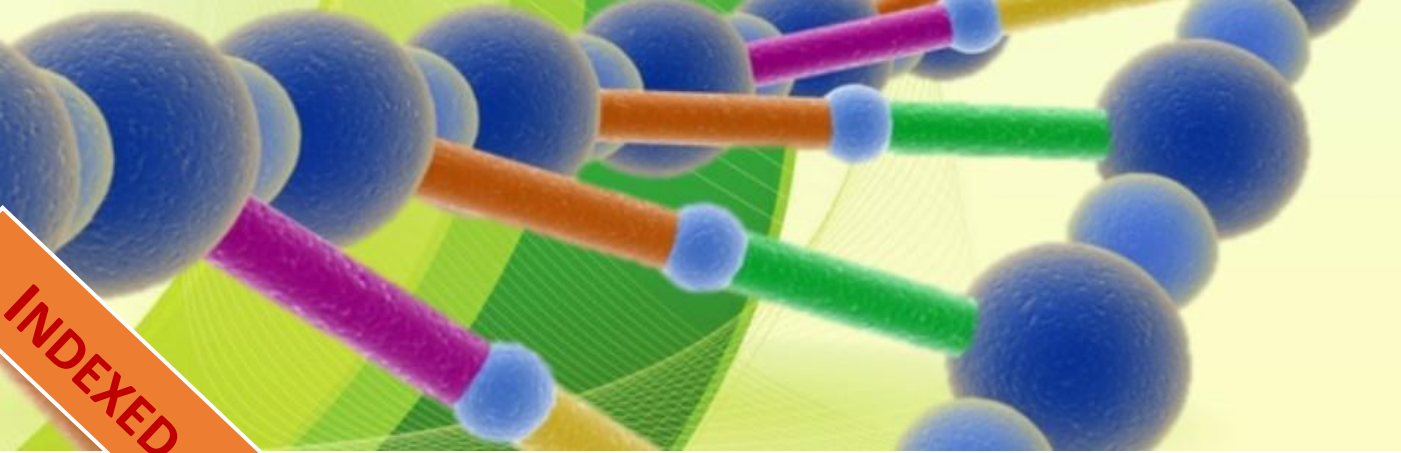

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Case Study

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"Therapeutic Leech Application in Acute Road Traffic Trauma: An Adjunct in Emergency Management" - A Case Report

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ABSTRACT:

Leech therapy, an ancient therapeutic modality described in traditional systems of medicine and now recognized in modern reconstructive practices, possesses unique biological properties that make it useful in the management of venous congestion and compromised tissue perfusion. Medicinal leeches, particularly Hirudo medicinalis, secrete a variety of bioactive substances in their saliva, including hirudin, calin, destabilase, and hyaluronidase. These substances exhibit anticoagulant, anti-inflammatory, vasodilatory, and thrombolytic effects, thereby enhancing local blood circulation and promoting tissue healing. Because of these properties, leech therapy has gained importance as an adjunctive treatment in traumatic injuries, reconstructive surgeries, and conditions associated with venous stasis. This case report describes the successful application of leech therapy in a 20-year-old male patient who sustained a lacerated injury near the right eyebrow following a road traffic accident. After initial wound management and primary suturing, the patient developed significant periorbital venous congestion characterized by progressive edema, bluish discoloration (cyanosis), and compromised tissue perfusion around the wound site. Considering the risk of tissue ischemia and necrosis due to impaired venous outflow, controlled application of medicinal leeches was undertaken as a supportive therapeutic intervention.

KEYWORDS: Leech Therapy, Hirudotherapy, Venous Congestion, Facial Trauma, Wound Healing, Hirudin.

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INTRODUCTION:

Traumatic injuries, especially crush injuries resulting from road traffic accidents, often lead to vascular compromise. While arterial repair can be surgically managed, venous congestion remains a significant challenge and may result in tissue necrosis if untreated. Leech therapy, involves the use of medicinal leeches such as Hirudo medicinalis. These leeches secrete bioactive substances including hirudin (an anticoagulant), calin (a platelet aggregation inhibitor), and vasodilators that improve local blood flow.

This case report aims to present the clinical outcome of leech therapy in managing post-traumatic venous congestion following an accident.

Methods

Case Presentation

A 20-year-old male was brought to the emergency department following a road traffic accident. He sustained a deep laceration measuring approximately 4 cm above the right eyebrow, with surrounding soft tissue swelling and hematoma formation.

Primary wound management included: Thorough irrigation, debridement, layered suturing, Tetanus prophylaxis, broad-spectrum antibiotics. Within 24 hours post-suturing, the patient developed: Marked periorbital edema, dark bluish discoloration around the wound. Delayed capillary refill, increased local warmth. These findings were consistent with venous congestion.

Intervention

After informed consent, sterile medicinal leeches (Hirudo medicinalis) were applied adjacent to the congested area.

Procedure details:

1–2 leeches per session

Duration: 20–30 minutes per session

Frequency: Once daily for 3 days.

Close monitoring for bleeding and infection

Prophylactic antibiotics targeting Aeromonas species

Hemoglobin levels and vital signs were monitored. The wound was assessed daily for color, edema, and tissue viability.

Results

Clinical progression was as follows:

Day 1: Visible reduction in periorbital tension. Mild continuous oozing after leech detachment

Day 2: Decrease in cyanosis.

Improved capillary refill time, reduced edema.

Day 3: Restoration of near-normal skin color.

Healthy wound margins, no signs of necrosis.

Follow-up at 2 weeks showed satisfactory wound healing with minimal scarring and no functional impairment of the eyelid or eyebrow movement.

DISCUSSION:

Venous congestion is a critical concern in facial trauma due to the rich vascular supply and cosmetic importance of the region. If untreated, it may result in tissue necrosis, infection, or poor aesthetic outcome.

Leech therapy provides therapeutic benefit through: Mechanical blood removal – Immediate decompression of congested tissue.

Biochemical effects – Hirudin-mediated anticoagulation

Improved microcirculation – Vasodilation and enhanced perfusion

Reduced tissue pressure – Prevention of ischemic damage

The use of Hirudo medicinalis is well documented in microsurgery and reattachment procedures.

In this case, early intervention with hirudotherapy prevented tissue necrosis and preserved cosmetic appearance. The minimally invasive nature of leech therapy makes it particularly suitable for delicate facial regions.

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CONCLUSION:

The application of therapeutic leeches in acute road traffic trauma represents a valuable adjunct in emergency and reconstructive management, particularly in cases involving severe soft-tissue injury, venous congestion, and compromised microcirculation. Road traffic accidents often result in complex trauma such as crush injuries, flap congestion, reattached limbs, and tissue ischemia. In such conditions, restoring adequate venous outflow is critical to prevent tissue necrosis and improve healing outcomes. Therapeutic leech therapy, also known as hirudotherapy, offers a biologically effective method to relieve venous congestion and enhance local blood circulation. Leeches secrete a variety of bioactive substances in their saliva, including hirudin, calin, hyaluronidase, and vasodilators, which collectively exhibit anticoagulant, anti-inflammatory, analgesic, and thrombolytic properties. These substances help maintain continuous blood flow from congested tissues, reduce edema, and promote oxygenation of the affected area. In emergency trauma care, particularly following reconstructive procedures such as skin grafts or replantation surgeries, leech therapy can play a significant role in salvaging tissues that might otherwise fail due to venous insufficiency.

Furthermore, therapeutic leech application is relatively simple, minimally invasive, and cost-effective compared to many advanced surgical or pharmacological interventions. This makes it particularly valuable in resource-limited settings where access to sophisticated microsurgical techniques may be restricted. When used under strict medical supervision with appropriate infection control measures, including prophylactic antibiotics to prevent complications such as Aeromonas infection, the therapy has demonstrated favorable clinical outcomes.

In conclusion, therapeutic leech application provides a promising supportive intervention in the management of acute road traffic trauma. By improving venous drainage, reducing tissue congestion, and enhancing microcirculation, it can significantly contribute to tissue preservation and better recovery outcomes when integrated with modern emergency and surgical care.

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