Topical liposomal Amphotericin B (AmBisome®) as an adjunctive therapy in the management of post-traumatic invasive fungal infection (IFI).

**BACKGROUND**

Topical antifungal preparations, such as Dakin’s solution (sodium hypochlorite 0.4-0.5%), have been described in the management of invasive fungal infections (IFIs) in military trauma patients. To our knowledge, we describe the first successful utilisation of liposomal amphotericin B (AmBisome®) to irrigate invasive infections with *Aspergillus fumigatus* and the mucormaceous mould, *Rhizopus arrhizus*, as an adjunct to aggressive surgical debridement and intravenous AmBisome® therapy.

**AmBisome®**

AmBisome® is a sterile, non-pyrogenic lipophilized product normally used for intravenous infusion. Amphotericin B, the active ingredient of AmBisome®, acts by binding to ergosterol on the cell membrane of susceptible fungi, inducing alterations in membrane permeability that result in fungal cell death. Liposomes are closed spherical vesicles created by mixing specific proportions of phospholipids and cholesterol so that they arrange themselves into multiple concentric bilayer membranes when hydrated in aqueous solutions.

**CASE HISTORY**

We describe the case of a 32-year-old male with type one diabetes mellitus admitted to our centre with severe polytrauma following a crush injury between a train and platform edge. The patient had a prolonged extrication and was transfused several units of packed red blood cells on scene. Initial assessment revealed complex pelvic injury with bilateral open femoral fractures, retroperitoneal haematoma, bladder rupture, perineal injury and bilateral lower limb soft tissue injuries. He required multiple debridements of his complex lower limb injuries and underwent fixation of his femoral and pelvic fractures. The right leg was deemed unsalvageable, and was amputated due to the extent of tissue loss and contamination.

**RESULTS**

*Aspergillus fumigatus* and *Rhizopus arrhizus* were cultured from tissue samples at time of debridement. Serum galactomannan was negative while serum (1, 3)-β-D-glucan (BDG) was raised. After aggressive surgical debridement with topical therapy and intravenous AmBisome® for 2 weeks, the patient’s tissue samples from left leg were culture negative for fungi with a healthier appearance. Subsequently, the patient was able to proceed to successful skin grafting.

**CONCLUSIONS**

Post-traumatic IFI is a rare and devastating clinical entity with mortality rates approaching 41% in the civilian population. In our patient, diabetes mellitus is a secondary risk factor for the development of IFI. While there is consensus that early, aggressive surgical debridement and systemic antifungals are vital, the optimal therapeutic approach is unknown and there is a role for further research on adjunctive therapies to preserve tissue and reduce mortality.

It has been suggested that tissue penetration of systemic antifungals is suboptimal in IFI due to thrombosis and tissue necrosis secondary to angio-invasive mould species. Thus, topical antifungal therapies may provide anti-mycoytic activity at the site of disease and aid in ensuring the resolution of IFI and preventing its recurrence.

To our knowledge, this case report describes the first use of AmBisome® in liquid preparation as a topical therapy during debridement for IFI. We suggest that the direct application of a broad spectrum, mould active antifungal at the site of infection may assist in reducing disease burden alongside aggressive surgical management and systemic therapy. Randomised trials are necessary to determine whether such therapy adds benefit in similar patient cohorts.

**REFERENCES**


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**Figure 1**

A schematic depiction of the liposome is presented above.

**Figure 2**

**Figure 3**

**Figure 4**

**Figure 5**

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