Efficacy and safety of decontamination with a hypertonic and amphoteric solution, after chemical exposure

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Objectives: Review the **safety** and **efficacy** of **Diphoterine® solution**, which is a hypertonic and amphoteric solution, for **chemical burn treatment** of **skin and eyes**.

Methods : **Information sources** were PubMed, Sciencedirect and Google Scholar. **Terms included** were Diphoterine, chemical burn irrigation, chemical injury, management, chemical burn emergency, Previn solution, skin decontamination and eye decontamination. Any study published through a peer-reviewed journal was considered eligible. Published data must have included Diphoterine® solution or chemical lesions and decontamination management used. Various testimonials received from industries and organisations were added to this bibliographic research.

Results: The retrieved data could be classified as studies of safety or studies of efficacy.

Main safety results showed that Diphoterine® solution is **non-irritant for skin and eyes**, **non cytotoxic** and **non toxic** with acute oral and dermal LD50>2000 mg/kg.

As to the efficacy of the solution, results could be divided in three categories.

First one is **industry testimonies**, **more than 70**, concerning immediate use after a chemical splash.

Second one concerns **chemical accident in industries**, **pre-hospital and hospital**, **more than 400 cases** of irritant and corrosive. Third one comprises a dozen **comparative studies** with **more than 2700 cases** washed with various solutions (water, saline or Diphoterine®).

- Sulfuric acid splash (**97% H₂SO₄**) from a pipe at the factory
- 1st rinsing with water and **1 hour after rinsing with Diphoterine®**
- **No surgery** and only 12 days of hospitalization

These documents helped to extract main conclusions about time of intervention, which were split in immediate intervention (industry) and delayed one (pre-hospital and hospital).

Conclusion: In all cases, Diphoterine® solution helps to **fix the chemical burning process**. Like water, Diphoterine® solution washes and removes the chemical from the surface, but thanks to its activity, it also stops the progression, extract the penetrated chemical and stops the reaction of the chemical product.

When **hypertonic and amphoteric solution** of Diphoterine® is used **immediately after the accident**, it **often enables tissues to be preserved without any lesion**. When used **after a delayed wash**, the need of medical treatment or surgery decreases and **allows medical cares in best conditions**.

FIRST 30 MINUTES
DIPHOTERINE® solution reduced lesions by 40% with first wash

Clinical cases 180 exposures

- Comparison number of cases 1st wash with Diphoterine® reduces cases with lesion by 40% (p<0,001)

FIRST 30 MINUTES
DIPHOTERINE® solution reduced hospitalization & treatment costs

- Diphoterine® solution reduced work loss days by 72% (p<0,14), reduced healing time by 76% (p<0,01) and reduced treatment costs by 46% (p<0,05) on an Indian industrial hospital on 65 cases comparison