A Review about Diphotérine®

The solution for emergency decontamination of eye/skin chemical splashes

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Introduction

Diphotérine® is an eye/skin decontamination solution for chemical splashes [1], produced by the PREVOR laboratory [2], France. Its chemical and physical properties allow a quasi polyvalent rinsing of chemical splashes with a quick return to a physiological state. Diphotérine® stops the penetration of the chemical product [3],[4]. The emergent use of Diphotérine® will avoid any damage.

Materials and methods

Most of the companies, mentioned in this report, were prevouisly using water for emergency first aid decontamination of eye/skin chemical splashes without complete success : irremediable sequelae, numerous secondary care and loss of work. Subsequently, the Medical and Health and Safety Services decided to introduce Diphotérine® (or Previn®) for rinsing chemical splashes and to train workers to use it correctly. Previn® is the German version of Diphotérine®. Each ocular or cutaneous chemical splash was rinsed in emergency (some seconds to a few minutes) with Diphotérine®, on location, while undressing if necessary. Then each person went to the nursery for an examination. In the Mannesmann company, a secondary rinsing with Diphotérine® was performed in the nursery.

For eye splashes, Sterilized Individual Eye wash (SIEW) of 50 mL was used within 10 seconds while 500 mL of Diphotérine® was used for a longer time of contact (about 1 minute). For small skin splashes such as a hand or a face, a spray of 100 or 200 mL of Diphotérine® was used depending of the time of contact and the area. A big skin splash such as a leg or the chest involved the use of an autonomous portable shower with 5 L of Diphotérine® in the minute following the accident.

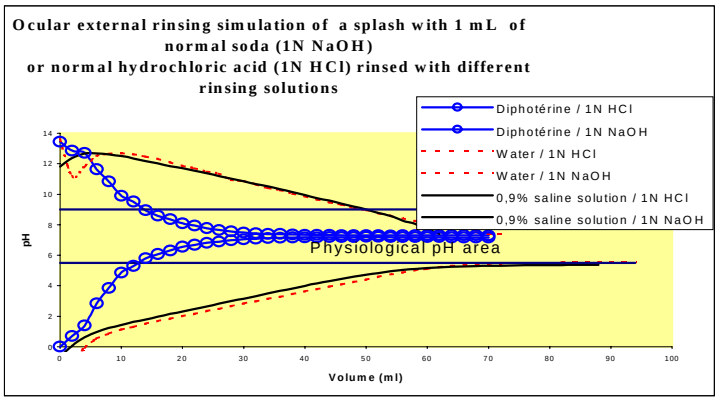
Results

TOXICITY

Diphotérine® is a non toxic solution (Oral Toxicity LD_{50}>2000 mg/Kg, Test, 6564TAR 1990 CIT; Acute Dermal Toxicity LD_{50}>2000 mg/Kg, test 133/9, 1988, Safepharm). Its residues with acids and bases are non irritant (tests 6463TAL/6462TAL, 1990, CIT) [5].

IN VITRO RESULTS

An in vitro experimental protocol [6],[7] has been ajusted by the PREVOR Laboratory for simulating ocular external rinsings of chemical splashes. It shows the greater efficacy of Diphotérine® rinsing versus water or saline solution rinsing of chemical splashes.



CASE REPORTS

Corrosive splashes rinsed with diphotérine®

year	No cases	Firm /country	Exposure	Body Surface Area
1999	1	Knoll AG Germany	96% sulfuric acid	cheek
1998	1	Giesecke&Debrient Germany	100% nitric acid	hand
1995	1	Metaleurop Germany	96% sulfuric acid	Face + neck
1993	1	Mewa Germany	50% soda*	forearm
1991	1	Alusuisse France	Soda flakes	Left eye
1991	2	Orgachim France	98% sulfuric acid	Face+neck+shoulders, (id + legs)

* : soda = sodium hydroxide, ** : Cream ointment for the first exposure

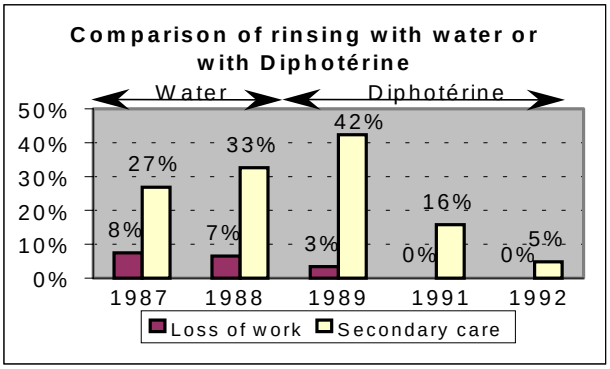
Result : no sequelae, no secondary care, no loss of work**

A SERIE [8] OF 24 CHEMICAL SPLASHES RINSED WITH DIPHOTÉRINE®
in the Mannesmann factory Remscheid, Germany (1994-1998)

No Cases	Exposure	Body Surface
2	Quicklime (Calcium oxide)	One eye
1	30% soda (sodium hydroxide)	One eye
1	30% basic solution	One eye
6*	20% sulfuric acid	One eye
2*	5% phosphoric acid/35% nitric acid	One eye
2	Pure Sulfamic acid	One eye
1	5% sulfuric acid/ 7% nitric acid	One eye
4	20% sulfuric acid	Check/thorax/face/hand
1	53% nitric acid	head
1	75% phosphoric acid	Thorax+Genitals+right thigh
2	15% phosphoric acid	Forearm/hand
1	45% soda (sodium hydroxide)	Knee

Results : no damage, no secondary care, no loss of work except 2 accidents* with one day lost from work

A STATISTICAL STUDY [7] ABOUT 180 CHEMICAL ACCIDENTS
In the Rhône-Poulenc factory, La Rochelle, France (1987-1992)



Results : using Diphotérine® instead of water completely suppressed loss of work and significantly reduced the need for secondary care

A STATISTICAL STUDY [7] ABOUT 42 SODA (40G/L TO 600 G/L SODIUM HYDROXIDE) SPLASHES RINSED WITH DIFFERENT WASHING SOLUTIONS
In the Martinswerk factory, Bergheim, Germany (1991-1993).

	Diphotérine®	Acetic acid	Water
No days lost from work	**0,18d ± 0,4**	**2,91 d ± 4,3**	**8 d ± 8,12**
No care	**100% ±15%**	**0% ± 15%**	**0 ± 15%**
Simple care	**0 ± 15%**	**80% ± 15%**	**25% ± 15%**
Medical care	**0 ± 15%**	**20% ± 15%**	**75% ± 15%**

Results : Using Diphotérine® resulted in a noticable decrease in sick leave average and a standard deviation. No secondary care was necessary. There is a significant difference ($p<0.05$) between Diphotérine® and water concerning secondary care and loss of work.

Conclusion

The emergency use of Diphotérine® is a good way for the decontamination of ocular or cutaneous chemical splashes. It achieves a reduction of loss of work and secondary care in all cases and avoids the sequelea for the workers.

References

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