Use of an Amphoteric Solution in Eye, Skin and Oral Chemical Exposures: Retrospective Multicenter Clinical Case Series

Authors J.L. Fortin, M. Fontaine, L. Bodson, A. Depil-Duval, M.P. Bitar, J.M. Macher, P. Paulin, F. Ravat, A.H. Hall

Year: 2017 **Journal**: Journal of Clinical Toxicology

Improvement for the customer

The victim will be relieved of the pain caused by the chemical and will be able to open his/her eyes

Technological advantage

Decontamination: Removes and reduces the amount of aggressive chemical

Main property of Diphoterine® solution

Active solution

Situation:

This publication presents the results of a multicenter study between France and Belgium involving **34 victims of chemical splashes**.

The **chemicals involved in this study are acids, bases, solvents and oxidants**. The majority of reported incidents occurred in a **professional setting (58.8% of cases), 29.4% of cases occurred at home, 5.9% occurred at school and 5.9% of cases were chemical assaults**.

Duration and location

- 3 years
- Emergency Department and ICU at Belfort Hospital,
- Emergency Department and ICU at Montbéliard Hospital, Burns Centre at Saint Joseph and Saint Luc Hospital in Lyon,
- Emergency Department at Liège University Hospital,
- Emergency Department at Evreux Hospital,
- Emergency Department at Saint-Dié Hospital

Chemicals involved

- acidic substances (11 cases)
- basic substances (11 cases)
- other substances: varnish, acrylic, tearing agent, paints (12 cases).

Eyes / Skin

- eyes (21 cases including 9 bilateral, 14 unilateral)
- skin (8 cases)
- eyes and skin (4 cases)
- mouth (1 case: ingestion of ammonia)

Time to decontamination

- from 1 to 555 minutes (average time is 118 min ≈ 2h)

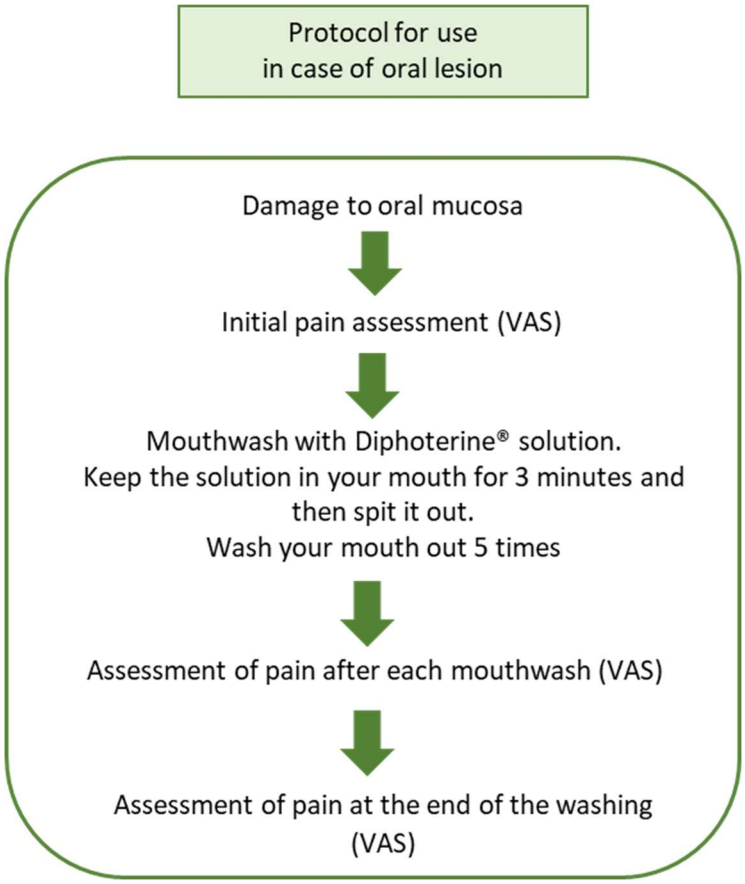
Diphoterine® solution's Competitor cited in the article

- none

Methods:

The authors proposed protocols for the use of Diphoterine® solution, to be followed according to the part of the body having received the chemical splash (eye, skin or ingestion). Summaries of these protocols are presented in the figure below.

An evaluation of pain according to the Visual Analogue Scale (VAS) was carried out before, during and after the washing.



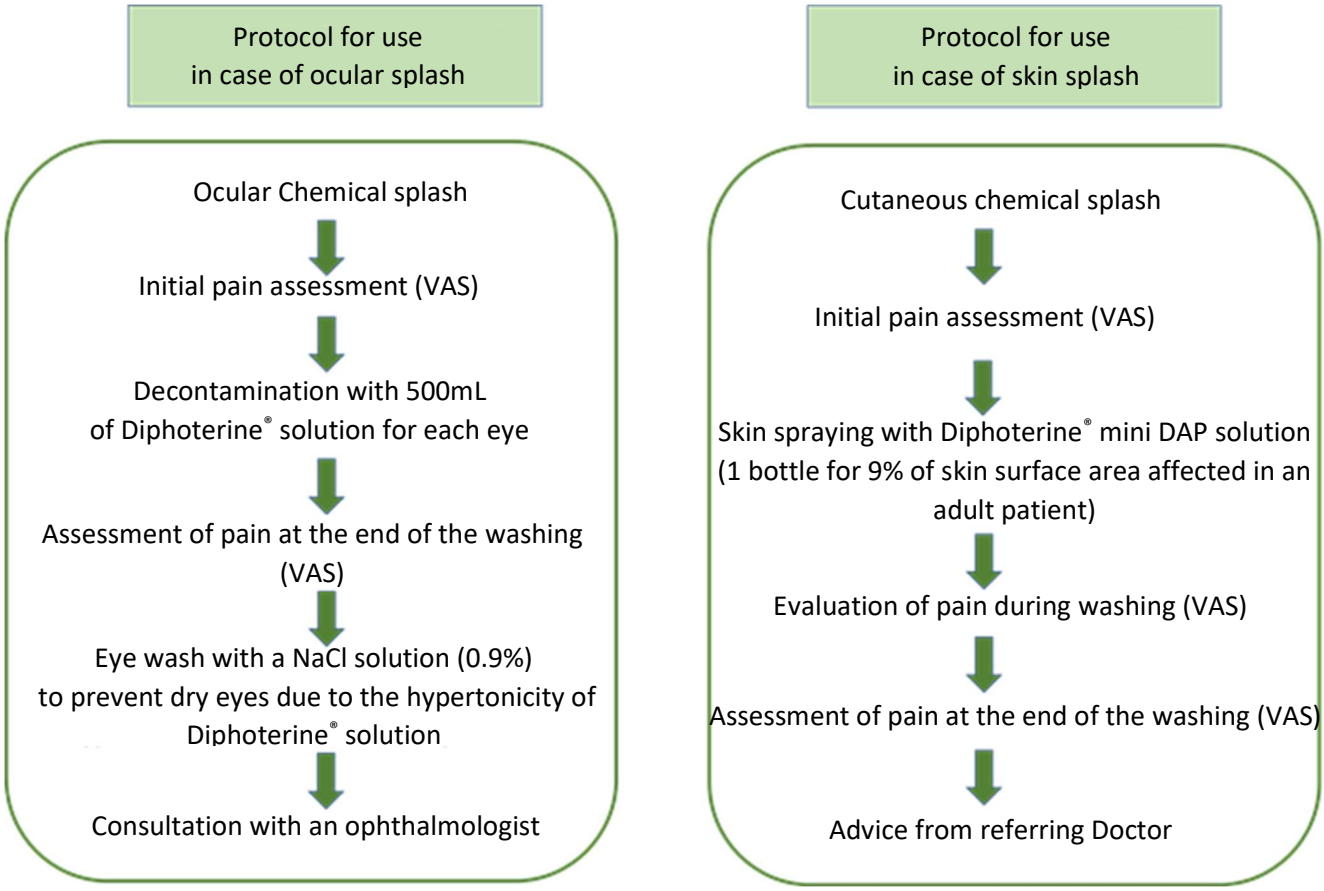


Figure 1: Decontamination protocols for chemical lesions proposed by Jean Luc Fortin et *al*

Results:

The results presented in this publication indicate that the use of Diphoterine® solution significantly reduces pain as shown in the figure below.

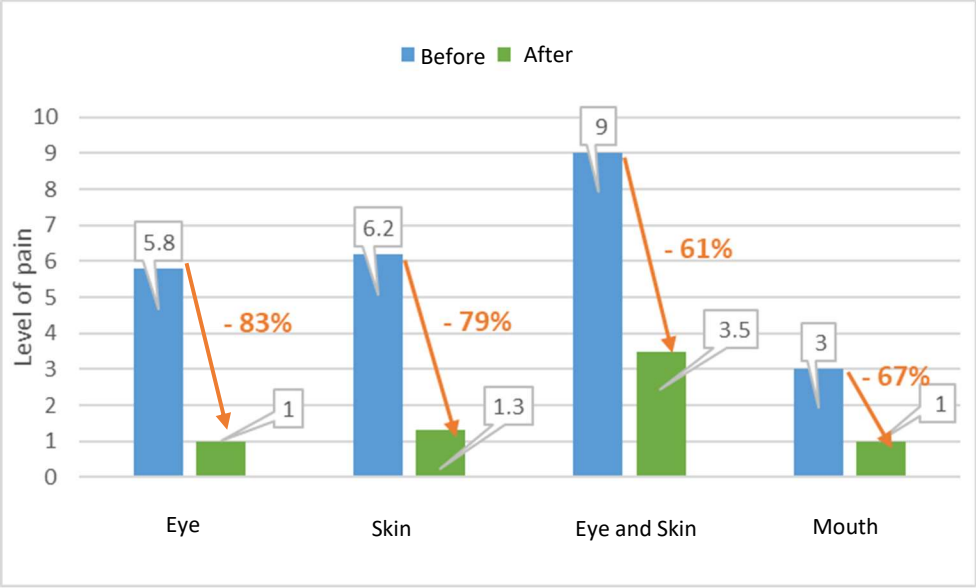


Figure 2: Evolution of the level of pain before and after decontamination with Diphoterine® solution

Evolution of skin signs

The authors noted**:**

- The **disappearance of all skin lesions** in the 7 cases of initial superficial lesions (erythema or blister) 46 hours after the accident.
- In the case of the initially deep lesion (necrosis), there was no improvement. Healing was achieved after surgical excision and skin grafting. It is, nevertheless, important to note that washing with Diphoterine® solution took place 90 min after the incident.

Evolution of the case of accidental ingestion of ammonia

Despite delayed use of Diphoterine solution® (8 hrs and 15 min after ingestion), the authors noted rapid effectiveness at the end of the sequence of 5 mouthwashes. The follow-up ENT examination, carried out the following day, was normal.

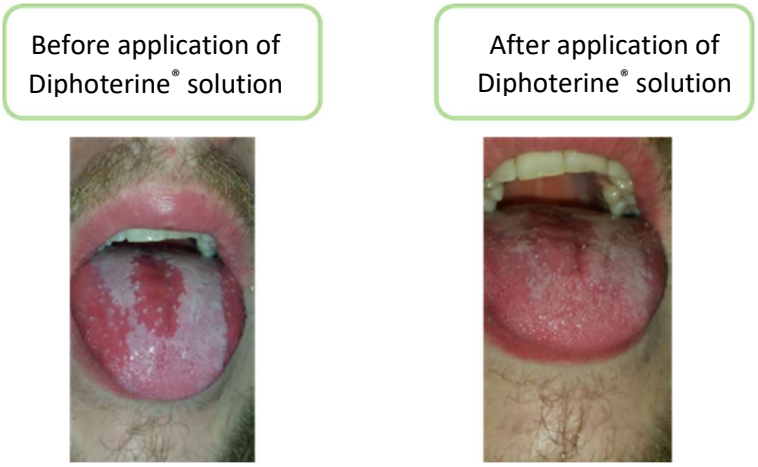


Figure 3: Evolution of the chemical lesion following accidental ingestion of an ammonia solution

Ophthalmologist consultation results in the case of ocular lesions

In this case too, the authors noted that Diphoterine® solution reduced the severity of the chemical lesions

	Number of cases
No lesions observed	**12 cases**
Moderate conjunctival lesions (which disappeared within a few days with treatment using eye drops)	**6 cases**
Superficial ulceration of the cornea.	**1 case**

Conclusion:

Diphoterine® solution enables effective decontamination of chemical lesions. Its effectiveness is all the more optimal if treatment is instituted without delay after the chemical has been splashed, in order to avoid potentially disabling after-effects.