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CHEMICAL NEWS

ICC

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VOL. XIII SEPTEMBER 2016 NO. 3

FIRST AID FOR CHEMICAL BURNS

Indian Study on "First Aid For Chemical Burns" Stands out at the Nordic Burns Congress held in Uppsala, Sweden.

By Laurence Matthieu

INTRODUCTION

Dr. Parag Kulkarni, surgeon and burns specialist conducted this study at Aashirwad Hospital located in Tarapur where he got cases of chemical splashes on the skin and eye. Dr. Parag Kulkarni has **28 years of experience in chemical burns, treating about 200 cases per year (Over 5000 chemical burns in his career).** Burns treated are due to various corrosive chemicals from industries. PH remains corrosive most of the time when patients reach the hospital despite 15 minutes safety shower rinsing with water. Treatment with water has limitations.

HOW DID DR. KULKARNI CHANCE UPON DIPHOTERINE ?

In an API unit of a prominent pharma company, a worker had an accidental splash of bromine.

Since the company had Diphoterine® solution with them they used it. Diphoterine® is a polyvalent hypertonic amphoteric first-aid solution which can stop corrosive reactions. Dr. Kulkarni was pleasantly surprised at the amazingly healed patient when he was brought to him after applying Diphoterine after 10 mins.

STUDY WITH 110 CASES OF CHEMICAL BURNS

The present study compares the results obtained from different first aid managements. During a 10 months period, chemical burns were registered. Water was used by the patient himself within the first 10 minutes after exposure on site. The polyvalent solution was used 20 minutes after exposure upon arrival at the hospital. When both rinsing solutions were used, water was used within 10 minutes after exposure and the polyvalent solution after 30 minutes. The hospital is situated only 10 minutes away from the industrial area, some patients came to the hospital without first rinsing with water at the accident site. Statistical analysis was performed following large or small samples according to the population. (Ref. Schwartz D).

RESULTS

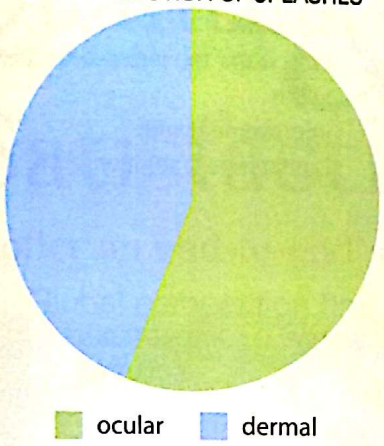
During the 10 months study, we registered 110 cases of chemical burns in industries. 100% of the patients are men. 71 cases rinsed with water only on site (plant), 31 cases rinsed with Diphoterine® solution only (at the hospital), 8 cases with water first and Diphoterine® solution upon arrival at the hospital. The hospital is located 10mn away from the industrial area, in 32 cases, patients came to the hospital without first rinsing with water at the accident site. After study duration of 6 months (70 cases), we noticed that some elements could help improve outcome, so they were introduced from December onwards (40 cases):

- Pain factor upon arrival versus pain factor when leaving the hospital (after use of water or Diphoterine® solution),
- Visual acuity upon arrival versus

A - DEMOGRAPHIC CHARACTERISTICS AND NATURE OF THE BURN

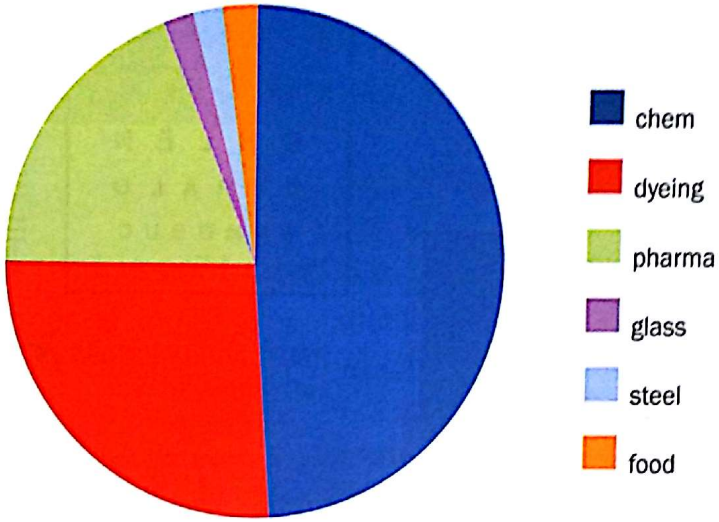
	WATER	DIPHOTERINE® SOLUTION	P	DIFFERENCE
Delay from exposure till rinsing (min)	9,93	19,52	<0,01	Diphoterine® solution delay significantly higher than that of water
standard deviation ±	0,593	1,50		
Mean Age (years) of patient	34,58	32,32	-	No difference between age in Diphoterine® solution and water group
standard deviation ±	9,65	10,20		
Cases	71	31		

B – DISTRIBUTION OF SPLASHES



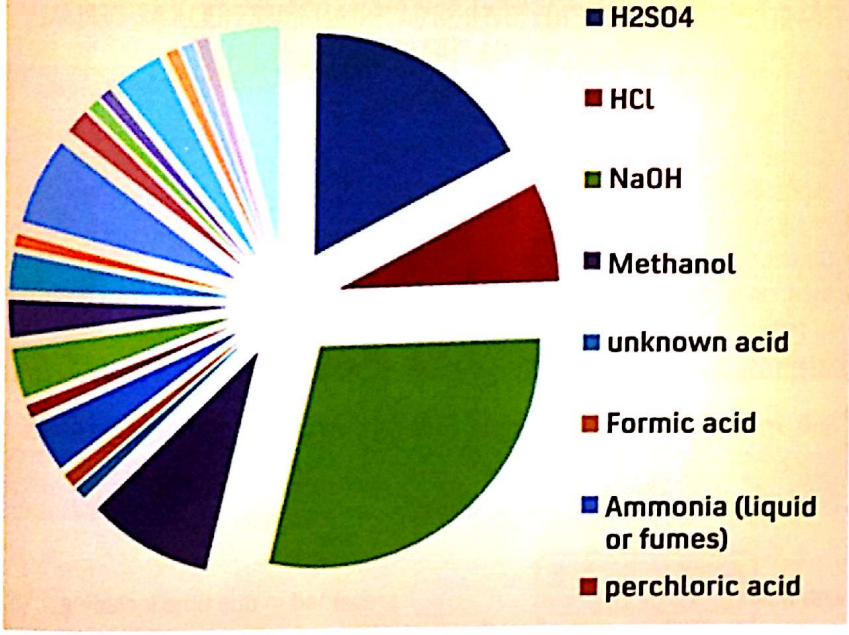
62 ocular = 56%
48 dermal = 44%
110 cases TOTAL

C – DISTRIBUTION OF SPLASHES ACCORDING TO INDUSTRIES



	CHEMICAL	DYEING	PHARMA	GLASS	STEEL	FOOD	TOTAL
CASES	54	29	21	2	2	2	110
%	49	26	19	2	2	2	100

D – DISTRIBUTION OF SPLASHES ACCORDING TO CHEMICALS



visual acuity when leaving the hospital (after use of water or Diphoterine® solution).

So the comparative study of these 2 criteria added at the end is based on the cases from Dec 2015 till March 2016 (26 for water and 12 for Diphoterine® solution).

There were 62 ocular, 48 dermal splashes. No patient has shown any side-effects / allergic reaction after using polyvalent solution. Work loss and time of recovery were significantly decreased when the polyvalent solution was used compared to water. When measured, pain score was significantly lower for the polyvalent solution and visual acuity was improved.

E - RESULTS: WORK LOSS - WORK-LOSS AFTER SPLASHES ALL CASES (OCULAR, DERMAL), ALL CHEMICALS

ALL	WATER	DIPHOTERINE® SOLUTION	P	
Work-loss days	10,41	2,42	< 0.01	Work-loss days with Diphoterine® solution is significantly less than with water
standard deviation ±	18,12	2,31		
number of cases	71	31		

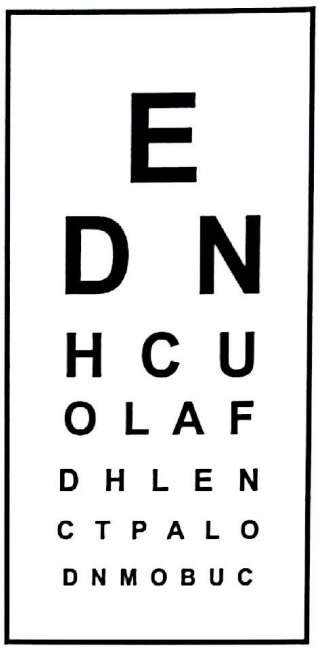
F- THUS WORK LOSS IS REDUCED BY 1/5th
A REAL CASE PICTURE

15 MINUTES AFTER
ACETIC ACID splash
INJURY TO LEFT EYE
500ml Diphoterine® solution applied

45 MINUTES AFTER
using Diphoterine® solution
Conjunctival edema has decreased, Lid edema has also decreased, Less epiphora after this Conjunctival edema has decreased, Lid edema has also decreased, Less epiphora after this.

12 HOURS AFTER
Diphoterine® solution WASH
Cornea and conjunctiva clear
No surrounding edema

G – RESULTS OF VISUAL ACUITY (OCULAR SPLASHES, ALL CHEMICALS, 28 CASES.)



The visual acuity is measured before and after the rinsing at the clinic (Snellen's 6/6, 6/9, 6/12, 6/18 etc.)
Average improvement outcome:
With water the improvement is : 19%
Improvement with Diphoterine® solution: 84%

VISUAL ACUITY BEFORE VS AFTER RINSING WITH	WATER	DIPHOTERINE® SOLUTION
No improvement	13	2
Improvement of 1 acuity threshold e.g. 6/9 to 6/6	3	8
Improvement of 2 acuity thresholds e.g. 6/12 to 6/6	0	2
Total cases	**16**	**12**

DECONTAMINATION WITH DIPHOTERINE® SOLUTION SIGNIFICANTLY IMPROVES VISUAL ACUITY VERSUS WASHING WITH WATER (P < 0,0005)

H – RESULTS OF PAIN FACTOR (OVER 38 CASES) ALL CASES (OCULAR, DERMAL), ALL CHEMICALS

	Water	Diphoterine® solution	p	Difference
Gap from exposure till rinsing (mn)	9,81	18,75	< 0,001	Victims decontaminated with Diphoterine® solution present pain change before/after significantly different from those washed with water.
Standard deviation	0,981	2,261		
Mean age (years) of patient	34,31	33,17		
Standard deviation	9,09	9,11		

SOLUTION	AVERAGE PAIN DECREASE	AVERAGE PAIN FROM
Water	2,12	6,1 to 3,8
Diphoterine® solution	3,67	6 to 2,4

CONCLUSION

These clinical preliminary results show that chemical burns classical management can be improved. The number of work-loss days when decontaminated with Diphoterine® solution are about a ¼ of the ones with water (p < 0,01). Victims decontaminated with Diphoterine® solution present pain change before/after significantly different from those washed with water (p < 0,001). Visual acuity was also improved (p < 0,0005). Further results will be presented in due time including more patients.

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