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BELGIUM

Personal experience:

- 14 years of Diphoterine® use for eye and skin chemical injuries
- About 200 hundred patients treated with Diphoterine®
- 3 recent cases of corrosive ingestion
 - Round Up
 - Sulphuric acid
 - base

Literature search has shown

- Real public health problem
 - Many available substances in public shops
 - Really dangerous substances
- No actual acute treatment
- Very long and expensive chronical treatments
- New digital devices for picture recording
- Benefit of neutralisation (in vivo studies)
- Release of heat during neutralisation seems to be a myth (in vivo studies)

Bernard MEYER 's in vivo study

Chef de Service ORL CHU St-Antoine Université Pierre & Marie Curie, Paris 6

Epidemiology

Description of oesophageal burns

Physiopathology of the chemical burn

Antidote tests in a pig model

Epidemiology

- 20 000 cases of accidental ingestion in France (Garnier R et al, 1980)

- « only » 27 000 cases in USA (Espinola T, 1992)

<u>Epidemiology</u>

- Most of the ingestion are with household products and are due to bases

Sodium hypochlorite (32% of the cases)
 Destop® equivalent to 20% caustic soda (24% of cases), which gives the most severe lesions.

Celerier M, 1989
Sarfati E et al, 1984

<u>Epidemiology</u>

- Most of the ingestions concern the child (95% of the cases), the young boy (66% of the cases) with an approximate age of 0-3 years (86% of the cases).
- The ingestion is accidental for the child and volunteer for the adults
- *Celerier M, 1989*
- Sarfati E et al, 1984
- Taillens JP et al, 1970

Necrosis caused by acids and alkalies

Ashcraft and Padula, Pediatrics, 1974

Acids - Coagulative



Alkalis - Liquefying



^{16. 5.} Mucosal destruction with submucosal thrombosis of vessels, edema nd inflammation following 8.3% NaOH burn (H & E stain, X 36 magnification).

Endoscopic aspect of the chemical burns

The emergency oeso-gastric fibroscopy shows two kinds of caustic oeso-gastric burns which can be classified in three steps in accordance with Taillens

Step I & II a : superficial burns with a good evolution

Step IIb & III : severe burns involving an injury evolution towards oesophageal stenosis and also a significant mortality

Physiopathology of the chemical burn

- Action of corrosives in case of ingestion are not very well known
 - They seem to have the same physiopathology that eye/skin burns
- but
 - what is the penetration kinetic ?
 - Is there a delay for an efficient treatment?

New physiological approach with a pig model experiment

MATERIAL AND METHOD



ANIMAL MODEL:

- A 30 Kg Free-range pig
- A randomised prospective therapeutic study.



BURN PROTOCOL:

 A segmental oesophagial burn realised with 2 Folley ballonet sondes

 Supra-cardial surroundings by laparotomy and gastrostomy

• pHmetric probe on surface and in smooth muscle

New physiological approach with a pig model experiment

Realisation of a step III burn with 100ml NaOH 5N Irrigation with 100ml of Diphoterine[®] gel at J + 15 mn as treatment

Judgment criteria: endoscopic step, pH metric evolution in time, histologic step statistical tests (χ² and variance analysis).

	Blank n = 6	Ingestion of Diphoterine® gel at 15 mn after the burn n = 6
Euthanasia JO + 30 mn	2	2
Euthanasia JO + 60 mn	2	2
Euthanasia JO + 24 hours	2	2

New physiological approach with a pig model experiment



New physiological approach with a pig model experiment



Conclusion 1 : New physiological approach with a pig model experiment

This experimental model brings a new kinetic dimension for the knowledge of the caustic diffusion through the tissues

> Penetration through the oesophagus membranes of 5N sodium hydroxide in a 10-15 minute delay

The tissue pH metry confirms the endoscopic and histologic data

Conclusion 2: New physiological approach with a pig model experiment

In this protocol of <u>severe</u> digestive step III burns

- the Diphoterine[®] gel allows an efficient mucous and intra-tissue decontamination, improving the injuries evolution
- Between the blank group and the Diphoterine[®] gel group, there are significant pHmetric and endoscopic differences (p<0.05)

Tomorrow,

what will you do

if your child drinks a glass of sulphuric acid ?

Who wants to work with us

to experiment

and

find the treatment ?

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