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TOWARDS AN OPTIMIZATION OF THE AVAILABILITY OF ANTIDOTES IN BELGIAN HOSPITALS

OBJECTIVE

The aim of this study was to investigate the availability of 22 antidotes in all Belgian hospitals with an emergency service and to optimize the stockpile of antidotes of the Belgian Poison Centre (BPC). A third objective was to investigate at hospital level the maintenance cost to hold a selection of antidotes.
Furthermore, to explore the added value of an online platform developed by the BPC with shared information on the real-time availability of antidotes in Belgian hospitals. In the context of preparedness for chemical incidents, a last objective was to verify if hospitals met the governments requirement to maintain a stock of atropine equal to twice their annual consumption.

METHOD

An online questionnaire was sent between February and April 2018 to all 126 hospitals with an emergency service. The antidotes were classified in three categories. Category A antidotes have good evidence-based proof of efficacy. Category B antidotes have alternatives more easily available or are widely used but not yet universally accepted as effective due to lack of research data. Category C antidotes have questionable usefulness or have better alternatives (table 1). For each hospital the list of available antidotes was compared with the category A antidotes in order to calculate the expense of an optimal availability to treat a 75 kg patient for the first 24 hours.

RESULTS

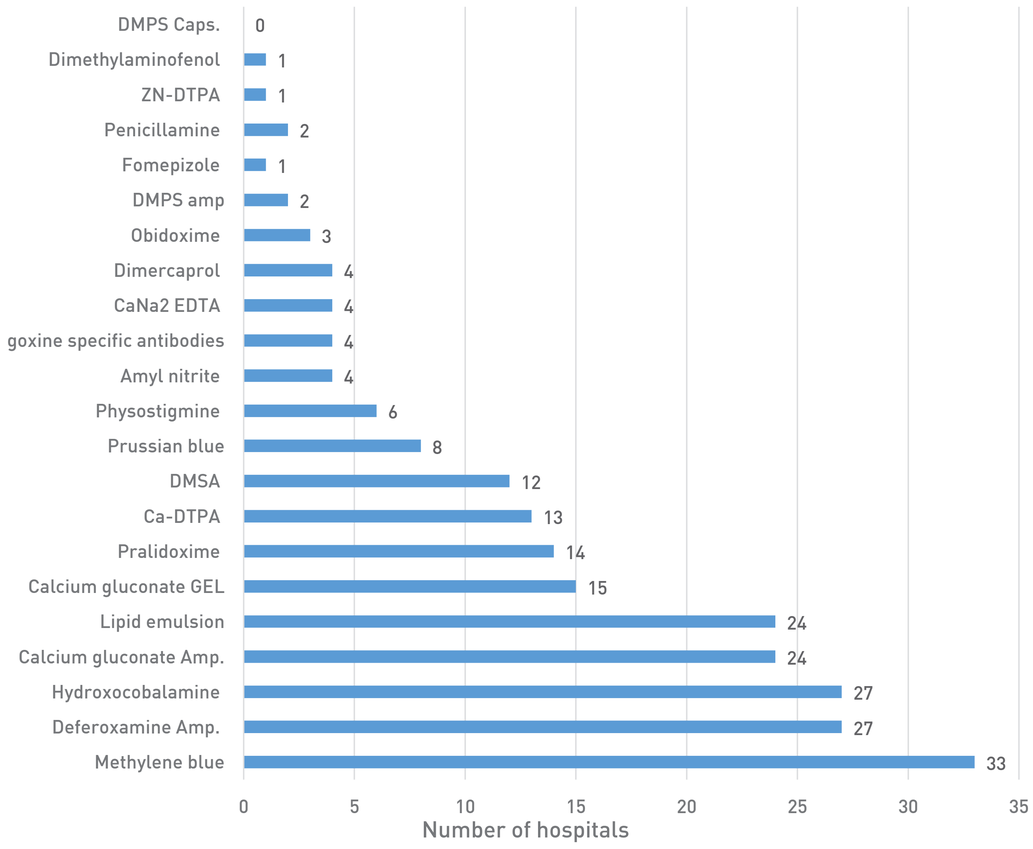
Response rate was 29%, of which 4 university hospitals and 33 non-university. Methylene blue, deferoxamine, hydroxocobalamine, calcium gluconate and intravenous lipid emulsion were available in more than 60% of the hospitals and 42% of hospitals held an atropine stock that met the imposed quantity (graph 1).

Digoxine immune fab (DIF) was ordered most frequently in urgent cases and was considered to be the most important antidote to be available via the depot of the BPC.

The availability of the category A antidotes in the hospitals could be realized with an average extra budget of less than €1,000/year without DIF or €3,500/year with DIF (based on the cost of six vials of Digifab®). Most respondents were interested in an online platform sharing the stock of other hospitals in real time, developed and controlled by the BPC.

Antidote	Intoxication	Category
Calciumgluconate gel	Hydrogen fluoride	A
Calciumgluconate amp	Hydrogen fluoride	A
Ca Na EDTA	Lead	A
Digoxin specific antibodies	Cardiac glycosides	A
Dimercaprol	Lead (with encephalopathy)	A
DMPS IV	Lead, mercury, arsenic,...	A
DMPS oral	Lead, mercury, arsenic,...	A
DMSA oral	Lead, mercury, arsenic,...	A
Hydroxocobalamine	Cyanides	A
Methylene blue	Methemoglobinemia	A
Obidoxime	Organophosphorous compounds	A
Pralidoxime	Organophosphorous compounds	A
Ca-DTPA	Radionuclides	B
Deferoxamine	Iron	B
Fomepizole	Toxic alcohols	B
Lipid emulsion IV	Local anaesthetics cardiotoxicity	B
Penicilamine	Copper, mercury, cadmium, ...	B
Physostigmine	Central anticholinergic syndromes	B
Prussian blue	Thallium	B
ZN-DTPA	Radionucliden	B
Amyl nitrite	Cyanides	C
Dimethylaminophenol	Cyanides	C

Table 1: List of the included antidotes with indication and appropriate category. Category A antidotes have good evidence-based proof of efficacy. Category B antidotes have alternatives more easily available or are widely used but not yet universally accepted as effective due to lack of research data. Category C antidotes have questionable usefulness or have better alternatives.



Graph 1: Number of hospitals having an antidote available

CONCLUSION

Not all antidotes commonly used in toxicology are available in the Belgian hospitals. Furthermore, the storage of atropine in most hospital pharmacies does not comply with the governments requirement. A minor investment will improve availability of the selected antidotes. Mutual cooperation between hospitals and the BPC, together with the development of a real-time online platform by the BPC, could boost the availability of antidotes.

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