

The Use of Antidotes in Hospitals and Communities, Supply Issues, and Emerging Research Needs

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Background

- Antidotes are critical in the care of poisoned patients
- To be effective, however, antidotes must be available at the appropriate time
- For some poisonings the antidote must be available immediately, while for others there is time to procure drug
- When not available in a timely manner, providers and poison centers try to locate drug to prevent greater injury or death (e.g. increased tissue damage with delayed snake antivenom)
- Insufficient antidote availability has been documented repeatedly throughout the United States, Canada, and in other countries for many different antidotes.

Challenges To Overcome

- Insufficient stocking of emergency antidotes in hospitals continues to be a worldwide problem
- Several studies over the last decade have reported that few hospitals stock adequate amounts of emergency antidotes to treat a single poisoned patient
- Suggested reasons for this:
 - Need for antidote stocking guidelines
 - Rarity of poisoned patients
 - Cost of stocking rarely used drugs

Addressing the Challenges

- Antidote stocking guidelines developed by national consensus panel (Dart et al 2000)
 - Panel consisted of experts representing many fields (toxicology, emergency medicine, critical care medicine)
 - Combined extensive literature review with clinical experiences of panel
 - 18 drugs reviewed, 15 recommended for stocking
 - Published in Annals of Emergency Medicine
 - US Poison Centers promoted recommendations

A first step in improving antidote availability

Addressing the Challenges

- However our poison center previously assessed the impact of antidote stocking recommendations
 - Poison center recommendations distributed to all hospitals in 4 states (CO, MT, ID, NV)
 - Surveyed hospitals comparing 1 year before and 6 months after distribution (60% response)
 - Insufficient stocking still persisted
 - Only 1 of 122 hospitals stocked 10 antidotes in adequate amounts (range 3% to 98%)
 - Improvement seen in newly marketed drug (16%)

Hospital Stocking of Antidotes



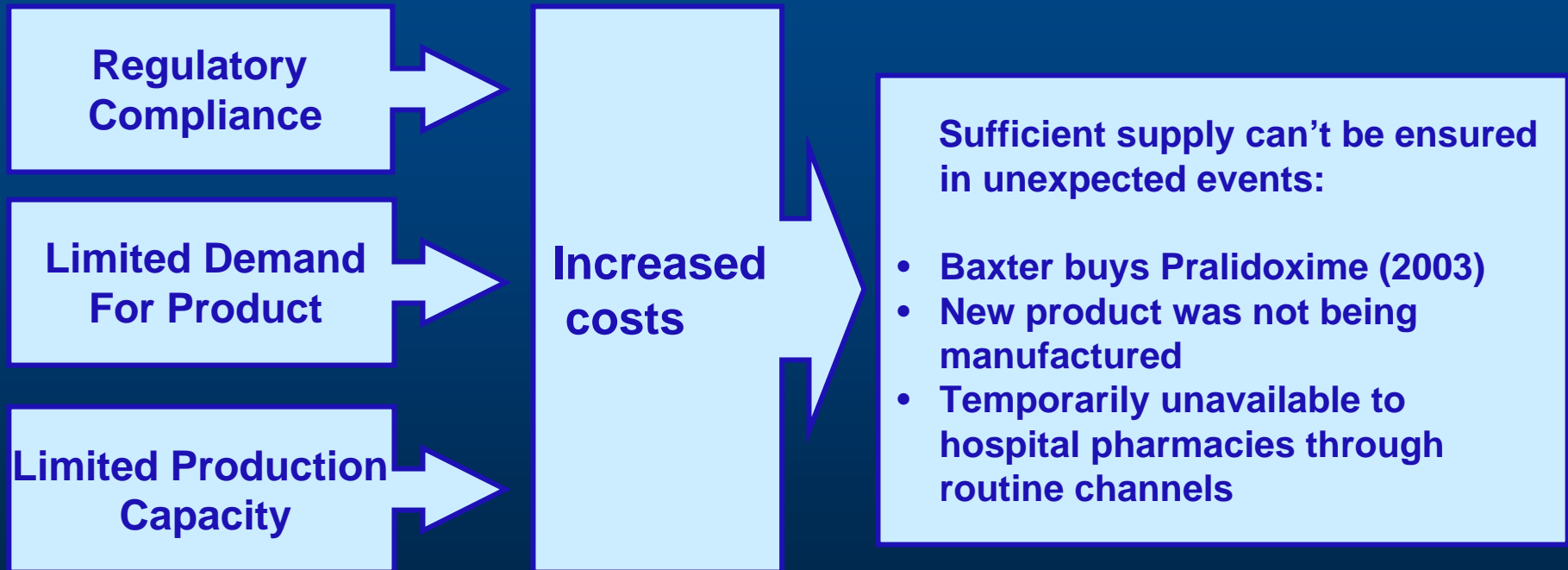
Hospital Stocking of Antidotes

Does cost affect stocking decisions?

Antidote	Cost	% of hospitals with recommended stock
Naloxone	\$412	98
Cyanide Antidote Kit	\$550	80
Methylene Blue	\$133	63
Crotalid Antivenin	\$4,504	46
Pyridoxine	\$50	24
Digoxin Immune Fab	\$8,053	3

Challenges in Antidote Supply

Pharmaceutical Industry Perspective



Ongoing Challenges

- Education of healthcare professionals
- Timely administration of appropriate antidote (availability, cost, recognition)
- No requirements or regulations for stocking
 - Joint Commission requires that hospitals stock antidotes, but does not provide specific requirements
- Acquiring and maintaining appropriate stocks
 - 2000 recommendations were hospital-based and did not address community stocking mass casualty incidents or terrorist events

Community Stocking of Antidotes

- Surveyed supply levels of Cyanide Antidote Kits (CAKs) in the 50 largest cities of the United States (819/1065 = 7% response)
- 85% of hospitals had at least 1 CAK (following Dart et al stocking recommendations)
- However hospitals in only 10 cities collectively had at least 100 CAKs
 - Insufficient quantity for mass exposure (>500)
 - 89% reported that CAKs expires prior to use
 - Stocking recommendations reported as an important influence for stocking CAKs

Possible Community Solutions

- Regional databases of antidote availability
 - Poisons centers (hard to maintain, often old info, how to move drug)
- Strategic National Stockpile
 - Some pre-deployed antidotes (CHEMPack – nerve agent drugs) but rest is hours away

Strategic National Stockpile

- National repository of chemical antidotes, antitoxins, and medical supplies managed by the CDC
- Designed to supplement and re-supply public health agencies in the event of a national emergency
- Immediate response with 12-hour Push Packages, caches of pharmaceuticals, antidotes, and medical supplies to address a variety of situations.
- Additional pharmaceuticals and/or medical supplies shipped to arrive within 24 to 36 hours.



ANTIDOTE SUMMIT

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- New Consensus Panel Convened March 2008:
30 drugs reviewed (publication in progress)
 - Panel consisted of experts representing many fields
 - Combined literature review with clinical experience
 - Included several new drugs approved since 2000
 - Availability (immediate, 1 hour, 8 hours)
 - Redefined “average” patient (100 kg from 70 kg)
 - Discussions on prehospital use and community stocking

Goal: Periodic forum to continue antidote issues

Emerging Research Needs

- Panel discussed upcoming challenges
 - Coral Snake Antivenom no longer manufactured and supply will be exhausted by end 2008
 - FDA OOPD and a foreign manufacturer began discussions
 - Several poisonings do not have acceptable treatments
 - Tricyclic antidepressant overdoses
 - Black Widow Spider envenomations
- Due to the scarcity of poisoned patients, multicenter networks have been established to evaluate treatments and further collaborations are planned

Thank You, Any Questions?

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