LIPID:
Will the Traditional Antidote Replace

Evvah Karakılıç MD, PhD.
Ankara Numune Education and Research Hospital
Department of Emergency Medicine

Treatment of Quetiapine Overdose with Intravenous Lipid Emulsion

Engin Deniz Arslan, Ali Demir, Fevzi Yilmaz, Cemil Kavalci, Evvah Karakilic and Elif Çelikel

Emergency Department, Ankara Numune Training and Research Hospital, Samanpazarı, Ankara, Turkey

(Received for publication on July 9, 2012)
(Revised for publication on August 29, 2012)
(Accepted for publication on September 25, 2012)
(Published online in advance on May 27, 2013)

We report the case of a 29-year-old woman who attempted suicide by oral ingestion of potentially fatal doses of multiple drugs including quetiapine. Intravenous lipid emulsion (ILE) was administered at a dose higher than that used in the standard management of toxicity. Rapid improvement was observed in the patient's status, and no additional treatment was required during the period of observation. No adverse effect of lipid administration was observed. ILE treatment seems to have great potential in the management of lipophilic drug toxicity in the future. (doi: 10.2302/kjm.2012-0010-CR) ; Keio J Med 62 (2) : 53–57, June 2013)

Intravenous lipid emulsions

- P
- gly

Recent research has focused on the efficacy of lipid emulsion in resuscitating patients from overdoses of lipophilic, non-LA agents.

Mechanism of Action

- Lipophilic substances, such as local anesthetics, are drawn into the "lipid sink" and a concentration gradient develops between tissue and blood which cause local anesthetics to move away from the heart or brain (areas of high concentrations) to the "lipid sink".

Opposite idea

- J. Jovic-stotic et al. published a case report
- Severe Propranol intoxication
  - (4.21 mg/mL) (highly lipid-soluble beta-blocker)
- after ILE treatment they observed that similar elimination pattern of propranolol
- These findings did not fit with the lipid sink theory

Other mechanisms

- Lipid emulsion could theoretically increase intracellular fatty acid content and therefore overcome the reduced ATP production, which results from LA block of fatty acid transport and oxidation.
- It is possible that the resulting increased intracellular fatty acid content contributes to improved ATP synthesis in the cardiomyocyte.

Other mechanisms

- Lipid emulsion infusion might also directly increase intramyocyte calcium levels and lead to a direct positive inotropic effect.
- Fatty acids have also been shown to increase calcium levels in cardiac myocytes.

Which kind of drug poisoning

"Weinberg G L" says in his paper,

- ILE treatment can use for lipid-soluble drugs
- Especially log P greater than 2

Opposite idea

EMA Emergency Medicine Australasia

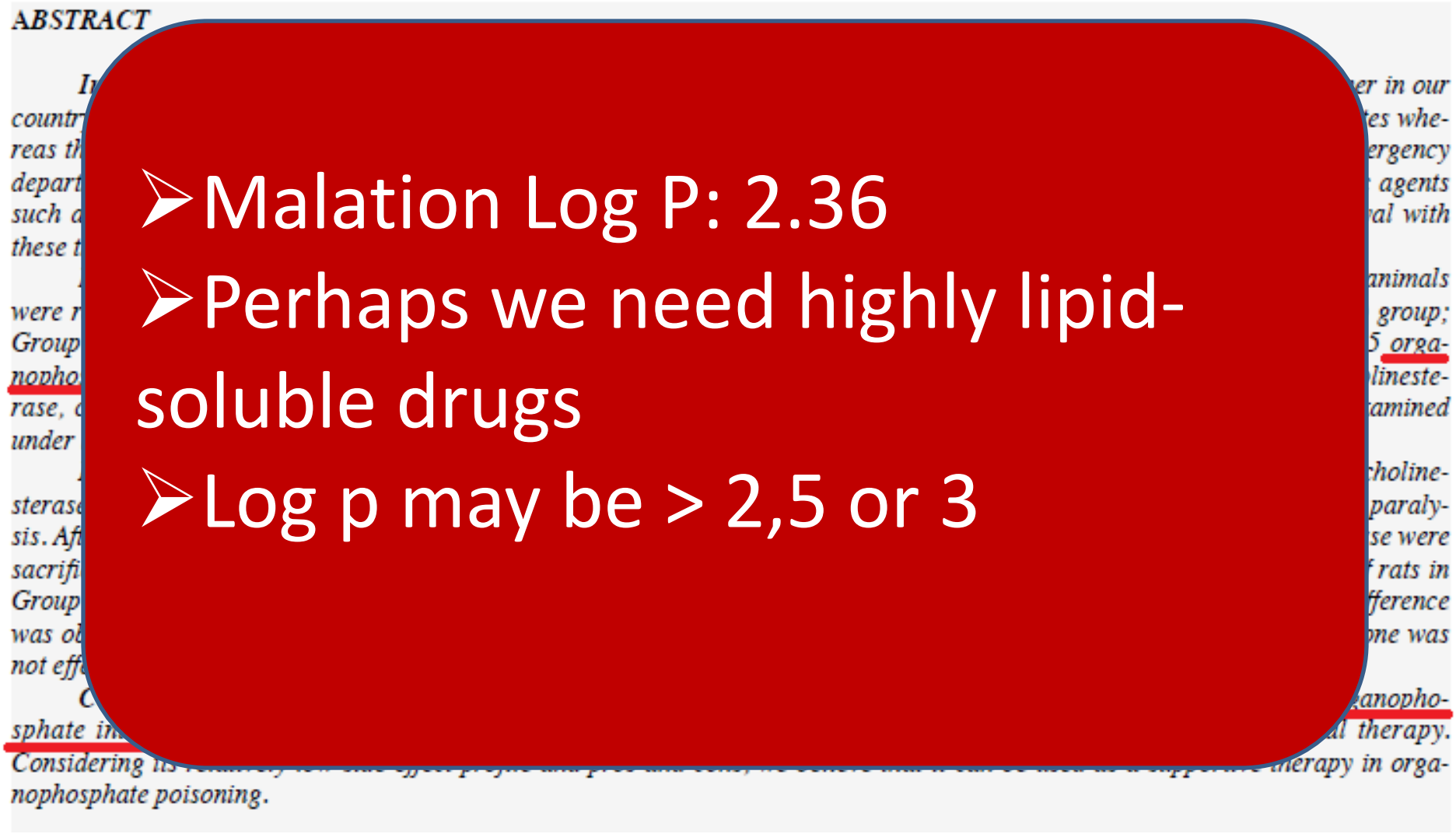
Emergency Medicine Australasia (2014) 26, 286–290

doi: 10.1111/1742-6723.12237

TABLE 1. *Demographic details and drugs ingested*

Case	Sex	Age (years)	Drug ingested	Log P	Amount	Coingestants
1	F	17	Baclofen	–1.0	1 g	Oxycodone, ibuprofen, diazepam
2	M	32	Baclofen	–1.0	Unknown	–
3	F	39	Carbamazepine	2.45	7.2 g	Amisulpride
4	M	33	Clonazepam	2.5	Unknown	Quetiapine
5	F	46	Quetiapine	2.5	8 g	–
6	F	27	Quetiapine	2.5	5 g	–
7	F	43	Quetiapine	2.5	11 g	–
8	F	52	Quetiapine	2.5	4.8 g	Mirtazapine
9	F	20	Quetiapine	2.5	6 g	–

Another study



ABSTRACT

- Malation Log P: 2.36
- Perhaps we need highly lipid-soluble drugs
- Log p may be > 2,5 or 3

- We can use ILE treatment highly liposoluble drugs poisoning
  - Local anesthetics
  - Calcium channel blockers
  - Beta blockers
  - Psychotropic drugs
  - Other non-LA drugs.

Dose

- For asystolic patients, or those with pulseless electrical activity, who do not respond to the bolus, **the dose may be repeated.**
- If there is an initial response to the bolus followed by the re-emergence of hemodynamic instability, **the infusion rate could be increased or, in severe cases, the bolus could be repeated.**

Table 1. Summary of Pediatric Cases of Intravenous Lipid Emulsion Reversal of Drug Toxicity

Reference	Drug	Age, Weight	Toxicity (onset)	Lipid Emulsion Regimen	Toxicity Reversal (onset)
Anesthetic medications for a medical procedure					
Sirianni (2008)[20]	Bupropion, lamotrigine	17 years, 55 kg	Coma, dysrhythmias, seizures, cardiac arrest (~10 hours)	Intralipid 20%, 1.8-mL/kg (100 mL) bolus dose	Palpable pulse detected (1 minute), normal sinus rhythm (15 minutes)
Montiel (2011)[21]	Diltiazem	18 years, 50 kg	Hypotension, tachycardia, respiratory failure, hyperglycemia (8 hours)	Intralipid 20%, 1.5-mL/kg bolus and 0.25 mL/kg over 1 hour	Normalized vital signs (1 hour), reduction in doses of norepinephrine and insulin-dextrose therapies

The patients in this pediatric series apparently tolerated the lipid emulsion well in the context of drug toxicity and resuscitative care.

Adverse reaction

Premature and low birth-weight infants which has been associated with death secondary to **fat accumulation in the lungs.**

As a result

- There are few antidotes in clinical toxicology
- In some poisonings; morbidity and mortality rates are high and supportive care is often ineffective.
- **Intralipid is an exciting development in clinical toxicology.**

- Thank you for your listening