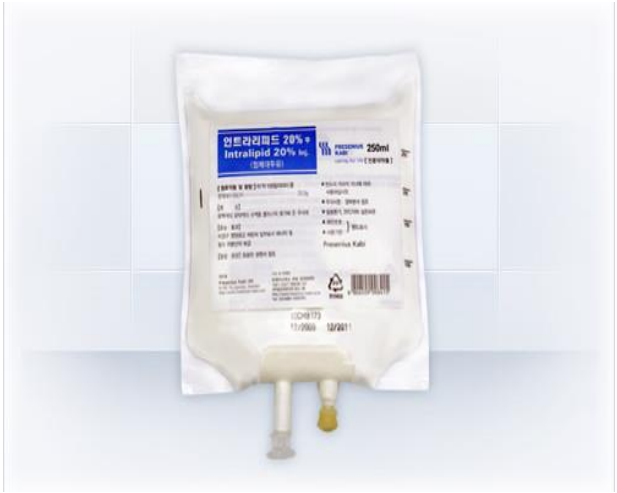
Zehirlenmelerde

İntravenöz Lipid Tedavisi



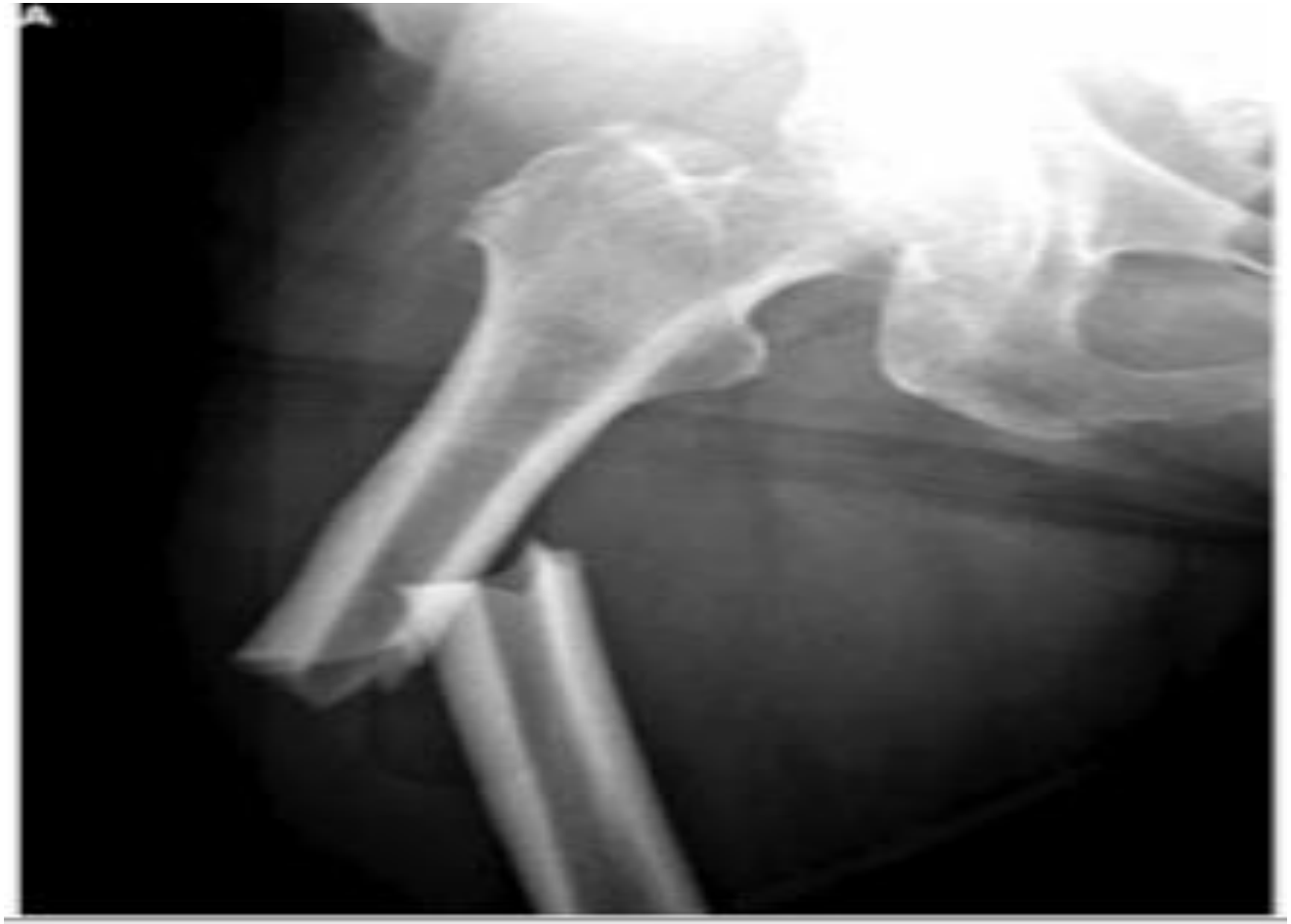
Prof. Dr. Mehmet GÜL

NEÜ Meram Tıp Fakültesi Acil Tıp AD

Ümraniye EAH Acil Tıp Kliniği

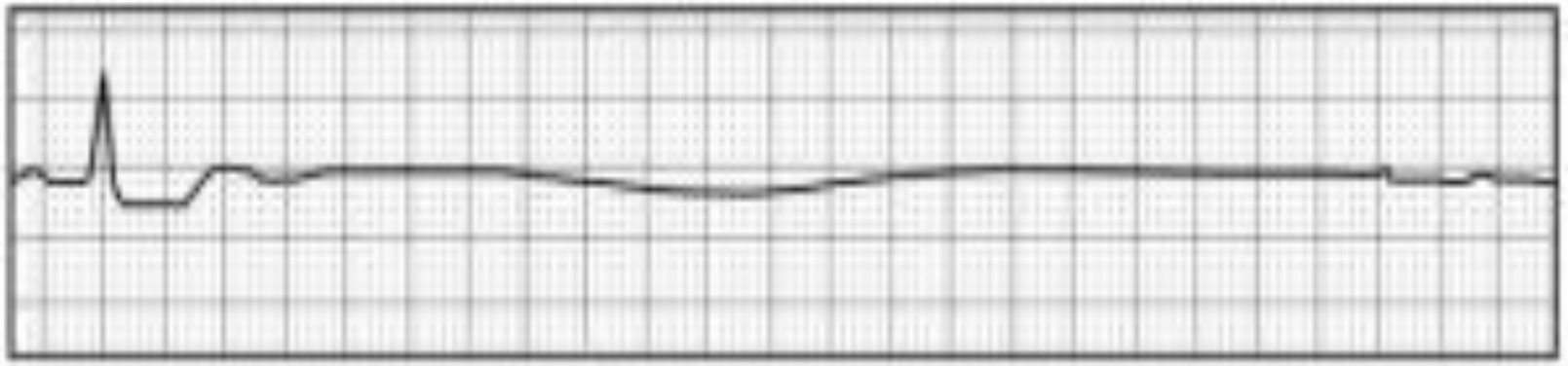
Vaka Sunumu

- 75 yaşında, köyde yaşayan bir erkek hasta,
- Evinin önünde düşüyor, oğlu olaya şahit oluyor ve acil servise ambulansla getiriliyor,
- Fizik muayene: acil serviste bacağını oynatamıyordu, sağ bacağında kısalma ve ağrı vardı
- Başka bir yaralanma yoktu
- Kısa bir süre içinde röntgen çekildi



SAĞ FEMUR CİSİM FRAKTÜRÜ

- Kasık ve uyluğa vuran ağrı için iv morfin ve parasetamol yapıldı.
- Ağrının devam etmesi üzerine Bupivacain ile 20 ml. femoral blok yapıldı.
- Birkaç dakika sonra hasta arrest oldu ve CPR başlandı



Hastanın ritmi Asistol, ekip algoritmaya göre CPR yaptı

- CPR'ye devam edildi,

- 1.5 ml/kg intralipid verildi

Etkin CPR'dan 8 dakika sonra dolaşım yeniden geldi

Tablo

lokal anesteziğe bağlı akut kardiyak toksisite

olarak değerlendirildi.

TARİHÇE

- 1884 -1891 yılları arasında 200 sistemik toksisite vakası ve 13 ölümün bu ilaçlarla ilişkilendirilmesi **kokainin** LA olarak başlangıçtaki yaygın kullanımını azalttı
- 1979 dan 1982 ye kadar olan periyot boyunca 5 hastanın ölümü
  - Acil servisde minör hastalıklar için tedavi edilen sağlıklı hastalardı
  - Bupivakain

    Hastaların ikisi 11 yaşında erkekti

    Önerilen ilaç dozuna bağlı kalınmasına rağmen ölümler gerçekleşti

    İV Regional Anestezi için kullanımı o zamandan beri terk edildi

Lokal Anestezik Toksisitesi (LAT)

- LAT periferik sinir bloğu tekniklerinin mortalitesi en yüksek komplikasyonudur.
- Lokal anesteziklerin

  - yanlışlıkla intravasküler uygulanması ya da

  -emniyet sınırının üzerindeki dozlarda kullanımı

  toksisitenin en sık nedenleridir.

İntravenöz Lipid Emülsiyonu (İLE)

- Önceleri, malnütrisyonda kalori kaynağı olarak total parenteral beslenme amaçlı kullanılan bir solüsyondu.

- Son yıllarda başta lokal anestezik ilaç zehirlenmeleri olmak üzere lipofilik olan ilaç zehirlenmelerinde hemodinamik anstabil hastaların resüsitasyonunda etkin bir antidot olarak kullanılmaya başladı *

*Rotschild L, et al. Lipid emulsion in clinical toxicology. Scand J Trauma Resusc Emerg Med 2010;18:51.

Scand J Trauma Resusc Emerg Med. 2010 Oct 5;18:51. doi: 10.1186/1757-7241-18-51.

Intravenous lipid emulsion in clinical toxicology.

Rothschild L[1], Bern S, Oswald S, Weinberg G.

Author information

[1]Department of Anesthesiology, University of Illinois at Chicago, UIC Medical Center, Chicago, Illinois, USA. leelach@uic.edu

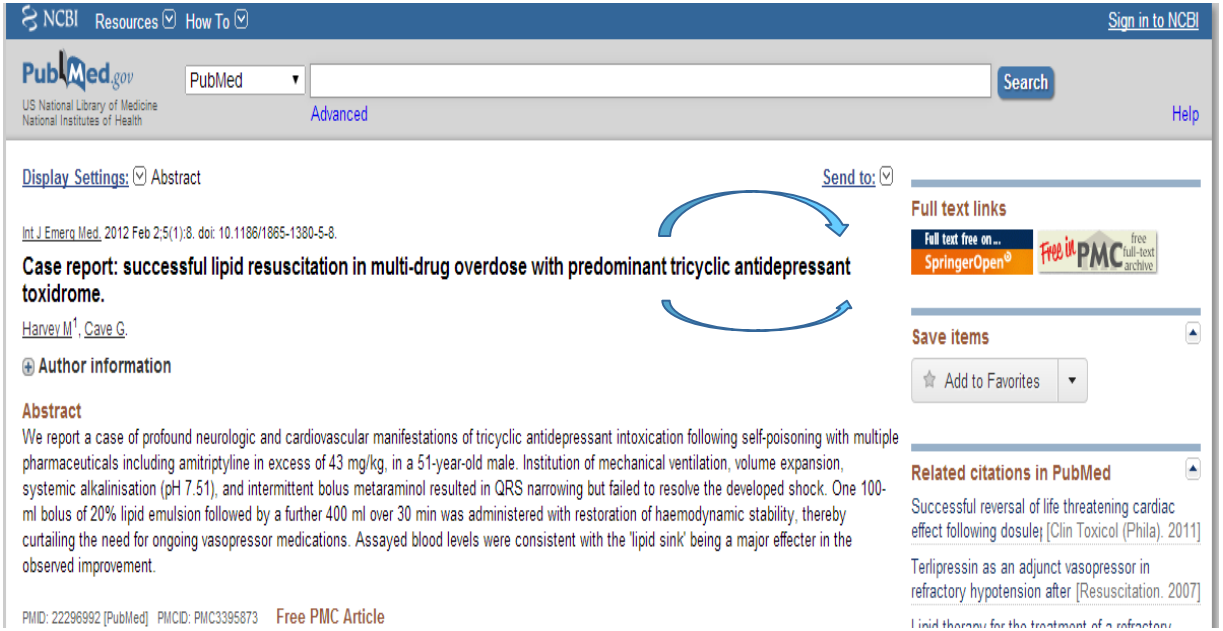
Abstract

Intravenous lipid emulsion is an established, effective treatment for local anesthetic-induced cardiovascular collapse. The predominant theory for its mechanism of action is that by creating an expanded, intravascular lipid phase, equilibria are established that drive the offending drug from target tissues into the newly formed 'lipid sink'. Based on this hypothesis, lipid emulsion has been considered a candidate for generic reversal of toxicity caused by overdose of any lipophilic drug. Recent case reports of successful resuscitation suggest the efficacy of lipid emulsion infusion for treating non-local anesthetic overdoses across a wide spectrum of drugs: beta blockers, calcium channel blockers, parasiticides, herbicides and several varieties of psychotropic agents. Lipid emulsion therapy is gaining acceptance in emergency rooms and other critical care settings as a possible treatment for lipophilic drug toxicity. While protocols exist for administration of lipid emulsion in the setting of local anesthetic toxicity, no optimal regimen has been established for treatment of acute non-local anesthetic poisonings. Future studies will shape the evolving recommendations for lipid emulsion in the setting of non-local anesthetic drug overdose.

PMID: 20923546 [PubMed - indexed for MEDLINE] PMCID: PMC2958894 Free PMC Article

Lipofilik İlaçlar

- Amlodipine
- Verapamil
- Metoprolol
- Bupivacaine
- Diphenhidramine
- Propranolol
- Tricyclic antidepressants
- Organophosphates
- Bupropion
- Carvedilol
- Quetiapine
- Flecainide



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Int J Emerg Med. 2012 Feb 2;5(1):8. doi: 10.1186/1865-1380-5-8.

Case report: successful lipid resuscitation in multi-drug overdose with predominant tricyclic antidepressant toxidrome.

Harvey M[1], Cave G.

Author information

Abstract

We report a case of profound neurologic and cardiovascular manifestations of tricyclic antidepressant intoxication following self-poisoning with multiple pharmaceuticals including amitriptyline in excess of 43 mg/kg, in a 51-year-old male. Institution of mechanical ventilation, volume expansion, systemic alkalinisation (pH 7.51), and intermittent bolus metaraminol resulted in QRS narrowing but failed to resolve the developed shock. One 100-ml bolus of 20% lipid emulsion followed by a further 400 ml over 30 min was administered with restoration of haemodynamic stability, thereby curtailing the need for ongoing vasopressor medications. Assayed blood levels were consistent with the 'lipid sink' being a major effecter in the observed improvement.

PMID: 22296992 [PubMed] PMCID: PMC3395873 Free PMC Article

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Terlipressin as an adjunct vasopressor in refractory hypotension after [Resuscitation. 2007]
Lipid therapy for the treatment of a refractory

TPR THE POISON REVIEW

"Poison is in everything, and no thing is without poison" – Paracelsus

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Fat emulsion therapy and tricyclic antidepressant overdose: first case

July 17, 2010, 1:15 pm

Intravenous fat emulsion to reverse haemodynamic instability from intentional amitriptyline overdose. Engels PT, Davidow JS. *Resuscitation* 2010;81:1037-1039.

Abstract

This case report, from Edmonton Alberta, describes a 27-year-old man who ingested — by history — 4.25 g of amitriptyline. In the emergency department he was unresponsive with a GCS of 3, BP 67/40, and QRS interval 240 msec. On arrival he had two tonic-clinic seizures and was intubated. Despite treatment with sodium bicarbonate, pressors, and benzodiazepines, he suffered episodes of pulseless ventricular tachycardia and remained pressor-dependent approximately 8 hours after ingestion At that time the treating team decided to administer intravenous fat emulsion therapy. After the initial bolus, pressors were rapidly weaned and eventually discontinued. Urine toxicology screen was positive for tricyclics.

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THE POISON REVIEW PODCAST

The Best of TPR

» This makes it clear: stoned driving is indeed dangerous

» Effects of marijuana on driving ability

J Med Case Rep. 2011 Aug 20;5:399. doi: 10.1186/1752-1947-5-399.

Lipid rescue of massive verapamil overdose: a case report.

Liang CW[1], Diamond SJ, Hagg DS.

Author information

Abstract

INTRODUCTION: Massive intentional verapamil overdose is a toxic ingestion which can cause multiorgan system failure and has no currently known antidote.

CASE PRESENTATION: The patient is a 41-year-old Caucasian woman who ingested 19.2 g of sustained release verapamil in a suicide attempt. Our patient became hypotensive requiring three high-dose vasopressors to maintain arterial pressure. She also developed acute respiratory failure, bradycardic ventricular rhythm necessitating continuous transvenous pacing, and anuric renal failure. Our patient was treated with intravenous calcium, bicarbonate, hyperinsulinemic euglycemic therapy and continuous venovenous hemodialysis without success. On the fourth day after hospital admission continuous intravenous lipid therapy was initiated. Within three hours of beginning lipid therapy, our patient's vasopressor requirement decreased by half. Within 24 hours, she was on minimal vasopressor support and regained an underlying junctional rhythm. After three days of lipid infusion, she no longer required inotropic agents to maintain blood pressure or pacing to maintain stable hemodynamics.

CONCLUSIONS: Intravenous fat emulsion therapy may be an effective antidote for massive verapamil toxicity.

PMID: 21854635 [PubMed] PMCID: PMC3169500 Free PMC Article

Lipid emulsion and propranolol: first case

October 22, 2010, 5:03 pm

Intravenous lipid emulsion in propranolol overdose. Dean P et al. *Anaesthesia* Nov 2010:65:1148-1150.

No abstract available online

This brief article presents the first clinical case report describing the use of IV lipid emulsion to treat propranolol overdose. A 27-year-old woman was brought to the emergency department approximately 1 hour after ingesting 7 g of propranolol. On presentation she was hypotensive (60/30 mmHg) and bradycardic (25 bpm). Despite treatment with fluids, atropine, glucagon, and high-dose insulin, and eternal pacing she remained unstable, suffering tonic-clinic seizures and cardiac arrest. A palpable pulse returned after administration of advanced life support measures, but her blood pressure and pulse remained low. After consultation with Britain's National poison Information Service, 20% Intralipid was given (100-ml bolus followed by 400-ml over 20 min). The authors suggestions that the patient's condition rapidly improved after this.

The Best of TPR

» This makes it clear: stoned driving is indeed dangerous

» Effects of marijuana on driving ability

Intravenous lipid emulsion and amiodarone

October 12, 2010, 12:06 pm

Intravenous Lipid Emulsion Sequesters Amiodarone in Plasma and Eliminates Its Hypotensive Action in Pigs. Niiya T et al. *Ann Emerg Med* October 2010;56:402-408.

Abstract

Multiple animal studies and limited clinical experience have suggested that administering IV lipid emulsion has a beneficial effect on outcomes in acute overdose of lipophilic drugs, including bupivacaine, propranolol, verapamil, clomipramine, bupropion, and amitriptyline. The exact mechanism responsible for this effect has not been fully determined. Does the lipid infusion provide a "sink" that sequesters fat-soluble drugs? Or do the lipids primarily provide fuel for the myocardium and improve cardiac function?

The main objective of this animal study was to determine how extensively IV-administered amiodarone was sequestered by an IV infusion of lipid emulsion. Twenty pigs were anesthetized and instrumented, then given a bolus of either lipid emulsion (ClinOleic) or Ringer's Lactate, followed by a continuous infusion of same plus IV

The Best of TPR

Toxicity of Lidocaine Improved with Lipid Emulsion Treatment: Case Report

Lipid Emülsiyon Tedavisi ile Düzelen Lidokain Toksisitesi: Olgu Sunumu

Lidokain Toksisitesi / Toxicity of Lidocaine

Hayriye Gönüllü[1], Edip Gönüllü[2], Lokman Soyoral[2], Mehmet Fatih Özbay[3], Yüksel Kaya[4]
[1]Yüzüncü Yıl Üniversitesi, Tıp Fakültesi, Acil Tıp AD, Van,
[2]Van Bölge Eğitim ve Araştırma Hastanesi, Anestezi ve Reanimasyon Kliniği, Van,
[3]Van Bölge Eğitim ve Araştırma Hastanesi, İç Hastalıkları Kliniği, Van,
[4]Kafkas Üniversitesi, Tıp Fakültesi, Kardiyoloji AD, Kars, Türkiye

Successful treatment of permethrin toxicosis in two cats with an intravenous lipid administration

M. Brückner; C. S. Schwedes
Kleintierklinik Augsburg, Fachtierärztliche Klinik für Kleintiere

Key words
Pyrethroids, intoxication, cat, intravenous lipids, soybean oil

Summary
The present work describes successful treatment of permethrin toxicosis in two cats with a novel therapy of intravenous lipid administration. Two cats presented in lateral recumbency and with generalized tremor after they had been incidentally treated with permethrin for flea control by their owners. Initial therapy consisted of diazepam, propofol, bathing, and intravenous fluids. After an initial bolus of 2 mg/kg BW pentobarbital a pentobarbital continuous rate infusion (CRI) was started. Both cats received an emulsion of 20% soybean oil and 80% olive oil, commonly used as fat component of total parenteral nutrition in humans, later in the course of therapy. A bolus of 2 ml/kg BW of the emulsion followed by a CRI of 4 ml/kg BW/h for 4 hours was administered via a jugular catheter as reported previously. One cat received two cycles of therapy with intravenous lipid whereas the other cat needed just one application. Both cats recovered completely without requiring any further treatment. In conclusion, administration of intravenous lipids for permethrin toxicosis in cats is a novel treatment approach which seems to be highly effective in shortening the recovery time for permethrin toxicosis and possibly other fat-soluble toxins.

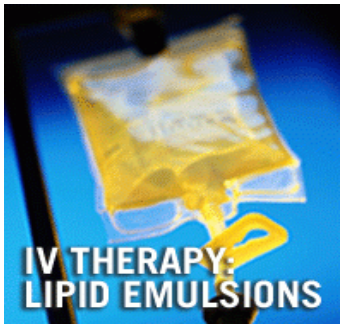
Schlüsselwörter
Pyrethroide, Intoxikation, Katze, intravenöse Lipidgabe, Sojabohnenöl

Zusammenfassung
Die vorliegende Arbeit beschreibt die erfolgreiche Behandlung einer Permethrinvergiftung bei zwei Katzen mit einem neuartigen Therapieansatz, der intravenösen Verabreichung einer Lipidlösung. Beide Katzen wurden in Seitenlage und mit einem generalisierten Tremor vorgestellt, nachdem sie versehentlich von ihren Besitzern mit einem Permethrinpräparat zur Flohbekämpfung behandelt worden waren. Die Initialtherapie bestand aus der intravenösen Applikation von Diazepam und Propofol sowie Baden und intravenöser Flüssigkeitstherapie. Nach einem initialen Bolus von 2 mg/kg KM Pentobarbital wurde ein Pentobarbitaldauertropf (DTI) gestartet. Im weiteren Verlauf erhielten beide Katzen über einen zentralen Venenkatheter in der V. jugularis eine Emulsion aus 20% Sojabohnenöl und 80% Olivenöl, die herkömmlich als Fettkomponente bei der totalen parenteralen Ernährung des Menschen Verwendung findet. Begonnen wurde mit einem Bolus von 2 ml/kg KM der Lipidemulsion, gefolgt von 4 ml/kg KM/h für 4 Stunden. Bei einer Katze erfolgten zwei derartige Therapiezyklen mit dem Lipid, während bei dem zweiten Patienten nur eine Anwendung erforderlich war. Beide Katzen erholten sich vollständig ohne weitere Therapiemaßnahmen. Zusammenfassend stellt die intravenöse Verabreichung von Lipiden für die Permethrinvergiftung der Katze einen neuartigen Behandlungsansatz dar. Diese erscheint äußerst effektiv bei der Verkürzung der Erholungszeit im Rahmen einer Permethrinvergiftung und möglicherweise auch bei einer Intoxikation mit anderen fettlöslichen Toxinen.

Korrespondenzadresse
Michael Brückner
Tierärztliche Fachklinik für Kleintiere

Erfolgreiche Therapie einer Permethrinvergiftung bei zwei Katzen durch intravenöse Gabe einer Lipidlösung
Tierärztl Prax 2012; 40 (K): 129–134

İntralipid Emülsiyon (İLE)



- İLE ilk kez suni beslenme amacıyla 1960'ta tıpta kullanıldı
- Lokal anestezik toksisitesinde İLE kullanımı ilk kez 1990'da tartışılmaya başlandı.
- İLE kullanımı ile ilgili literatür şimdilik İnsan vaka sunumu, hayvan deneyleri, birçok sayıda derleme ve vaka serisinden ibaret

American Society of Regional Anaesthesia

İnsanlarda görülen ciddi LAST olaylarının değerlendirildiği
hiç bir RKÇ bulunmamaktadır

- ✓ **Bu komplikasyonların nadir görülmesi**
- ✓ **Kritik hastalıklarda medikal girişimler için bilgilendirilmiş hasta onamı alınmasının güç**
- ✓ **Gelecekte de RKÇ'ların yapılması zor bir olasılık gibi görünmektedir**

Retrospektif çalışmalar – epidemiyolojik
Hayvan çalışması
Olgu sunuları

Am J Emerg Med. 2012 Jul;30(6):1012.e1-2. doi: 10.1016/j.ajem.2011.03.025.

Lipid 20% emulsion ameliorates the symptoms of olanzapine toxicity in a 4-year-old.

McAllister RK[1], Tutt CD, Colvin CS.

Author information

Abstract

Olanzapine (Zyprexa; Eli Lilly, Indianapolis, IN) is an antipsychotic medication that has been useful in the treatment of psychiatric disorders. In cases of overdose, cardiovascular and neurologic changes are seen. Lipid emulsion has proven successful in relieving the toxicity associated with overdose of lipid-soluble drugs. We present a case report of a 4-year-old child who presented with tachycardia and agitation, followed by somnolence after presumed accidental olanzapine ingestion. Treatment with lipid emulsion resulted in amelioration of the symptoms. Inadvertent discontinuation of a lipid emulsion infusion led to recurrence of symptoms, which quickly resolved with an additional loading dose of lipid emulsion.

Comment in

Comment on "Lipid 20% emulsion ameliorates the symptoms of olanzapine toxicity in a 4-year-old". [Am J Emerg Med. 2012]

PMID: 21641141 [PubMed - indexed for MEDLINE]

EMA
Emergency Medicine Australasia

doi: 10.1111/j.1742-6723.2011.01398.x

Emergency Medicine Australasia (2011) **23**, 123–141

EMA

REVIEW ARTICLE

Review article: Intravenous lipid emulsion as antidote: A summary of published human experience

Grant Cave,[1,2,5] Martyn Harvey[3,4] and Andis Graudins[6,7]
[1]Hutt Hospital, Lower Hutt, [2]University of Otago, Wellington School of Medicine and Health Sciences, Wellington, [3]Emergency Department, Waikato Hospital, Hamilton and [4]University of Auckland, Waikato Campus, Auckland, New Zealand; and [5]Tamworth Rural Referral Hospital, Tamworth, New South Wales, [6]Department of Medicine, Southern Clinical School, Monash University and [7]Southern Health, Monash Medical Centre, Clayton, Victoria, Australia

Abstract

Intravenous lipid emulsion (ILE) has been demonstrated to be effective in amelioration of cardiovascular and central nervous system sequelae of local-anaesthetic and non-local-anaesthetic drug toxicity in animal models. Sequestration of lipophilic toxins to an expanded plasma lipid phase is credited as the predominant beneficial mechanism of action of ILE. Systematic review of published human experience is however lacking. We determined to report a comprehensive literature search of all human reports of ILE application in drug poisoning. Forty-two cases of ILE use (19 local-anaesthetic, 23 non-local-

- Önceden deneysel bir tedavi kabul edilen, fakat şimdi sıklaşan kullanımla beraber ana akım tedavi haline gelen İLE tedavisi Acil Tıp hekimleri'nin ilgisini çekmektedir

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IV Fat Emulsion Beneficial for Some Drug Overdoses

Several mechanisms have been proposed to explain why IFE might work as an antidote.

ACEP News
July 2009

By Diana Mahoney
Elsevier Global Medical News

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- Amerika Zehir Kontrol Merkezleri'nde yakın zamanda yapılan bir araştırma, çoğu merkezin İLE tedavisi için bir protokole sahip olduğunu ortaya koyuyor *

* Christian MR, et al. J Med Toxicol 2013 May 10. [Epub ahead of print]

AMERICAN SOCIETY OF
REGIONAL ANESTHESIA AND PAIN MEDICINE

Checklist for Treatment of Local Anesthetic Systemic Toxicity

The Pharmacologic Treatment of Local Anesthetic Systemic Toxicity (LAST) is Different from Other Cardiac Arrest Scenarios

- ❑ **Get Help**
- ❑ **Initial Focus**
  - ❑ **Airway management:** ventilate with 100% oxygen
  - ❑ **Seizures uppression:** benzodiazepines are preferred; **AVOID propofol** in patients having signs of cardiovascular instability
  - ❑ **Alert** the nearest facility having **cardiopulmonary bypass** capability
- ❑ **Management of Cardiac Arrhythmias**
  - ❑ **Basic and Advanced Cardiac Life Support (ACLS)** will require adjustment of medications and perhaps prolonged effort
  - ❑ **AVOID vasopressin, calcium channel blockers, beta blockers, or local anesthetic**
  - ❑ **REDUCE individual epinephrine doses to <1 mcg/kg**
- ❑ **Lipid Emulsion (20%) Therapy** (values in parenthesis are for 70kg patient)
  - ❑ **Bolus 1.5 mL/kg** (lean body mass) intravenously over 1 minute (~100mL)
  - ❑ **Continuous infusion 0.25 mL/kg/min** (~18 mL/min; adjust by roller clamp)
  - ❑ Repeat bolus once or twice for persistent cardiovascular collapse
  - ❑ Double the infusion rate to 0.5 mL/kg/min if blood pressure remains low
  - ❑ **Continue infusion** for at least10 minutes after attaining circulatory stability
  - ❑ Recommended upper limit: Approximately 10 mL/kg lipid emulsion over the first 30 minutes
- ❑ **Post LAST events at** www.lipidrescue.org and report use of lipid to www.lipidregistry.org

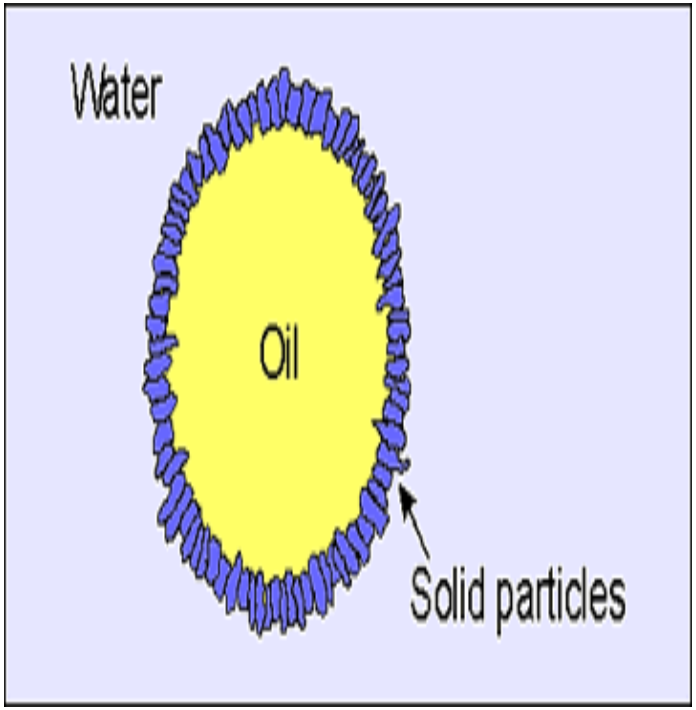
İLE nedir?

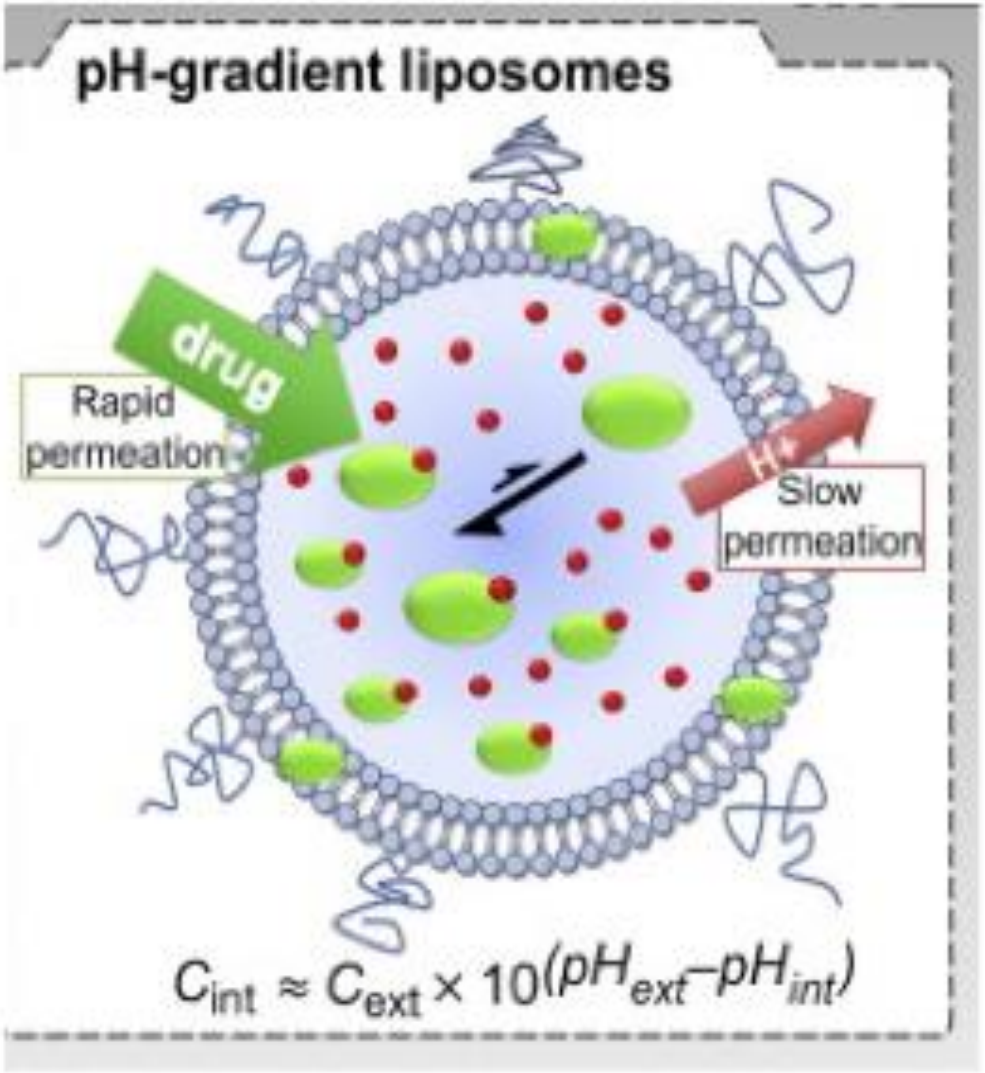
- ILE bir yağ ve su mikroemülsiyonudur (%20)

  soya yağı, yumurta fosfolipidleri, gliserin ve su

- Soya fasülyesinden elde edilmiştir
- pH'sı 8.0'dır
- En sık kullanılan ticari formu %20'lik İntralipid

Emülsiyonlar, birbiriyle karışmayan iki sıvının birbiri içinde dağılmasından oluşmuş, homojen görünüşlü heterojen sistemlerdir.





Lokal Anesteziklerin etki mekanizması

- Voltaj bağımlı sodyum kanal blokajı (%75)
- Kalsiyum kanal blokajı
- Potasyum kanal blokajı
- G-protein ile regüle kanal blokajı

Etki mekanizması nasıldır?

İLE'nin etki mekanizması tam anlaşılmamakla beraber şu faktörlerle ilişkili olduğu düşünülmektedir:

- "Lipid Sink"

- Plazmada lipofilik ilaçları hızla bağlar, bir lipid atık deposu oluşturur
- Bu, en olası primer farmakokinetik mekanizma

- İyon kanalları üzerine etkileri

- Bloke olan Sodyum ve Kalsiyum kanallarını aktive eder

- Metabolotrofik

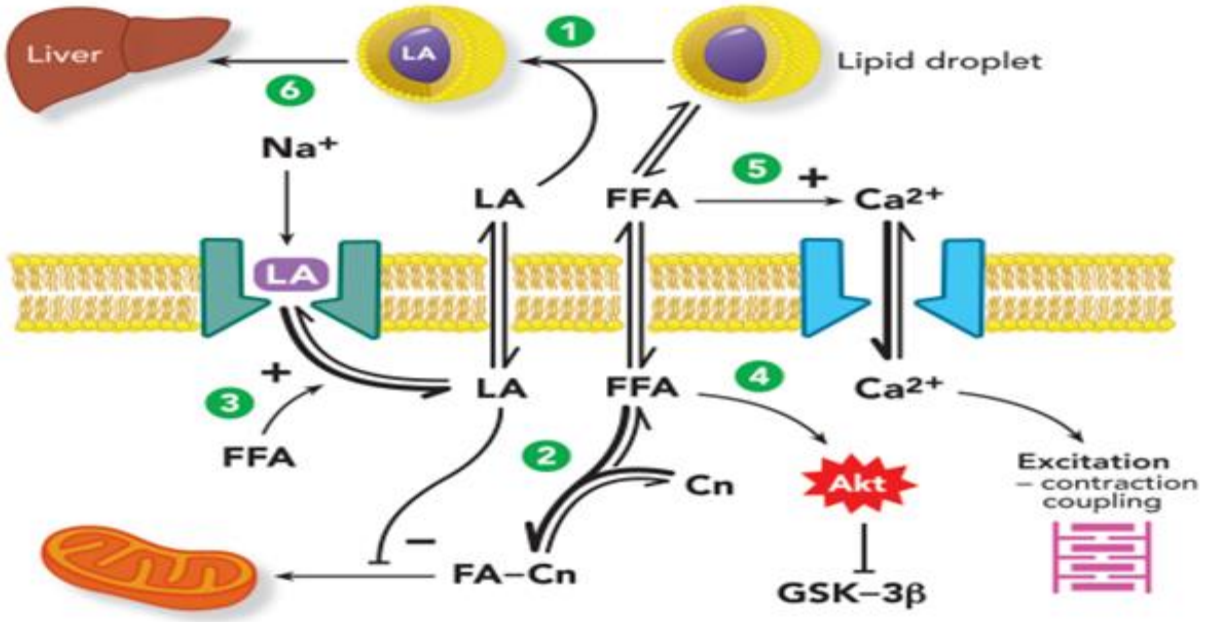
- G-proteinler yoluyla sekonder mesaj iletimi etkileri

- Alkaline pH

- Kalp kası için Enerji Substratı

- Mitokondriyal enerji üretimini yeniden sağlar

"Lipid Sink"



Lipid infüzyonu;

- Miyokarda yağ asidi girişini artırarak, kitle etkisi ile LA kaynaklı taşıma blokajını ortadan kaldırır
- Kanda suni lipid faz oluşturarak, lipofilik LA'lerin bu faz içine çıkmaları yolu ile plazma seviyelerini azaltır
- Büyük olasılıkla yağda çözünen LA içeriğini kardiyak dokudan çeken ve böylece kardiyak ileti, kontraktilite ve koroner perfüzyonu iyileştiren bir "lipid sink (lipid çamuru)" gibi etki ederek resüsitasyonun kolaylaştırılmasına yardımcı olabilir

Kalp kası için Enerji Substratı

- Serbest yağ asitlerinin mitokondride oksidasyonu myokard için gerekli ATP'nin %70' ini sağlar.
-
- İLE uygulaması ile serbest yağ asidinin verilmesi daha fazla ATP oluşumunu ve daha fazla miyokard enerji kaynağı olmasını sağlar.

İyon kanalları üzerine etkileri

- Bupivakaine bağlı toksisitede İLE'nin membran kanallarına etkisi gösterilmiştir.

- Bupivakain, myokardda sodyum kanallarını bloke eder ve bu etki İLE tarafından ortadan kalkar.

İyon kanalları üzerine etkileri

- İLE voltaja bağımlı çalışan kalsiyum kanallarından kalsiyumun içeri girişini artırır.
- Bu kalsiyumun içeri akışı demek daha güçlü miyokard kontraktilesi demektir.

- Bu model işleyişi, bupivakain gibi lokal anestetik maddeler ile olan zehirlenmelerde gösterilmiştir.
-
- Kokain, lipofilik bir madde olduğu için kokain zehirlenmesinde İLE'nin faydalı etkisini de açıklayabilen bir varsayım olabilir.

Kokain zehirlenmesi neden önemli?

- 2008 yılında "National Survey of Drug Use and Health" verilerine göre kokain gibi maddeler nedenli acil servislere başvuru oranı, tüm kötüye kullanımlı ilaca bağlı olan zehirlenmeler içinde % 25' tir.
-
- Acil hekimleri bu ilaca maruz kalmış hastalar ile sıklıkla karşılaşmaktadırlar
-
- Güçlü bir sempatomimetik olan Kokain'in zehirlenmesinde, yüksek morbidite ve mortalite riski vardır !!

Kokain zehirlenmesi neden önemli?

- Kokain dozu arttıkça lokal anestetik etkileri başlar, gerek sodyum gerekse de potasyum kanalları bloke olur.
- Kardiyovaskuler komplikasyonlar olarak;
    - miyokardiyal iskemi,
    - hipertansif atak,
    - aritmi, miyokardit ve
    - aort diseksiyonu gelişebilir.

Hastalar serebral infarkt, intrakranyal kanama ve nöbet riski de taşırlar.

Anaesthesia. 2011 Dec;66(12):1168-70. doi: 10.1111/j.1365-2044.2011.06895.x.

Treatment of cocaine overdose with lipid emulsion.

Jakkala-Saibaba R[1], Morgan PG, Morton GL.

Author information

Abstract

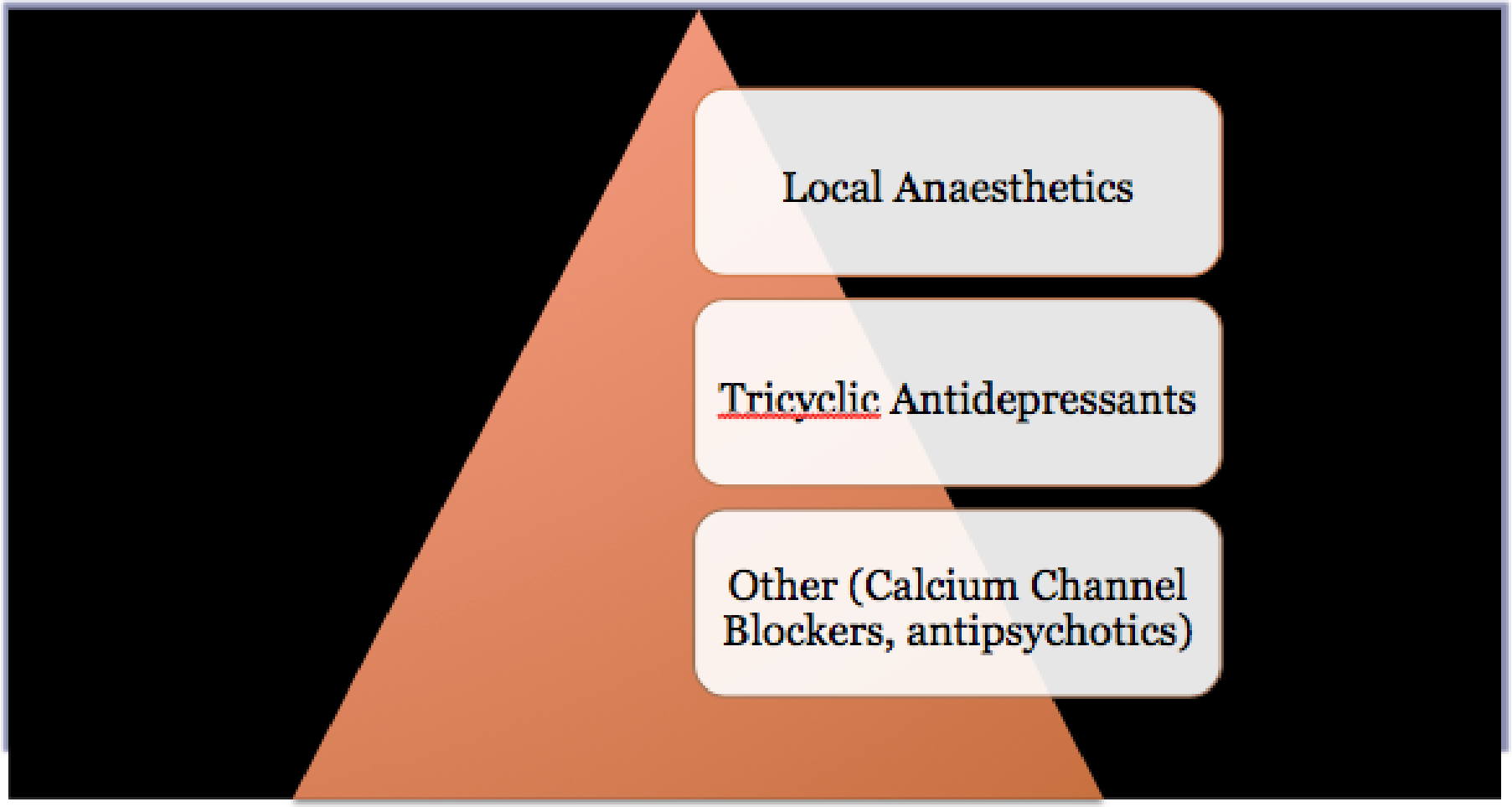
We describe the management and recovery of a 28-year-old man following a history of overdose by nasal inhalation of cocaine. The patient was presented in a comatose state suffering from seizures and marked cardiovascularly instability. Intravenous lipid emulsion was administered following initial resuscitation and tracheal intubation, as a means of treating persistent cardiac arrhythmias and profound hypotension. Following lipid emulsion therapy, the patient's life-threatening cardiovascular parameters rapidly improved and he recovered well without any side effects, thus being discharged within 2 days.

Comment in

Logging the delivery of intravenous lipid emulsion for cocaine and other lipophilic drug overdoses. [Anaesthesia. 2012]

PMID: 22074030 [PubMed - indexed for MEDLINE]

İLE Endikasyonları



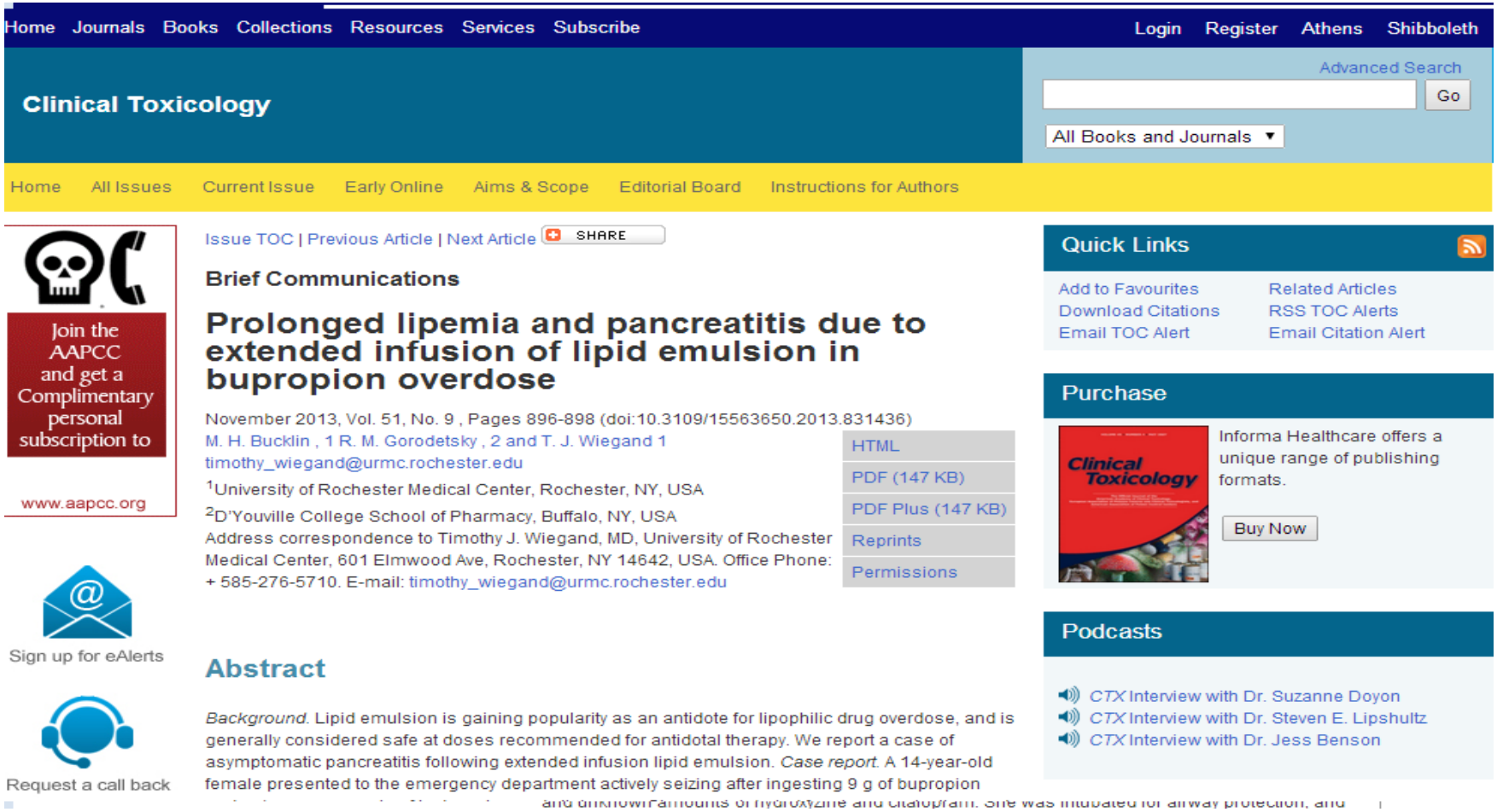
İLE Yan Etkileri

- İLE tedavisi bazı laboratuar sonuçlarında karışıklığa yol açabilir !! *
- LE tedavisinden sonra, kreatinin, lipaz, ALT, CK ve bilirübin seviyeleri ölçülemezken kolorimetrik testlerle ölçülen serum glukoz seviyesi ve serum magnezyum ve albumin değerleri yanlış çıkar

* Grunbaum AM, et al. Clin Toxicol (Phila) 2012;50:812-7.

Yan Etkiler

* Hipersensitivite, Hipertrigliseridemi, Kolestaz, artmış infeksiyon riski
* Pankreatit



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Brief Communications

Prolonged lipemia and pancreatitis due to extended infusion of lipid emulsion in bupropion overdose

November 2013, Vol. 51, No. 9 , Pages 896-898 (doi:10.3109/15563650.2013.831436)

M. H. Bucklin , 1 R. M. Gorodetsky , 2 and T. J. Wiegand 1

timothy_wiegand@urmc.rochester.edu

[1]University of Rochester Medical Center, Rochester, NY, USA

[2]D'Youville College School of Pharmacy, Buffalo, NY, USA

Address correspondence to Timothy J. Wiegand, MD, University of Rochester Medical Center, 601 Elmwood Ave, Rochester, NY 14642, USA. Office Phone: + 585-276-5710. E-mail: timothy_wiegand@urmc.rochester.edu

HTML PDF (147 KB) PDF Plus (147 KB) Reprints Permissions

Abstract

Background. Lipid emulsion is gaining popularity as an antidote for lipophilic drug overdose, and is generally considered safe at doses recommended for antidotal therapy. We report a case of asymptomatic pancreatitis following extended infusion lipid emulsion. *Case report.* A 14-year-old female presented to the emergency department actively seizing after ingesting 9 g of bupropion

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Lipid Emulsion Overdose

May 21, 2010, 12:37 pm

Iatrogenic lipid emulsion overdose in a case of amlodipine poisoning. West PL et al. *Clin Toxicol* [Epub ahead of print]

Abstract

This report describes a rare case of lipid emulsion overdose. A 71-year-old woman ingested 27 5-mg tablets of amlodipine and was treated with lipid emulsion therapy (LET) after developing hypotension resistant to fluid, pressors, and hyperinsulinemia-eugylcemia therapy. A standard protocol for LET — calling for a maximum of 8 mL/kg — was faxed to the hospital, but the patient inadvertently received five times the recommended dose. After the infusion was stopped, the patient's blood specimens were described as looking like "creamy tomato soup". The authors state that they could not detect any beneficial or adverse effect from the LET overdose.

To my reading, the data do not support the claim that there was no adverse effect from the excess lipid. Table 1 shows that just after the infusion was stopped, the pO2

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» Effects of marijuana on driving ability

http://www.lipidrescue.org/

LipidRescue™ Resuscitation

... for drug toxicity

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Treatment Overview
Instructions (PDFs)
Introducing LipidRescue to Your Facility
Medical Literature
⊞ Local Anesthetic Toxicity
Post Your Cases
Sample LipidRescue™ Kit

Welcome

LipidRescue™ resuscitation refers to the use of an intravascular infusion of a lipid emulsion to treat severe, systemic drug toxicity or poisoning. It was originally developed to treat local anesthetic toxicity, a potentially fatal complication of regional anesthesia that can also occur in other situations where patients receive local anesthetic injections. More recently, LipidRescue™ has been shown in the peer-reviewed medical literature and elsewhere to be an effective antidote for poisoning or overdose caused by a wide array of other (non-local anesthetic) lipophilic agents. Initial support for this view was provided by a most remarkable case report where lipid

A Review of Lipid Resuscitation
A Comprehensive Review of Lipid Resuscitation

Bu site 2006'da kuruldu,

Başta lokal anestezik toksisitesi olmak üzere benzer hayatı tehdit edici overdozlarda lipid tedavisi, epidemiyoloji, araştırmalar vb. Konularda güncel detaylı bilgi kaynağı

Table 3. Animal studies on the treatment of local anaesthetic intoxication with intravenous lipid emulsion. ACLS = Advanced cardiac life support, ADR = Adrenaline, AVP = Vasopressin, IV = Intravenous, KRB = Krebs–Ringer buffer, MAP = Mean arterial pressure, PSS = Physiologic saline solution, ROSC = Return of spontaneous circulation, RPP = Rate–pressure product.

Publication	Model	Local anaesthetic (IV)	Compared treatments (IV)	Treatment timing	Follow-up
Weinberg et al. 1998 part 1	Rat	Bupivacaine 0.75% 10 ml/kg/min until cardiac arrest	**1.** 10%, 20%, or 30% Intralipid® **2.** PSS 3 ml/kg for 5 min	5 min before bupivacaine	Until death
Weinberg et al. 1998 part 2	Rat	Bupivacaine 1. 15, 17.5, 20, or 22.5 mg/kg 2. 10, 12.5, or 15 ml/kg	**1.** 30% Intralipid® **2.** PSS 7.5 ml/kg bolus, 3 ml/kg for 2 min	Immediately after bupivacaine	Until death
Weinberg et al. 2003	Dog	Bupivacaine 10 mg/kg	**1.** 20% Intralipid® **2.** PSS 4 ml/kg bolus, 0.5 ml/kg/min	10 min after cardiac arrest and open-chest heart massage	30 min
Weinberg et al. 2006	Rat heart	Bupivacaine 500 µM	**1.** 20% Intralipid® until triglyceride concentration 1% **2.** KRB	Immediately after bupivacaine	Until return of heartbeats, RPP 90% of baseline
Stehr et al. 2007	Rat heart	Levobupivacaine 5 µg/ml	20% Structolipid® 0.25 ml/kg/min	5 min after bupivacaine	10 min
Mayr et al. 2008	Pig	Bupivacaine 5 mg/kg + Asphyxia	**1.** 20% Intralipid® 4 ml/kg bolus, 0.5 ml/kg/min for 10 min **2.** ADR + AVP	3 min after cardiac arrest	60 min
Weinberg et al. 2008	Rat	Bupivacaine 20 mg/kg	**1.** 30% Intralipid® **2.** PSS 5 ml/kg bolus, 0.5 ml/kg/min **3.** ADR	Immediately after bupivacaine, bolus repeated 2.5 and 5 min later if RPP below 20% of baseline	10 min
Cave et al. 2009	Rabbit	Bupivacaine 10 mg/kg	**1.** 20% Intralipid® **2.** PSS 1.5 ml/kg bolus, 0.25	1 min after bupivacaine, bolus	20 min

Table 4. Case reports of local anaesthetic intoxication treated with intravenous lipid emulsion. ACLS = Advanced cardiac life support, ADR = Adrenaline, ASA = American Society of Anesthesiologists physical status classification, ATR = Atropine, AVP = Vasopressin, CNS = Central nervous system, CPR = Cardiopulmonary resuscitation, ILE = Intravenous lipid emulsion, MAP = Mean arterial pressure, NADR = Noradrenaline, PEA = Pulseless electrical activity, PSS = Physiologic saline solution, ROSC = Return of spontaneous circulation, RPP = Rate-pressure product.

Publication	Patient	Local anaesthetic	Situation	Delay ILE dose	Other interventions
Rosenblatt et al. 2006	Male, 52 y, 82 kg	Bupivacaine 1.2 mg/kg Mepivacaine 3.7 mg/kg	Cardiac arrest	20 min 20% Intralipid® 100 ml bolus, 0.5 ml/kg/min for 2h	Propofol, chest compressions, ADR, ATR, AVP, amiodarone
Litz et al. 2006	Female, 84 y, 50 kg, ASA 3	Ropivacaine	Cardiac arrest	10 min 20% Intralipid® 100 ml bolus, 10 ml/min	Chest compressions, thiopental, ADR
Foxall et al. 2007	Female, 75 y, 85 kg, ASA 3	Levobupivacaine 1.2 mg/kg	Seizures, haemodynamic collapse	4 min 20% Intralipid® 100 ml in 5 min	Metaraminol, propofol, suxamethonium
Spence 2007	Female, 18 y, 86 kg, pregnant	Bupivacaine 0.76 mg/kg	CNS symptoms	Not reported 20% Intralipid® 2 x 50 ml bolus, 400 ml infusion	None
Litz et al. 2008	Male, 91 y, 57 kg, ASA 3	Mepivacaine 5.3 mg/kg Prilocaine 1.75 mg/kg	Agitation, vertigo	Not reported 20% Intralipid® 2 x 50 ml bolus, 100 ml at 0.25 ml/kg/min	None
Ludot et al. 2008	Female, 13 y, 55 kg, ASA 1	Lidocaine 1.8 mg/kg Ropivacaine 1.4 mg/kg	Ventricular tachycardia	Not reported 20% Medialipide® 150 ml in 3 min	None
McCutchen & Gerancher 2008	Female, 82 y	Ropivacaine 150 mg Bupivacaine 150 mg	Ventricular tachycardia	3 min 20% Intralipid® 100 ml bolus, 400 ml in 15 min	Midazolam, amiodarone, defibrillation
H. M. Smith et al. 2008	Male, 83 y, 75 kg, ASA 3	Bupivacaine 1.7 mg/kg	Cardiac arrest	1 min 20% Intralipid® 250 ml in 2 min, 0.2 ml/kg/min	Midazolam, ADR, ATR, defibrillation

Table 5. Animal studies on the treatment of other intoxications with lipid emulsion. ILE = Intravenous lipid emulsion, INS = Insulin, IV = Intravenous, MAP = Mean arterial pressure, PSS = Physiologic saline solution, Vf = Respiration rate.

Publication	Model	Drug (IV)	Compared treatments (IV)	Treatment timing	Follow-up
Russell & Westfall 1962	Rat	Thiopental 20 mg/kg	**1.** 10% corn oil emulsion **2.** 15% Lipomul® **3.** Lipomul® with no lipid 10 ml/kg	Immediately after thiopental	Until waking
Krieglstein et al. 1974	Rabbit	Chlorpromazine 25 mg/kg in 1 min, additional 30 mg/kg if survived	**1.** 10% ILE **2.** Xylitol solution 1 ml/min for 50 min	15 min before chlorpromazine	None
Straathof et al. 1984	Rat	Phenytoin 10 mg	**1.** 20% Intralipid® **2.** PSS **3.** No treatment 0.123 ml/h for 45h	41h before phenytoin	4h

Table 6. Human case reports on the treatment of other intoxications with lipid emulsion. ADR = Adrenaline, ASA = American Society of Anesthesiologists physical status classification, ATR = Atropine, AVP = Vasopressin, DOPA = Dopamine, ILE = Intravenous lipid emulsion, INS = Insulin, NADR = Noradrenaline, PEA = Pulseless electrical activity, PSS = Physiologic saline solution.

Publication	Patient	Drug (PO)	Situation	Delay ILE dose	Other interventions
Dolcourt & Aaron 2008	Male, 52 y	Verapamil, metoprolol	Shock	Not reported 20% ILE 1.5 ml bolus, 0.25 ml/kg/min. Repeated.	PSS, Ca^{2+}, DOPA, NADR, INS, cardiac pacing
Harchelroad & Palma 2008	Female, 46 y	Atenolol, paracetamol, ethanol	Sinus bradycardia	Not reported 20% ILE 1000 ml in 2h	ATR, PSS, glucagon

DENEYSEL (HAYVAN) ÇALIŞMALAR

1962 Russel; thiopental

•1987 Minton; amitriptyline

•2006 Cave; propanolol

•2006 Tebutt; verapamil

•2007 Weinberg; bupivacaine

•2008 Bania; verapamil

•2008 Medlej; verapamil

•2008 Perez; verapamil (optimal dose)

•2009 Hicks; bupivacaine (epi + VP)

•2009 Chu; nifedipine

•2009 Di Gregorio; bupivacaine (epi + VP)

•2010 Niiya; amiodarone

•2011 Kazemi; thiopental

•2012 …

•2013 …

•1974 Krielsgtein; carbamazepine

•2006 Weinberg; bupivacaine

•2006 Bania; propanolol

•2007 Harvey; clomipramine

•2008 Harvey; propanol

•2008 Mayr; bupivacaine

•2008 Weinberg; bupivacaine

•2008 Yoav; clomipramine

•2009 Cave; atenolol

•2009 Perez; verapamil (infusion rate)

•2010 Candela; bupivacaine

•2010 Browne; metoprolol

•2011 Harvey; propanolol (insulin)

AMERICAN SOCIETY OF
REGIONAL ANESTHESIA AND PAIN MEDICINE

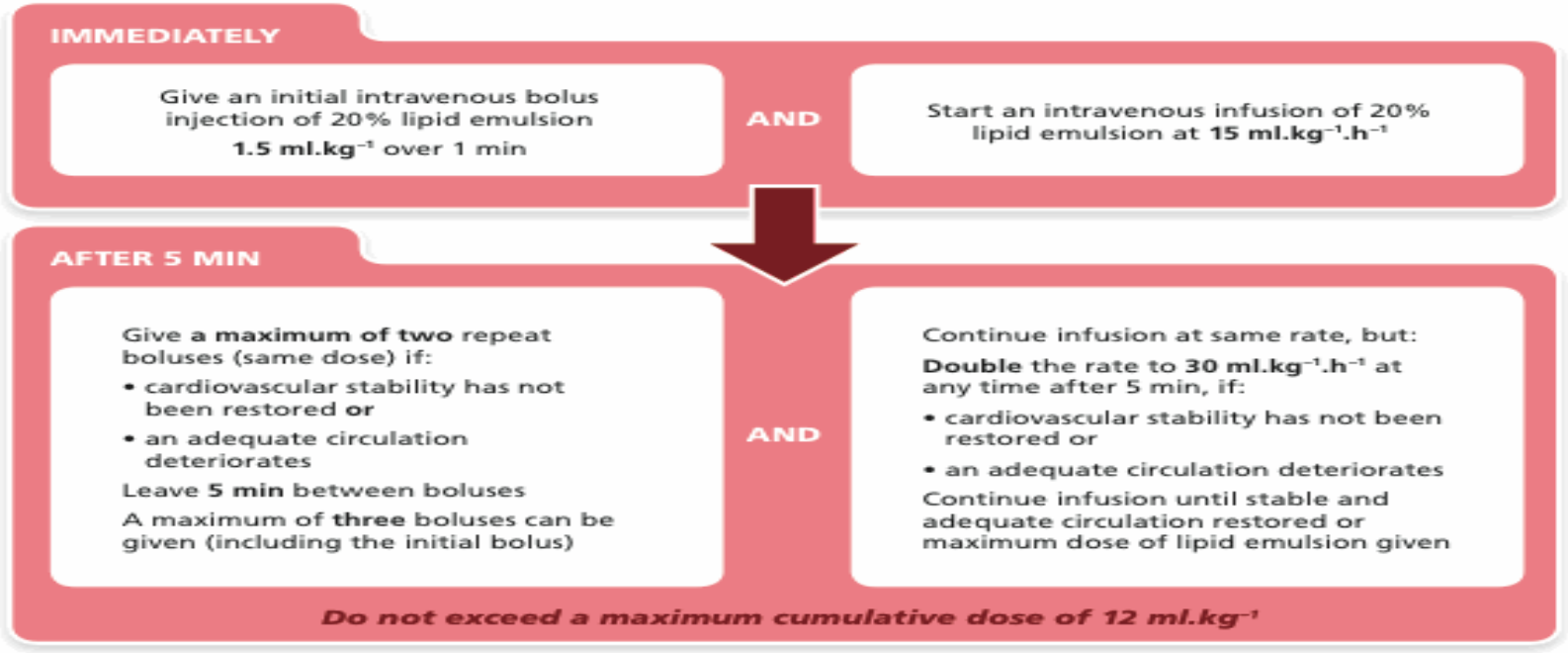
Checklist for Treatment of Local Anesthetic Systemic Toxicity

- ❑ Get Help
- ❑ Initial Focus
  - ❑ **Airway management:** ventilate with 100% oxygen
  - ❑ **Seizures uppression:** benzodiazepines are preferred; **AVOID propofol** in patients having signs of cardiovascular instability
  - ❑ **Alert** the nearest facility having **cardiopulmonary bypass** capability

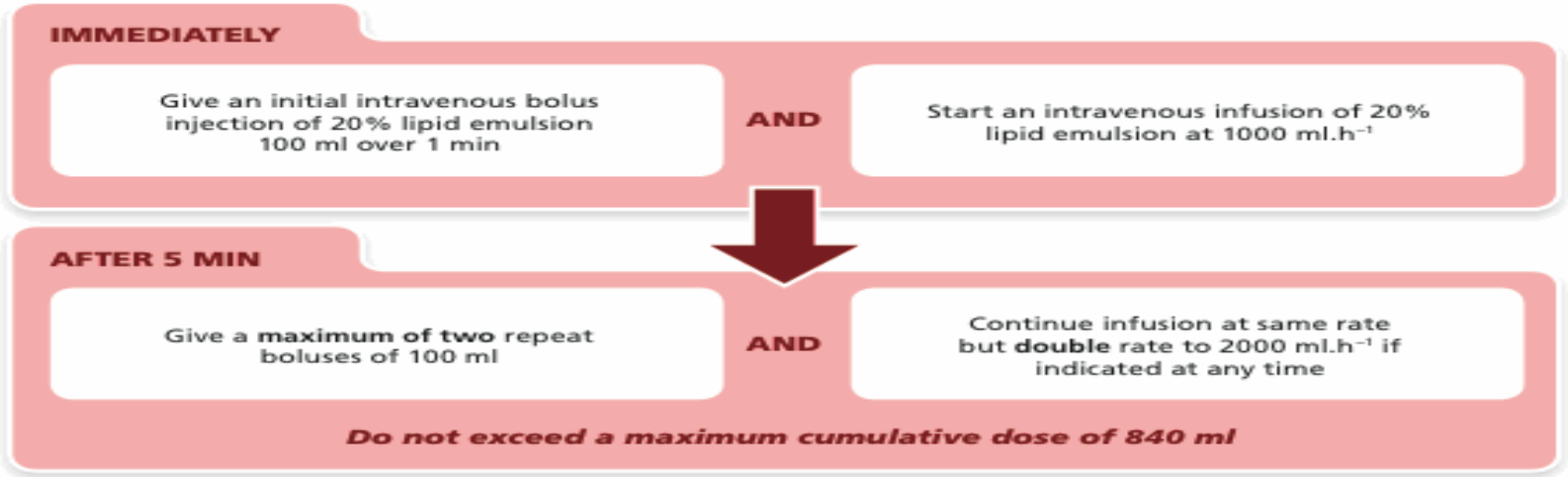
- **Management of Cardiac Arrhythmias**
  - **Basic and Advanced Cardiac Life Support (ACLS)** will require adjustment of medications and perhaps prolonged effort
  - **AVOID vasopressin, calcium channel blockers, beta blockers, or local anesthetic**
  - **REDUCE individual epinephrine doses to <1 mcg/kg**
- **Lipid Emulsion (20%) Therapy** (values in parenthesis are for 70kg patient)
  - **Bolus 1.5 mL/kg** (lean body mass) intravenously over 1 minute (~100mL)
  - **Continuous infusion 0.25 mL/kg/min** (~18 mL/min; adjust by roller clamp)
  - Repeat bolus once or twice for persistent cardiovascular collapse
  - Double the infusion rate to 0.5 mL/kg/min if blood pressure remains low
  - **Continue infusion** for at least10 minutes after attaining circulatory stability
  - Recommended upper limit: Approximately 10 mL/kg lipid emulsion over the first 30 minutes
- **Post LAST events at** www.lipidrescue.org and report use of lipid to www.lipidregistry.org

Amerika Rejyonel Anestezi Birliği (ASRA) İLE Tedavi Protokolü

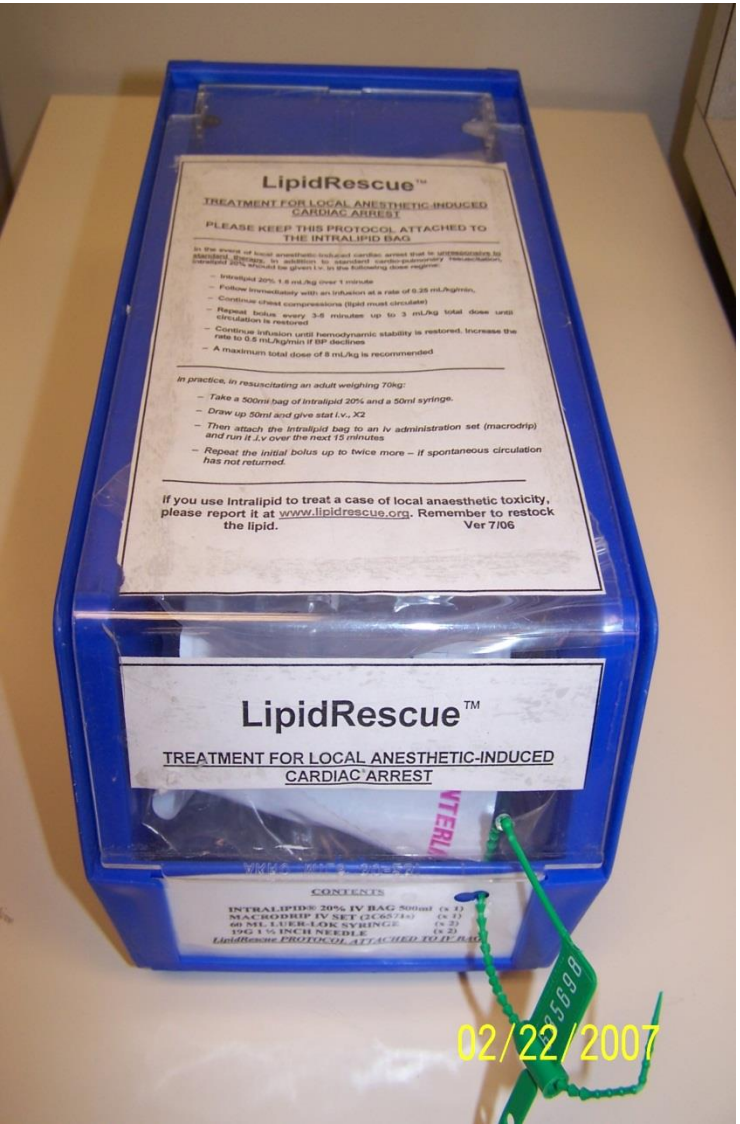
- İlk bolus dozu 1.5 ml/kg
- 10 ml/kg üzerine çıkılmamalı
- Bolus süresi 15-30 dk. olmalı
- Ardından 0.25 ml/kg/saat infüzyon

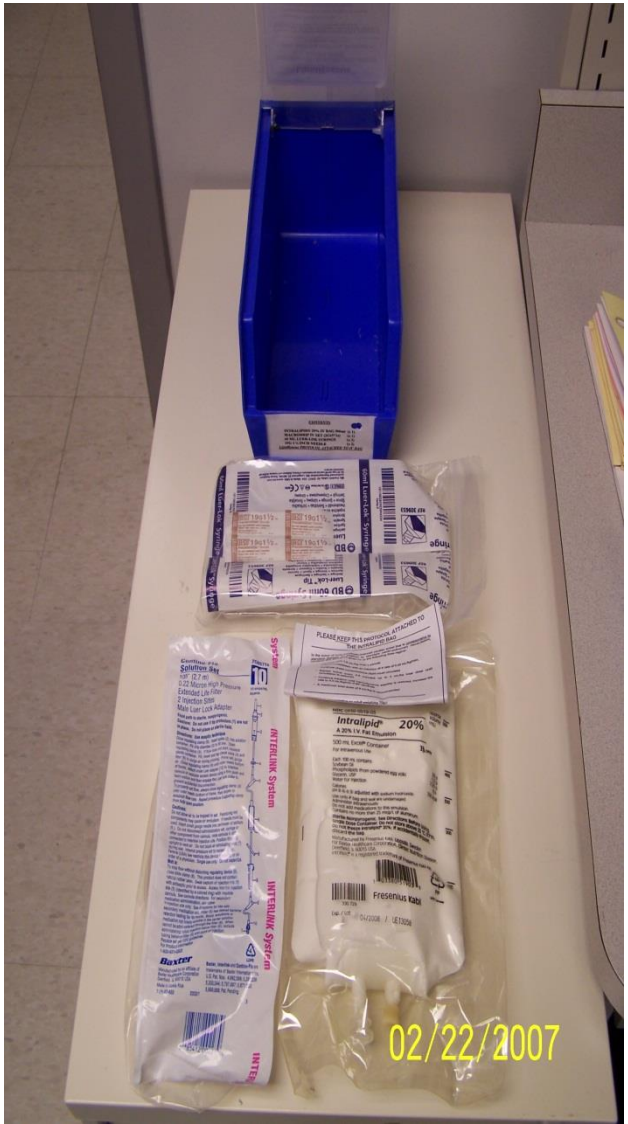


An approximate dose regimen for a 70-kg patient would be as follows:



- **Lipid Kiti: %20 Lipid kutusu (500 ml), IV tubing, 60 cc Enjektörler, ve intraketler**
- **Lipid uygulama protokolü kutuya iliştirilmiş**





Sonuç

- Deneysel çalışmalar ve vaka sunumları LAT başta olmak üzere lipofilik ilaç zehirlenmelerinde ILE kullanımını destekliyor.
- Fakat LAT dışındaki zehirlenmelerde kontrollü klinik çalışmalara ihtiyaç var
- Acil servis ve anestezi departmanında İLE endikasyonları iyi bilinmeli ve gerektiği durumlarda hızlıca ulaşılabilecek durumda olmalıdır.

TEŞEKKÜR EDERİM