Limited knowledge of lipid rescue therapy in local anaesthetic systemic toxicity

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ABSTRACT

INTRODUCTION: There is increasing evidence to support the use of intravenous lipid emulsion (ILE) in the management of local anaesthetic systemic toxicity (LAST) and non-local anaesthetic lipophilic-drug poisoning. This trend is supported by the Association of Anaesthetists of Great Britain and Ireland's latest guidelines on LAST treatment. Similar national guidelines have yet to be introduced in Denmark. The aim of the present study was to study the adoption of lipid rescue therapy in Denmark.

MATERIAL AND METHODS: All Danish hospitals with an attending anaesthesiologist (no. 38) were contacted by phone. A total of 34 attending anaesthesiologists (AAs) participated in the systematic telephone survey.

RESULTS: A total of 22 (65%) of the AAs were aware of use of ILE in the management of LAST. One (3%) had knowledge of ILE treatment for non-local anaesthetic-drug poisoning. Eight (24%) had access to local guidelines on lipid rescue therapy. The same eight AAs also knew where to find ILE. None of the hospitals lacking guidelines had taken an active stand against the treatment.

CONCLUSION: Patients with toxic reactions who could potentially benefit from ILE will not be offered lipid rescue therapy in 26 of 34 hospitals (76%) – either because the AA is not aware of this treatment modality, or due to absence of either guidelines or ILE. To improve the availability of lipid rescue therapy, more hospitals need to develop emergency packs containing ILE and guidelines. Introduction of national guidelines on lipid rescue therapy would probably accelerate this process.

ORIGINAL ARTICLE

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A growing number of case reports and animal studies suggest that intravenous lipid emulsion (ILE) such as Intralipid can be used as an antidote in the resuscitation of patients with cardiovascular collapse due to an overdose of local anaesthetics or lipophilic non-local anaesthetic drugs [1-6]. The term lipid rescue therapy is used internationally for ILE treatment during resuscitation. The Association of Anaesthetists of Great Britain and Ireland (AAGBI) published treatment guidelines in 2007 on the use of local anaesthetic systemic toxicity (LAST). These guidelines state that ILE should be immediately available in all areas where potentially cardiotoxic doses of local anaesthetics are given, along with guidelines for its use (**Table 1**) [7]. The guidelines are relevant, e.g. in departments performing nerve blocks guided by nerve stimulator as well as by ultrasound, intravenous regional block, extensive infiltration with local anaesthetics or epidural anaesthesia.

The aim of this study was to determine to which extent lipid rescue therapy has been adopted by Danish anaesthesiology departments. Based on our survey results, we wanted to answer the question: ''What is the probability that a person with LAST will encounter an attending anaesthesiologist who knows about lipid rescue therapy and has the remedies to initiate treatment immediately supported by local guidelines?''

MATERIAL AND METHODS

A systematic questionnaire-guided telephone survey was conducted by a single interviewer in the period from June to September 2009. The inclusion criteria were as follows: All Danish hospitals were called during the evening shift (after 4 PM), and the interviewer requested to be put through to the attending anaesthesiologist. Hospitals at which the attending anaesthesiologist was available and participated were included. The authors' own hospital was not included.

The surveys used are detailed in **Table 2**.

In summary, the questionnaire focused on the anaesthesiologist's knowledge on Intralipid in the treatment of LAST or poisoning with non-local anaesthetic drugs. The anaesthesiologists were asked if ILE was available at the department, and whether they were aware of the physical location of ILE. Furthermore, they were asked if the department had guidelines on lipid rescue therapy. If the department did not have lipid rescue therapy guidelines, the anaesthesiologists were asked if this was so as the result of a deliberate decision? Finally, we asked whether the department had ever used ILE for lipid rescue therapy.

RESULTS

Among the 38 hospitals that had an attending anaesthesiologist according to the receptionist, we successfully interviewed 34. A total of 22 (65%) were aware of ILE as a treatment option in local anaesthetics poisoning. One out of 34 (3%) had heard about ILE in the treatment of

TABLE 1

Lipid rescue therapy for the management of cardiac arrest associated with local anaesthetic injection as recommended by the Association of Anaesthetists of Great Britain and Ireland.

Start CPR using standard protocols
Manage arrhythmias using the same protocols, recognising that they may be very refractory to treatment
Prolonged resuscitation may be necessary; it may be appropriate to consider other options
Consider the use of cardiopulmonary bypass if available
Consider treatment with intravenous lipid emulsion
Treatment of cardiac arrest with lipid emulsion
Give an intravenous bolus injection of Intralipid 20% 1.5 ml/kg over 1 min
Continue CPR
Start an intravenous infusion of Intralipid 20% at 0.25 ml/kg/min
Repeat the bolus injection twice at 5-min intervals if adequate circulation has not been restored
After another 5 min, increase the rate to 0.5 ml/kg/min if adequate circulation has not been restored
Continue infusion until a stable and adequate circulation has been restored
Remember
Continue CPR throughout treatment with lipid emulsion
Recovery from LA-induced cardiac arrest may take > 1 hour
Propofol is not a suitable substitute for Intralipid

CPR = cardiopulmonary resuscitation; LA = local anaesthetic.

non-local anaesthetic-drug poisoning. In all, 14 (41%) stated that their department/hospital stocked ILE, and ten knew where to find it.

Eight anaesthesiologists (24%) stated that their department had local guidelines on lipid rescue therapy. None of the attending anaesthesiologists believed that a deliberate boycott of lipid rescue therapy was the reason for the absence of local guidelines.

TABLE 2

Questionnaire and distribution of answers (n = 34).

	n (%)		
Question	**yes**	**no**	**don't know**
1) Do you know about the treatment with ILE in the treatment of LAST?	22 (65)	12 (35)	–
2) Do you know about the treatment with ILE in other types of poisoning?	1 (3)	33 (97)	–
3) Is ILE available at your hospital?	14 (41)	15 (44)	5 (15)
4) Do you know the location of ILE at your hospital?	10 (29)	24 (71)	–
5) Has ILE been used for LAST in your hospital?	1 (3)	26 (76)	7 (21)
6a) Does your hospital have local guidelines on lipid rescue therapy?	8 (24)	17 (50)	9 (26)
If no ↓ 6b) Is the lack of guidelines on lipid rescue therapy based on an active decision?		None of the 17 were based on a deliberate decision not to use lipid rescue therapy	

ILE = intravenous lipid emulsion; LAST = local anaesthetic systemic toxicity.

Eight out of the 34 (24%) who were aware of treatment with ILE in LAST stated that their department had guidelines and that they knew where to find ILE. One of the 34 (3%) was aware of a case within the department in which ILE had recently been used for LAST. ILE had not been used for non-local anaesthetic-drug poisoning.

DISCUSSION

The authors' own hospital was excluded from the study due to a local focus on lipid rescue therapy arising from local scientific work on the topic, and successful lipid rescue therapy in an 18-year-old non-local anaesthetic-drug poisoned patient at the intensive care unit [8].

One limitation of the present survey is that the attending anaesthesiologists interviewed expressed their own immediate knowledge on the subject. Even if they e.g. had no knowledge of local guidelines in lipid rescue therapy, this does not necessarily mean that the department had not prepared local guidelines.

The results of this study provide an indication of the likelihood that a patient with LAST will receive treatment with ILE at a Danish anaesthesia department. Eight out of 34 attending anaesthesiologists had the knowledge to provide LAST with ILE, to find the ILE and to perform treatment on the basis of local guidelines. Conversely, 26 (76%) would be unable to provide lipid rescue therapy because the attending anaesthesiologist had no knowledge about the treatment, or because local guidelines or ILE were unavailable. One in 34 had some knowledge about treatment with ILE in non-local anaesthetic-drug poisoning.

None of the respondents stated that deliberate boycott of lipid rescue therapy was the reason for the absence of guidelines in the field. Consequently, improvements may be achieved simply by deciding whether or not the department wants to provide this treatment option. The implementation of local guidelines may be considered a necessity to ensure support in acute situations as cases are rare. Guidelines will also ensure that lipid rescue therapy will not be attempted in the cases in which it appears to have negative effects, such as in hypoxic cardiac arrest [9].

The present study shows that the use of lipid rescue therapy is rare, as only one (3%) had used ILE for LAST. This underlines the importance of reporting these rare cases to the dedicated website www.lipidregistry.org or by publishing case reports. At present, approx. 40 cases of lipid rescue therapy have been published, and about 50 cases from some 20 countries have been reported to the above website. The actual use of the treatment is likely to be far greater than suggested by such reporting which is likely to be woefully inadequate. Finally, it should be emphasized that any treatment failure should also be reported to improve knowledge in the field.

Lipid rescue therapy package.

A report that a single patient has received ILE could be interpreted as an indication that three other patients were not treated (according to the 76% who would not get the offer). Although hypothetical, this interpretation is in line with figures from a study by Hamann et al in which Intralipid was used for intoxication in 19% of departments in the past 12 months [10].

Comparison with similar studies from England

Hamann et al [10] studied lipid rescue therapy availability in England in 2009. ILE was available in 95% of hospitals and usually at several locations. Guidelines were available in 83% of the hospitals. ILE had been used in 19% of the hospitals in the past 12 months. From the study it was unclear what ILE had been used for in 19% of the hospitals, but in 6% of the cases it had been used for LAST and in 3% of the cases for non-local anaesthetic-drug poisoning. When comparing Hamann et al's results with those of the present study, the different methods of the two studies should be taken into account – telephone survey versus questionnaire. A questionnaire gives more time to respond to questions, whereas a telephone interview provides a more accurate picture of the physician's immediate knowledge. It is the immediate knowledge which is needed in an emergency situation. Furthermore, Hamann's questionnaire was sent to the chief pharmacist, whereas the Danish telephone survey was conducted with the attending anaesthesiologist who usually handles acute situations in Denmark.

Picard et al studied the adoption of lipid rescue therapy guidelines in England and Ireland in 2005-2008 by performing surveys in 66 National Health Service hospitals delivering acute care within London and its surrounding areas [11]. Denmark has guidelines in place in 24% of all departments, which corresponds to the level in England around April 2007. The level in Denmark is thus similar to that of England before the introduction of national guidelines. Picard et al also show a steep increase in the number of departments adopting guidelines from this point in time – which may in part be attributed to the publication of national AAGBI guidelines. It seems likely that National guidelines would have a similar effect in Denmark.

CONCLUSION

Lipid rescue therapy availability in Denmark 2009 was at the same level as in England in 2007 before the introduction of national guidelines there. If Denmark is to catch up with England, more hospitals need lipid rescue therapy emergency packs containing ILE and guidelines placed in appropriate locations at the hospitals. Publication of Danish national guidelines on lipid rescue therapy would likely speed up the process.

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CONFLICTS OF INTEREST: None

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