

NHS Sheffield Area Prescribing Committee

Guidance to support the implementation in primary care of
NPSA Rapid Response Report:

Preventing fatalities from medication loading doses (NPSA/2010/RRR018)

1. Background

A loading dose is an initial large dose of a medicine used to ensure a quick therapeutic response. It is usually given for a short period before therapy continues with a lower maintenance dose. The use of loading doses of medicines can be complex and error prone. Incorrect use of loading doses or subsequent maintenance regimens may lead to severe harm or death.

Between 1 January 2005 and 30 April 2010 there were 1,165 patient safety incidents related to loading doses reported to the National Reporting and Learning System. Of these incidents, two were fatal, four caused severe harm and 102 caused moderate harm. A further fatality was reported by coroner's letter. The fatal and severe harm incidents all related to incorrect loading doses, omitted or delayed administration of loading doses, or unintentional continuation of loading doses.

In response to this the NPSA issued an alert which tasked organizations with the following.

1. All medicines used by the organisation that are likely to cause harm if loading doses and subsequent maintenance doses are not prescribed and administered correctly are risk assessed and used to produce a list of critical medicines (which may contain speciality subsections). This must include warfarin, amiodarone, digoxin, phenytoin and any other medicines identified locally.
2. There is effective communication regarding loading dose and subsequent maintenance dose regimens when prescribing, dispensing or administering critical medicines. This should include handover of patients between healthcare organisations. Tools such as loading dose work sheets, loading dose prescription charts, handover and clinical protocols, and patient-held information should be considered
3. Clinical checks are performed by medical, nursing and pharmacy staff (when available) to make sure that loading and maintenance doses are correct. Appropriate information should be available to support these checks
4. Healthcare professionals in the community know when to challenge abnormal doses of the identified critical medicines.

2. Risk assessment of medicines requiring loading doses

Medications requiring loading doses are less likely to be initiated in primary care than secondary care. Certain drugs e.g. digoxin and warfarin may be initiated in primary care using a slow start regimen where the loading dose is omitted. However, patients receiving medicines that are initiated with a loading dose in secondary care may be discharged to primary care.

In response to the NPSA alert, UKMi has produced a risk assessment tool to support local implementation. This tool, along with STHFT policy, was used to produce the following list of critical medicines for NHS Sheffield:

NHS Sheffield Critical List of Medicines Requiring Loading Doses

Warfarin	Acenocoumarol
Digoxin	Phenindione
Amiodarone *	Aspirin
Phenytoin *	Prasugrel
Leflunomide *	Clopidogrel
Methotrexate *	Flecainide
Azathioprine *	Prednisolone
Phenobarbital *	Voriconazole
Low molecular weight heparins *	Aminophylline
	Theophylline

The 4 medicines in bold together account for 36% of the patient safety incidents involving loading doses reported to the NRLS.

The * medicines are those for which a shared care protocol is available for certain indications.

3. Management of high risk medicines requiring loading doses

Prescribers should be familiar with the NPSA alert and the NHS Sheffield critical list of medicines requiring loading doses. They should follow the prescribing guidelines in the BNF, SPC or local guidelines including the shared care protocol. Where patients are discharged on high risk medicines and there is uncertainty in the discharge communication, prescribers are advised to confirm the dose with secondary care.

Sheffield Teaching Hospitals (STH) NHSFT policy for medicines requiring loading doses states that:

- Where patients are discharged on high risk medicines, the secondary care prescriber should, where necessary, write clear instructions to general practitioners on the reduction of doses.
- Where it is possible that a patient is discharged before the maintenance dose is established, the STH protocol is available at http://sthweb.sth.nhs.uk/pharmacy_pub/guidelines/High%20risk%20LD%20medicines.doc.

Other sources of information:

BNF <http://bnf.org/bnf/bnf/current/>

Summary of product characteristics (SPCs) available at: <http://www.medicines.org.uk/emc/>

Shared care protocols: <http://nww.sheffield.nhs.uk/apc/scps.php>

4. Clinical checks

Clinical checks should be performed by medical, nursing and pharmacy staff involved in prescribing, administration and dispensing of medicines. The clinical check of medicines requiring a loading dose includes checking that all relevant patient factors have been taken in to account, and that loading and maintenance doses are correct and appropriate. For some medicines e.g. LMWH, warfarin a bespoke communication form should be completed by secondary care on discharge.

Nursing and community pharmacists may not have access to information to enable a clinical check on an individual patient basis to be carried out. They should take steps to confirm doses of medicines which are higher than normal before administering or dispensing the medicine. The information below under abnormal doses may assist. Appropriate steps include confirming with the patient or carer, and checking the patient's record. If further assurance is required the prescriber should be contacted.

5. Abnormal doses

Examples of abnormal maintenance dose are shown in the following table:

Table of abnormal maintenance doses

Aminophylline	doses higher than 450mg twice daily
Amiodarone	doses higher than 200mg daily
Digoxin	doses higher than 250microgram daily and higher than 125microgram in people over 70 years of age
Clopidogrel	doses higher than 75mg daily
Flecainide	doses higher than 200mg daily
Methotrexate	doses higher than 25mg once weekly
Phenytoin	doses higher than 500mg daily
Prasugrel	doses higher than 10mg daily in adults weighing over 60kg doses higher than 5mg daily in adults weighing under 60kg or people over 75 years of age
Theophylline	doses higher than 350-500mg twice daily (depending on brand)
Voriconazole	doses higher than 300mg twice daily in adults weighing over 40kg and higher than 150mg twice daily in adults weighing under 40kg
Warfarin	newly initiated therapy at doses higher than 5mg daily

All doses specified above are oral doses for adults and may be adjusted according to symptom control and/or blood levels.

6. Clinical Incidents

Any incident involving medicines requiring loading doses should be reported using the PCT incident report form (available at:

<http://nww.sheffield.nhs.uk/policies/resources/incidentreporting.pdf>).

The incidents will be reviewed by the Medicines Safety Group. Learning from these incidents will be shared and the critical list amended as appropriate.

7. References

NPSA/2010/RRR018 is available at: <http://www.nrls.npsa.nhs.uk/alerts/?entryid45=92305>

UKMi NPSA Rapid Response Report: Preventing fatalities from medication loading doses A risk assessment tool to support local implementation [link](#)

8. Acknowledgement

Policy for medicines requiring loading doses
Sheffield Teaching Hospitals NHS FT October 2011

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