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ORIGINAL ARTICLE

PRN Oral/IM Lorazepam for Rapid Control of Acutely Disturbed Behaviour in Older Adults (Over 65)

Guirguis Ramy, Hysenagolli Rexhep

Thames Valley Foundation Trust, Department of Psychiatry, Medical Doctor at Royal Berkshire NHS Foundation Trust.

Correspondence to *Ramy Guirguis, Thames Valley Foundation Trust, Department of Psychiatry, Medical Doctor at Royal Berkshire NHS Foundation Trustx.*

Background Lorazepam is common ly used for the treatment of acute behavioural disturbance and violence/ aggression in the older population. It is associated with sedation, increased risk of falls and paradoxical disinhibition. 1,4,5 The current NICE guideline recommends patient monitoring after intramuscular (IM) administration of lorazepam for RT but not for oral lorazepam, even though both routes of administration achieve peak plasma concentration within two hours (range between 1 and 6h). 2 In May 2018, PRN oral Lorazepam use in older adult inpatients for acutely disturbed behaviour was audited. The results were then disseminated among the old-age psychiatry colleagues with learning points. Since then, the electronic documentation of patient observations has been implemented between 2018 and 2019 to improve compliance with monitoring and recording vital signs. This re-audit was undertaken in November 2019 using the same standards, however, both oral and intramuscular administration of lorazepam have been included for older adult inpatients treated for acutely disturbed behaviour.

Subjects and Methods Data were collected retrospectively for older adult inpatients who were treated with oral and/or intramuscular lorazepam PRN during admission. A data collection tool was created and charted against the standards.

Results Overall, it can be concluded that the reaudit showed improvement in use of de-escalation techniques, documenting treatment episode for RT, and hydration of patients. There was no improvement in monitoring patients' response and vital signs for oral and IM lorazepam treatment episodes.

Conclusions We recommend some action points to ensure compliance with adequate monitoring following its use in RT. For example, the training for nursing colleagues and promoting safe prescription of PRN lorazepam.

Keywords Elderly, Lorazepam, Old age psychiatry.

INTRODUCTION

This study has been undertaken to check if appropriate measures, precautions, and physical health monitoring were implemented as the Rapid Tranquillization (RT) guideline. Where it is used, the indication must be documented to show the risk of treatment with lorazepam was outweighed by the benefits. Other ways of managing behaviour such as redirection (De-escalation techniques) should also be trialled first. In the first audit carried out in May 2018, we focused on the administration of Oral Lorazepam in patients admitted to older adult wards, when required (PRN) for acutely disturbed behaviour. Results showed an inadequate recording of patient response and follow-on vital signs monitoring; the results were then disseminated among the old-age psychiatry colleagues with learning points. Since then, electronic documentation of patient observations has been implemented between 2018-2019 to improve compliance with monitoring and recording of vital signs. We now include IM (intramuscular) administration of lorazepam in the re-audit for comparison with previous results with regards to compliance with the guideline across both forms of Lorazepam administration.

The aim of this study is to measure compliance with Trust guideline "Rapid Tranquillisation (RT) of acutely disturbed behaviour in older adults (over 65)", which includes adequate documentation, patient monitoring, considering capacity/consent issues and de-escalation strategies.

Our objectives are: (a) To identify the areas where the standards are not met and explore ways to rectify this. (b) To check if the implementation of the action plan following the first Audit has improved the outcome. (c) To explore whether the two forms of Lorazepam administration are receiving the same level of monitoring.

SUBJECTS AND METHODS

This is a quality improvement study that seeks to improve the patient care and outcomes through a systematic review of care against the current Trust guidelines. It is a retrospective audit for inpatients on Ward 1 and Ward 2 (Older adults acute wards) who were treated with oral and/or Intramuscular Lorazepam PRN during their period of admission until the date of data collection. Ten patients were randomly selected, for each of these patients, three treatment episodes where oral and or intramuscular Lorazepam was given for RT were randomly selected and measured against the audit standards.

Standards

The data are measured against the Trust guideline on Rapid Control/Tranquillisation of Acutely Disturbed Behaviour in Adults (18–65 Years) And Older Adults (Over 65), which are based on NICE NG10 – Violence and Aggression: Short-term management in mental health, health and community settings. The standards were divided into 4 categories;

On admission

(1) PRN medication should not be prescribed routinely or automatically on admission/and if prescribed, clear documentation for the reason should be stated.

Before

(1) Consideration given to consent and capacity to consent to receive treatment.

(2) De-escalation techniques were used prior to considering oral and/or intramuscular Lorazepam PRN.

During

(1) Lorazepam administration documented and the reason given for administration.

(2) Response after administration was monitored and recorded on RiO progress notes

After-care

(1) Recording patient's activity levels after Oral PRNs given. As per guideline, blood pressure, pulse, temperature, respiratory rate and level of consciousness should be recorded at least every 30min – until the patient is active. If the patient is sedated or concerns about the physical health are raised, then observations should be performed every 15min (In the guideline, it is not clear whether this also applies to oral lorazepam PRN in addition to intramuscular).

(2) Service users should be encouraged to drink and their levels of hydration state should be recorded on RIO progress notes.

No.	Evidence of quality of care or service (Standard)	Compliance (100% or 0%)	Clinical exceptions
1	PRN medication should *not* be prescribed routinely or automatically on admission/ and if prescribed, a clear documentation for the reason should be included.	100	
2	Consideration given to consent and capacity to consent to receive treatment	100	
3	De-escalation techniques were used prior to considering Oral/ Intramuscular Lorazepam PRN.	100	
4	Lorazepam administration documented and reason given for administration.	100	
	Response after administration was monitored and recorded on RiO progress notes		
6	Recording patient's activity levels after Oral/Intramuscular PRNs given (As per guideline, blood pressure, pulse, temperature, respiratory rate and level of consciousness should be recorded at least every 30min – until the patient is active. If the patient is sedated or concerns about physical health are raised, then observations should be performed every 15min *(In the guideline, it is not clear whether this also applies to oral lorazepam PRN.)*	100	
7	Service users should be encouraged to drink and their levels of hydration recorded on RIO progress notes.	100	

Data collection

Audit period

This set of data was collected on the 21st November 2019 – events of oral and intramuscular Lorazepam PRN administration were recorded from the 24th August 2019 to 21st November 2019.

Defined population

The population audited included inpatients on Ward 1 and Ward 2 (Older adults acute wards) who were treated with oral and/or intramuscular Lorazepam PRN during their period of admission until the date of data collection. For each patient, three treatment episodes where oral and/or intramuscular lorazepam was given for RT were randomly selected and measured against the standards-no exclusion criteria were applied. One patient only had two events recorded.

Population size

The total number of older adult inpatients on the day of data collection (21/11/19) was 31 patients (15 on Ward 1–16 on Ward 2).

Sample size audited

A total of 10 patients (5 from Ward 1 and 5 from Ward 2) were prescribed Lorazepam during the course of their admission-29 treatment episodes were randomly selected.

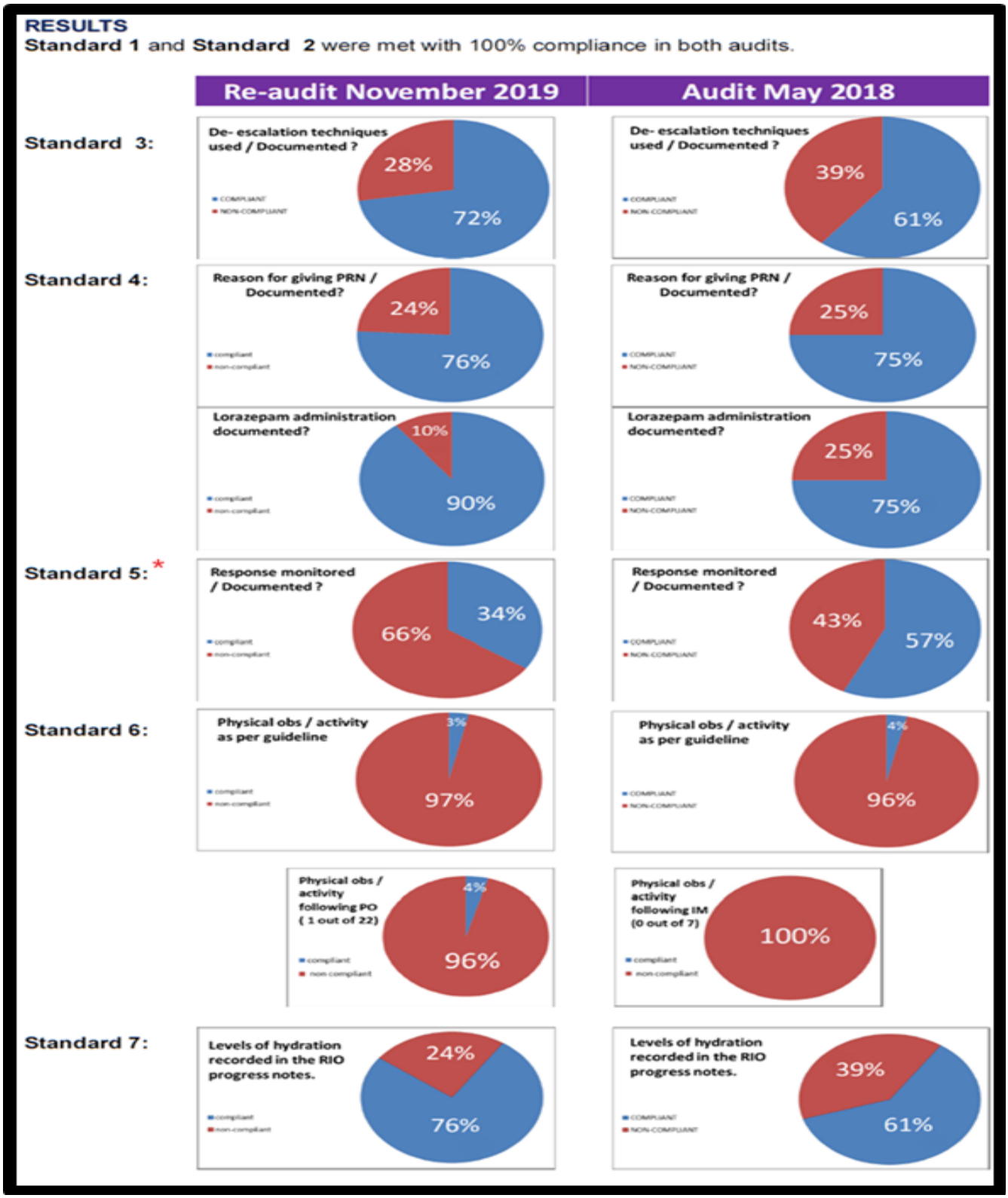
Data collection

21/11/2019-Data were collected retrospectively, and the following sources were

Used to collect the data: the progress notes, the electronic observation charts and the electronic medications charts.

	ADMISSION		BEFORE		ROUTE	DURING				AFTER		
NHS NUMBER	PRN prescribe on Admission? (Y/N)	If Y, Clear doc of reason?	Consideration given to consent and capacity to consent	De-escalation techniques used/ Documented ?	Oral / IM	Lorazepam administration documented? (Y/N)	Reason for giving PRN documented? (Y/N)	Response monitored /documented? (Y/N)	If N, Clarify	Physical obs/ activity as per guideline (Y/N)	If N, Clarify	Level of Hydration documented
Patient 1	Y	Y	Y	Y	IM	Y	Y	Y	"	N	Obs 1st done 5 hours later	N
			Y	Y	PO	Y	Y	N	No doc of admin or response	N	Obs 1st done next day	N
Patient 2	N	"	Y	Y	PO	Y	N	N	No doc for reason or response	N	Obs 1st done 8 hours later	N
			Y	Y	PO	Y	Y	N	no doc for reason or response	Y	"	Y
			Y	N	PO	Y	N	N	No doc for reason or response	N	Obs 1st done 1 hour later	Y
Patient 3	N	"	Y	Y	PO	Y	Y	Y	"	N	Obs1st done next day	Y
			Y	N	PO	N	N	N	No doc for reason or response	N	Obs 1st done next day	N
			Y	Y	IM	N	N	N	No doc of admin or response	N	Obs 1st done next day	N
Patient 4	N	"	Y	Y	IM	Y	Y	Y	"	N	Obs 1st done next day	N
			Y	Y	IM	Y	Y	Y	"	N	Obs 1st done 1 hour later	Y
			Y	N	IM	Y	Y	Y	"	N	Obs 1st done next day	Y
Patient 5	N	"	Y	N	PO	Y	Y	N	No doc for response	N	Obs 1st done 1 hour later	Y
			Y	N	PO	N	N	N	No doc of admin or response	N	Obs 1st done 3 hours 17 mins later	Y
			Y	N	PO	Y	Y	Y	"	N	Obs 1st done 9 hours later	Y
			Y	N	PO	Y	Y	N	No doc of response	N	Obs 1st done next day	Y
			Y	N	PO	Y	N	N	No doc of reason or response	N	Obs 1st done next day	Y
Patient 7	N	"	Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done 6 hours later	Y
			Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done 2.5 hours later	Y
			Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done 1 hour 26 mins later	Y
Patient 8	N	"	Y	Y	IM	Y	Y	N	No doc of response	N	Obs 1st done next day	Y
			Y	Y	IM	Y	Y	Y	"	N	Obs 1st done next day	Y
			Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done next day	Y
Patient 9	N	"	Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done 7hours 15mins later	Y
			Y	Y	PO	Y	Y	Y	"	N	Obs 1st done next day	Y
			Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done next day	Y
Patient 10	Y	Y	Y	Y	PO	Y	Y	N	No doc of response	N	Obs 1st done 2 days later	N
			Y	Y	PO	Y	Y	Y	"	N	Obs 1st done 10 hours later	Y
			Y	Y	PO	Y	N	N	No doc of reason or response	N	s 1st done 16 hours la	Y
	TOTAL NUMBER	29										
	COMPLIANT		29	21		26	22	10		1	0	22
	NON-COMPLIANT		0	8		3	7	19		28	0	7
	COMPLIANCE %		100	72.4		89.7	75.9	34.5		3.4	0	75.9

The data collection tool



*It is worth mentioning that in some trusts, ACES (Agitation-Calmness Evaluation Scale) is used to monitorresponse following both IM and oral administration (■, ■).

DISCUSSION

Lorazepam PRN is regularly used in the older adults' inpatient population; however, the relevant physical health monitoring requirements after administering oral lorazepam to patients is rather ambiguous. Most other Trust guidelines available on internet were not clear on whether physical health monitoring applies to oral RT (rapid tranquilization). Maudsley guideline 13th edition (Taylor *et al*., 2018) suggests regular physical health monitoring after any parenteral drug administration for RT.

The trust RT guideline includes a detailed section on physical health monitoring, but whether this should be carried out after IM use of medication only or also after oral administration is not clearly stated.

The definition of "Rapid Tranquillisation" has been rather controversial. In 2014, NICE defined RT as "any use of medicines that are given to a person who is very agitated or displaying aggressive behaviour to help quickly calm them. This is to reduce any risk to themselves or others and allow them to receive the medical care that they need" (NICE National Institute for Health and Care Excellence, 2014b).

In 2015, NICE Guideline on the short-term management of violence and aggression defined RT as 'The use of medication 'by the parenteral route (usually intramuscular or, exceptionally, intravenous) if oral medication is not possible or appropriate and urgent sedation with medication is needed.' (NICE National Institute for Health and Care Excellence, 2014b).

The current Maudsley guideline on the treatment of acutely disturbed or violent behaviour includes use of oral lorazepam under RT however recommends physical health monitoring only after parenteral administration of medication.

BNF reported side effects of Lorazepam (XX, XX). The following are reported as very common side effects: Amnesia; ataxia (in children); ataxia (especially in the elderly) (in adults); confusion (in children); confusion (especially in the elderly) (in adults); dependence; drowsiness the next day; light-headedness the next day; muscle weakness; paradoxical increase in aggression.

Manufacturer prescribing information (ATIVAN, Pfizer,) (XX, 2022)

Lorazepam is rapidly absorbed after oral administration, which means peak plasma concentrations of free lorazepam is reached at 2h (range between 1 and 6h). Following administration by the intramuscular route, peak plasma levels occur between 60 to 90min By the intramuscular route, the absorption half-life values of lorazepam average 12 and 19min, whereas by the oral route, there is an additional lag period averaging 15 and 17min Bioavailability was shown to be identical by all routes of administration. This warrants a cautious use of lorazepam in older population both via oral and intramuscular route as in both cases, the drug plasma levels peaks within two hours.

Manufacturer's warning (Pfizer) (XX, 2022)

Use in the Elderly: Elderly and debilitated patients, or those with organic brain syndrome, have been found to be prone to CNS depression after even low doses of benzodiazepines. Therefore, medication should be initiated with very low initial doses in these patients, depending on the response of the patient, in order to avoid oversedation or neurological impairment.

Low-dose lorazepam in Alzheimer's dementia is associated with reduced attention and sedation (Sunderland *et al*., 1989).

Pharmacokinetics and pharmacodynamics in elderly

studies on benzodiazepine pharmacokinetics have shown that alterations in the distribution and elimination of these agents occur among older patients. The increased sensitivity of older people to benzodiazepines is due to age-related alterations in the central nervous system receptors. It is likely that benzodiazepine receptors in the brain become more sensitive, causing increased sedation, unsteadiness, memory loss, and disinhibition (Bogunovic and Greenfield, 2004).

Drug interactions

Most benzodiazepines are metabolised by CYP3A4 enzymes, which are inhibited by drugs such as erythromycin, ketoconazole and several SSRIs, co-administration of these drugs can increase the serum level of benzodiazepines., (Janicak *et al*., 2001) Pharmacodynamicinteraction with co-prescribed hypnotics, sedative antipsychotics or antidepressants, antihistamines may enhance the sedative action (Ashton, 1995).

Main risks in older adults

Benzodiazepines may contribute to psychomotor impairment and increase the risk of falls leading to hip fractures. The risk of falls has been associated with sudden increases in dosage and with continuous use of benzodiazepines (Cumming and Le Couter, 2003) Cognitive impairment: The use of benzodiazepines among elderly patients has been associated with intellectual and cognitive impairment (Gray *et al*., 1999).

Therefore, for elderly patients with multiple co-morbidities where there is additional risk, cautious use of

lorazepam (both PO and IM) with careful monitoring of physical health parameters is warranted.

RECOMMENDATIONS

Overall, it can be concluded that the reaudit showed improvement in: use of de-escalation techniques, documenting treatment episode for RT and hydration of patients. Although electronic documentation of patient observations has been implemented between 2018 and 2019 to improve compliance with monitoring and recording of vital signs, there was no improvement in monitoring patients' response and vital signs for both oral and IM lorazepam treatment episodes.

Given the results collected from this sample, one can conclude that some of the easy-to-achieve standards were not met; this can be improved by making the staff members more familiar with the guideline, especially the postadministration care, the documentation of reasoning for administration, the fact that alternative methods were trialled and the response to treatment. This is information that should be documented as a matter of course, as well as being present in the guideline.

Education around this can be carried out by discussion in ward meetings and quality improvement meetings.

Oral medication is included in "The Trust guideline on Rapid Control/Tranquillisation of Acutely Disturbed Behaviour in Adults (18–65 Years) And Older Adults (Over 65)-CCR052" and thus it seems it should be treated in the same way as IM injection.

Discussions need to be held with senior clinicians / pharmacists to clarify the wording of the guidance to make this completely clear and then to roll out the guidance appropriately to clinical staff.

From discussing this further with the Physical Health Lead, it was found that the importance of accurate documentation and physical health monitoring has been emphasized in both the formal RT mandatory course and in informal teachings offered by senior clinicians. Nevertheless, not much of improvement has been noted in terms of compliance.

This is also evident in an audit that was recently carried out by the Physical health Lead. The purpose was to review the frequency and level of physical monitoring of side effects of rapid tranquilisation over a 3-month period to determine compliance with current guidelines and policies.

Measures that prescribers can be made aware of at induction:

(1) Cautious use for the shortest period of time at lowest possible dose. The information about Benzodiazepines use in elderly could be added to doctors' induction booklet

(2) Avoid, if possible, especially with concomitant use of other sedative drugs

(3) Avoid in high-risk patients (respiratory deficiency, history of fractures, risk of falling, dementia)

(4) The need for PRN lorazepam to be reviewed on a weekly basis during the MDT and dose adjusted according to need &/or response.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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David M. Taylor BSc, MSc, PhD, FFRPS, FRPharmS, FRCPEdin, FRCPsychHon,, Thomas R. E. Barnes MBBS, MD, FRCPsych, DSc,, Allan H. Young MB, ChB, MPhil, PhD, FRCP, FRCPsych, First published: 17 December 2021

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