

Guideline on Medication and the Risk of Falling

Purpose	<ul style="list-style-type: none"> • This guideline provides advice and information relating to medication and the risk of falls • The guideline complements and may be used as an aide when completing the Trusts patients Falls Assessment
Scope	This guideline is applicable to all Dorset HealthCare staff that may have a responsibility for assessing a patient's medication in relation to their risk of falling.
Responsibility	<ul style="list-style-type: none"> • This guideline is not a comprehensive list of all drugs but is intended to raise awareness of the types of drugs which can cause falls. • Please refer to a member of the Pharmacy team for further information and clarification if required.
Related Documents	DHC Patients Falls Assessment

1. Clinical objectives

- 1.1 All patients should have their drug burden reviewed with respect to likelihood to cause falls.
- 1.2 The drug history should establish the reason the drug was given, when it was started, whether it is effective and what its side effects have been.
- 1.3 An attempt should be made to reduce the number and dosage of medications and ensure they are appropriate and not causing undue side effects

2. Medicines and risk of falling

- 2.1 Falls can be caused by almost any medicine that acts on the brain or circulation
- 2.2 Taking a drug which acts on the brain can double the risk of a fall.
- 2.3 Taking 2 or more drugs that can affect the circulation or brain can double the risk of a fall.
- 2.4 Falls may be a result of recent medication change but are usually caused by medicines that have been given for some time.
- 2.5 Polypharmacy is an independent risk factor for falls. Patients on four or more medicines of any type are at greater risk of a fall

- 2.6 The mechanism leading to a fall is usually one or a combination of:
- **Sedation**; slowing of reaction time and impaired balance
 - **Hypotension**; including orthostatic hypotension, vasovagal syndrome, vasodepressor carotid sinus hypersensitivity
 - **Cardiac changes**; bradycardia, tachycardia, periods of asystole

3. Intrinsic risk factors

- 3.1 The risk of having a fall or recurrent falls increases with the number of associated intrinsic risk factors listed below:
- Previous fall
 - Poor mobility / gait
 - Balance disorders
 - Cognitive impairment
 - Polypharmacy
 - Psychotropic drugs use
 - Visual impairment
 - Alcohol > 1 unit/day
 - Orthostatic hypotension
 - Hearing impairment

4. Risk Stratification

- 4.1 Appendix A provides a classification of medicines into groups based on the likelihood of causing a fall based on evidence and pharmacological side effect profiles.

5. References

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Appendix A: Medicines and the Risk of Falling

(Adapted from Darowski A, Dwight J, Reynolds J (2011) Medicines and Falls in Hospital. John Radcliff Hospital)

This risk classification is based on published evidence of medicines implicated in falls. This list is not fully inclusive but highlights groups of drugs where particular care is required.

Please refer to a member of the Pharmacy team if further information is required

High Risk – medicines that can commonly cause falls on their own or in combination

Medicine Class	Examples	Effects that may lead to a fall
Benzodiazepines	Temazepam, nitrazepam, diazepam. Lorazepam. Chlordiazepoxide, flurazepam. Lorazepam, oxazepam, clonazepam	Drowsiness, slow reaction times, impaired balance. Particular caution required in patients whom have been taking for some time.
Z-drugs	Zopiclone, zolpidem	Drowsiness, slow reaction times, impaired balance.
Tricyclic antidepressants	Amitriptyline, dosulepin, imipramine, doxepin, clomipramine, lofepramine, nortriptyline, trimipramine	All have some α blocking ability and can cause orthostatic hypotension. All have antihistamine properties and can cause drowsiness, impaired balance and slow reaction times.
Other antidepressants	Mirtazapine, trazadone, mianserin	Can double the rate of falling. Nortriptyline, imipramine and lofepramine are associated as being less sedative compared to others in the class.
SNRI antidepressants	Venlafaxine, duloxetine	Can cause orthostatic hypotension through noradrenaline reuptake blockade.
Monamine oxidase A inhibitors	Phenelzine, isocarboxazid, tranylcypromine	Cause severe orthostatic hypotension
Drugs for psychosis and agitation	Chlorpromazine, haloperidol, fluphenazine, risperidone, quetiapine, olanzapine	All have some α blocking ability and can cause orthostatic hypotension. Sedation, slow reflexes, loss of balance.
Opiate analgesics	All opiates and related analgesia – e.g. codeine, morphine tramadol	Sedate, slow reactions, impair balance, cause delirium

High Risk continued....

Medicine Class	Examples	Effects that may lead to a fall
Antiepileptic's	Phenytoin	Phenytoin may cause permanent cerebellar damage and unsteadiness in long term therapeutic dose. Toxicity due to excessive blood levels cause ataxia and unsteadiness.
	Carbamazepine Phenobarbitone	Sedation, slow reaction times. Toxicity due to excessive blood levels cause ataxia and unsteadiness.
Parkinsons Disease Dopamine agonists	Ropinirole, pramipexole, bromocriptine, cabergoline, pergolide	May cause delirium and orthostatic hypotension
Monoamine oxidase - B inhibitors	Selegiline	Causes orthostatic hypotension
α receptor blockers	Doxazosin, tamsulosin, prazosin	Cause orthostatic hypotension
Centrally acting α₂ receptor agonists	Clonidine, moxonidine	May cause severe orthostatic hypotension. Also sedating
Thiazide diuretics	Bendroflumethazide, chlortalidone, metolazone	Causes orthostatic hypotension, weakness due to low potassium. Hyponatraemia.
Angiotensin Converting Enzyme Inhibitors	Lisinopril, Ramipril, enalapril, captopril, perindopril	Decrease in peripheral resistance and drop in blood pressure. These drugs rely almost entirely on the kidney for their elimination and can accumulate in dehydration and renal impairment.
	Fosinopril, trandolapril, quinapril	Excreted by kidney and liver
Beta Blockers	Atenolol, sotalol (renally excreted can accumulate in renal impairment)	Initial decrease in cardiac output, decrease in peripheral vascular resistance. Can cause bradycardia, hypotension, orthostatic hypotension and vasovagal syndrome
	Bisoprolol, metoprolol, propranolol, carvedilol, timolol eye drops	
Antianginals	GTN	Common cause of syncope due to sudden loss of BP
	Isosorbide mononitrate, nicorandil	Causes hypotension and paroxysmal hypotension
Long acting oral Hypoglycaemics	Glimepiride, glibenclamide, chlorpropamide	Long acting sulfonylureas have increased associated risk of causing hypoglycaemia.

Moderate risk: these medicines can cause falls especially in combination

Medicine Class	Examples	Effects that may lead to a fall
SSRI antidepressants	Sertraline, citalopram, paroxetine, fluoxetine	Several population studies show that SSRIs are consistently associated with an increased rate of falls and fractures, but there are no prospective trials. The mechanism of such an effect is unknown. They cause orthostatic hypotension and bradycardia rarely. They do not normally sedate but can disturb sleep.
Antiepileptics	Sodium valproate, gabapentin, pregabalin	Some data on falls association
Muscle relaxants	Baclofen, dantrolene	Sedative, reduce muscle tone
Loop diuretics	Furosemide, bumetanide	Dehydration causes hypotension. Low potassium and sodium
Angiotensin II receptor Blockers	Losartan, candesartan, valsartan, irbesartan, olmesartan, telmisartan, eprosartan	May cause less orthostatic hypotension than ACE inhibitors. Excreted by kidney and liver
Calcium channel blockers that only reduce blood pressure	(Dihydropyridines) Amlodipine, felodipine, nifedipine, lercanidipine, lacidipine, nimodipine	Vasodilatation; may cause hypotension and paroxysmal hypotension
Calcium channel blockers which slow the heart and reduce blood pressure	(Phenylalkylamines) Verapamil (Benzothiazepines) Diltiazem	May cause hypotension or bradycardia
Other antidysrhythmics	Digoxin, amiodarone, flecainide	Cause symptomatic bradycardia and syncope (NB patient's condition may predispose them to falls)
Oral Hypoglycaemics	(Sulfonylureas) Gliclazide, glipizide, tolbutamide (metglitinides) Nateglinide, repaglinide	Release insulin, may cause hypoglycaemia in periods of poor diabetic control e.g. illness

Possible risk of falls: these medicines possibly cause falls, particularly in combination, published evidence of direct causal link is lacking, medical condition may mean that patient more likely to fall

Medicine Class	Examples	Effects that may lead to a fall
Antiepileptics	Lamotrigine, levetiracetam, topiramate, zonisamide	May cause falls, insufficient data available
Vestibular sedatives	Prochlorperazine	Dopamine antagonist – may cause movement disorder in long term. Also has α blocking ability (can cause orthostatic hypotension) and antihistamine properties causing sedation. NB being used to treat a condition associated with falling.
	Cinnarizine, betahistine	Antihistamines – sedating. NB being used to treat a condition associated with falling.
Sedating antihistamines for allergies	Chlorphenamine, hydroxyzine, promethazine, trimeprazine	Sedation likely to contribute to falls; drugs have long half life's. However lack of data on contribution to falls risk.
Anticholinergics acting on bladder	Oxybutynin, tolterodine, duloxetine, solifenacin	Lack of data on falls risk, but pharmacologically have CNS effects as well as effects on the autonomic nervous system
Dementia drugs (Acetylcholinesterase inhibitors)	Donepezil, rivastigmine, galantamine	May cause symptomatic bradycardia and syncope.
Proton pump inhibitors	Omeprazole, lansoprazole	Rare reports of dizziness, confusion, blurred vision and drowsiness