Subcutaneous furosemide (frusemide) for end stage heart failure with fluid overload in the dying patient

Title	**Subcutaneous furosemide (frusemide) for end stage heart failure with fluid overload in the dying patient**
Area where Protocol/Guideline applicable	SESLHD Inpatient settings (including Calvary hospital)
Indications for use	For management of refractory congestive cardiac failure and/or pulmonary oedema in end stage cardiac failure, when the oral route is no longer possible and the IV route is not appropriate or desirable.
Place in Therapy	When oral route for furosemide therapy no longer available and patient in terminal phase of illness.
Clinical condition	Continuing diuretic therapy is crucial to decrease the pulmonary fluid overload in a patient with end-stage heart failure on regular furosemide to minimise exacerbation of breathlessness and other symptoms associated with end stage heart failure.
If part of combination therapy, list other drugs	Frequently used in conjunction with opioids for dyspnoea management in end stage heart failure
Contraindications	Allergy to furosemide or sulfonamides Fluid depletion, anuria
Known adverse effects	Electrolyte imbalance, dehydration, metabolic alkalosis Orthostatic hypotension, dizziness Rash Tinnitus
Preparations	Furosemide 20mg/2mL ampoules Furosemide 250mg/25mL ampoules
Dose conversion for oral to subcutaneous route	A ratio of 1:1 between oral and subcutaneous routes should be used
Dosage	Intermittent dosing: initial dose 20mg once or twice daily subcutaneously Note doses greater than 20mg are unsuitable for intermittent dosing due to volume. Continous Subcutaneous Infusion (CSCI): Adjust dose according to clinical response to a maintenance dose of 40-250mg daily (maximum 1g daily)

Administration	Dilute to a maximum concentration of 10mg/mL: Maximum 200mg in 20mL syringe Maximum 300mg in 30mL syringe (30mL syringes available from Palliative Care team) If higher doses required two 12 hour syringe drivers may be necessary
Diluents	Sodium chloride 0.9%
Drug Compatibility	Furosemide injection is alkaline and there is a high risk of incompatibility when mixed with acidic drugs. Because of this and the lack of compatibility data, **furosemide should not be mixed in the same syringe with any other drugs**
Monitoring requirements	Monitor level of fluid overload and titrate dose accordingly. Monitor for injection site reactions. If administered via CSCI perform 4 hourly infusion site checks as per Subcutaneous Syringe Driver inpatient management form SES130.021
Practice Points	Administer alone in a separate syringe driver
Basis of Protocol/Guideline (including sources of evidence, references)	Palliative Care Formulary 7th Ed, 2020 p 67-72 Therapeutic Guidelines – Palliative Care Version 4, 2016, Dickman A, Schneider J. The syringe driver: continuous subcutaneous in palliative care. Oxford University Press; 2016 Domenic, A.S et al, *Subcutaneous Furosemide in Heart Failure,* JACC: Basic to Translational Science VOL, 3 NO 1, Feb 2018 pp 25 -34
Consultation	St George Palliative Care Team SESLHD Palliative Care working party: Dr Jan Maree Davis, Medical Director, Palliative Care.

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GOVERNANCE	
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Chairperson, QUM Committee	Dr John Shephard
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