

Appendix 1

Adequacy of stress ulcer prophylaxis prescription in the intensive care unit: an observational study

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Supplementary data

Table S1: Indications for acid suppressant therapy.

1. Healing of erosive oesophagitis and maintenance of this healing
2. Non-erosive reflux disease (acidity excess or acid hypersensitive oesophagus)
3. Gastro-oesophageal reflux disease with its various clinical manifestations (chronic cough, asthma, hoarseness) and complications (oesophageal strictures and Barrett's oesophagus)
4. Oesophageal eosinophilia responding to proton pump inhibitor treatment
5. *Helicobacter pylori* treatment in combination with antibiotics
6. Treatment of *H. pylori* negative peptic ulcers
7. Zollinger-Ellison syndrome therapy
8. Functional dyspepsia, short term treatment
9. Nonsteroidal anti-inflammatory drug (NSAID) treatment with ≥ 1 criteria: age >65, history of ulcer, elevated doses of NSAID, combined treatment with an anticoagulant, another NSAID, or an antiplatelet agent.
10. Aspirin or antiplatelet therapy with ≥ 1 criteria: history of ulcer, dual antiplatelet therapy or antiplatelet + anticoagulation, or ≥ 2 criteria: age >60, corticosteroid, dyspepsia or gastro-oesophageal reflux disease
11. Anticoagulation with ≥ 1 criteria: history of gastrointestinal bleeding, positive *H. Pylori* status, associated high risk treatments: corticosteroids, NSAID, aspirin

Table S2: Summary of studies reporting data on adequacy of stress ulcer prophylaxis and its prescription on ICU / hospital discharge						
Ref*	First author	Year	Country	Number of patients	Setting	Main results
6	Farley	2013	Australia	387	2 ICUs	Among the 190 patients with newly initiated SUP in the ICU, the therapy was continued on ICU discharge in 63% without an indication and in 39% on hospital discharge.
10	Tan	2016	Australia	531	5 ICUs	Among the 184 patients with newly initiated SUP in the ICU, 48.9% were still receiving the therapy on hospital discharge. A documented indication was present in only 10% of the patients.
11	Pavlov	2014	USA	703	Single ICU	In Epoch 1, 74% of patients had no acid suppressive therapy on admission. Of those, 26.6% had such therapy on hospital discharge, 19.1% without an indication. In epoch 2, after medication reconciliation, 61% of patients had no acid suppressive therapy on admission, 14.6% had such therapy on hospital discharge and 11.2% without an indication.
13	Bez	2013	Switzerland	255	General surgery department	Among the 67 patients screened for SUP prescription adequacy, 79% had no risk factor for stress ulcer. 33% of those with de novo prescription were discharged on SUP (without an indication in 86% of the cases).
14	Farrell	2010	USA	210	Single ICU	87.1% of patients received SUP, 68.1% without any indication, 60.4% continued on treatment at ICU discharge and 31% were discharged home on SUP without a new indication.
15	Thomas	2010	USA	29348	Acute care hospital admissions	Among eligible patients, 68.8% had acid-blocker prescribed without an indication on hospital discharge. Rates of inappropriate acid-blocker use were approximately equal for patients who stayed in the ICU versus non-ICU patients. Over the 4-year period of the analysis, the total cost associated with inappropriate continuation of acid-blocker therapy in the first 30 days following hospital discharge was approximately 3 million dollars.
ICU = intensive care unit; SUP = stress ulcer prophylaxis * Reference numbers refer to the list in the main article						

		Daily Cost		Patients days		Total Cost over study period			Estimated yearly costs		
		po	iv	Adequate	Inadequate	Adequate	Inadequate	Total	Adequate	Inadequate	Total
Actual price CHUV	Esomeprazole	CHF 0,02	CHF 1,24	218	468	CHF 190,53	CHF 409,03	CHF 599,56	CHF 1 053,70	CHF 2 262,07	CHF 3 315,77
	Ranitidine	CHF 0,40	CHF 1,92	35	75	CHF 51,24	CHF 109,80	CHF 161,04	CHF 283,37	CHF 607,23	CHF 890,60
	Total			253	543	CHF 241,77	CHF 518,83	CHF 760,60	CHF 1 337,07	CHF 2 869,30	CHF 4 206,37
Min Public Price	Esomeprazole	CHF 0,60	CHF 8,75	218	468	CHF 1 374,49	CHF 2 950,74	CHF 4 325,23	CHF 7 601,35	CHF 16 318,49	CHF 23 919,83
	Ranitidine	CHF 0,80	CHF 4,65	35	75	CHF 122,33	CHF 262,13	CHF 384,45	CHF 676,49	CHF 1 449,63	CHF 2 126,13
	Total			253	543	CHF 1 496,82	CHF 3 212,87	CHF 4 709,68	CHF 8 277,84	CHF 17 768,12	CHF 26 045,96
Max public Price	Esomeprazole	CHF 1,64	#####	218	468	CHF 2 350,48	CHF 5 045,98	CHF 7 396,45	CHF 12 998,84	CHF 27 905,78	CHF 40 904,62
	Ranitidine	CHF 0,80	CHF 4,65	35	75	CHF 122,33	CHF 262,13	CHF 384,45	CHF 676,49	CHF 1 449,63	CHF 2 126,13
	Total			253	543	CHF 2 472,80	CHF 5 308,10	CHF 7 780,90	CHF 13 675,34	CHF 29 355,41	CHF 43 030,75

Figure S1: Cost estimations.

Total cost over study period were estimated using the following formula:

$$\text{Total cost over study period} = \text{DCO} \times \text{nPD} \times (1 - \%iv) + \text{DCiv} \times (\text{nPD} \times \%iv)$$

where DCO = daily cost oral therapy; nPD = number of patient days; %iv = percentage intravenous therapy; DCiv = daily cost intravenous therapy

Conversion from study period to estimated cost was performed using the following formula:

$$\text{Estimated yearly cost} = (\text{total cost over study period} \div 66) \times 365$$

Calculation Parameters							
Esomeprazole				Patients days			
Tablets / day	1			Adequate		253	
Amp / day	1				Esomeprazole	218	
Price Min					Ranitidine	35	
Tablets	CHF 0,60						
iv	CHF 8,75			Inadequate			543
Price Max					Esomeprazole	468	
Tablets	CHF 1,64				Ranitidine	75	
iv	CHF 14,70						
Price CHUV				% intravenous		70%	
Tablets	CHF 0,02						
iv	CHF 1,24						
Ranitidine							
Tablets / day	2						
Amp / day	3						
Price							
Tablets	CHF 0,40						
iv	CHF 1,55						
Price CHUV							
Tablets	CHF 0,20						
iv	CHF 0,64						

Figure S2: Simulated costs for inpatients.

	Pts discharged with inadequate SUP	Est. Yearly number	Daily Price	Total 3 Mo	Total 6 Mo	Total 1 year
Minimum	28	154,8	0,6	CHF 8 361,82	CHF 16 909,45	CHF 33 911,82
Maximum	28	154,8	1,64	CHF 22 855,64	CHF 46 219,18	CHF 92 692,30

Figure S3: Simulated costs for outpatients.