



Ready-to-use syringes: building a decision tool to help select drugs to develop in priority

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BACKGROUND AND OBJECTIVE

It is now well known that ready to use syringes (RTUS), produced at the pharmacy under GMP conditions, can markedly improve the safety of use of powerful intravenous drugs. However, their development is costly and time consuming and it is therefore essential to set priorities by targeting the best candidates.

METHODS

In order to gather the various important criteria, an observational study of RTUS use in an intensive care unit and an emergency room was carried out. Interviews among the nurse staff were made. Based on the collected information and the literature, a list of criteria was elaborated. Three experienced hospital pharmacists attributed scores to each item of this list to gauge the importance of the respective criteria.

RESULTS

The list included 16 criteria in four fields: safety (n=6), asepsis (6), economics (2), and ergonomics (2). A score ranging from 0 to 3 points was attributed to each criteria. Items "intrathecal drugs" and "drugs needed in an emergency" had the higher score (3). They were followed by "drugs with particular consumption (either very frequent or very seldom)", "drugs with low therapeutic index", "drugs prepared in advance", and "drugs enhancing microbial growth" with a score of 2. A cumulative score of 10 points was decided as a cut-off to be considered as valuable candidate. The final selection is thereafter based on an algorithm including the score, resources availability, costs, and stability data.

Field	Risk factor	Description	notation
Safety	Complex and unusual calculation	Unit conversion (% in mg, mg in mmol) 24h rate of flow calculation	1.5
	Complex preparation process	Several stages => increase error risk	0.5 /handling
	Particular drug consumption	Unusual use or frequent use	2
	Confusing drug	Look-alike, sound-alike, several dosage	1.5
	Unusual indication and dilution	Ex: ketamine as analgesic vs anaesthetic	1.5
	Low therapeutic index	Important patient injury in case of drug misuse	2
Asepsis	Number of aseptic handling	Cumulative aseptic risk	0.5 /handling
	Administration route		
	Intrathecal		3
	Epidural		2
	IV	Some administration route are more risky than other in case of drugs contamination (eg: intrathecal route)	1
	IM or SC		0.5
	Other uncommon route (intravitreal, intraperitoneal, intracardiac)		1
	Drug prepared in advance	Global Microbial risk	2
24h administration	Microbial risk increase when drugs preparation pass along 24h	1	
Disease, patient condition (immunocompromised patient, patient in ICU, renal impairment, etc...)	Microbial contamination consequences more risky for such patient	1.5	
Drugs enhancing microbial growth	Emulsion (eg: Propofol, TNP)	2	
Economics	Drug prepared in advance	Confusion risk when selection occurs, wastage...	1.5
	Unsuitable packaging	5ml use and packaging presentation of 10ml Risk of dosage error and wastage	1.5
Ergonomics	Emergency drugs	Stress and psychologig pressure (p.ex. during patient resuscitation)	3
	Usual dilutions	Drugs always use in the same dosage/total volume	1

Fig 1. Score results

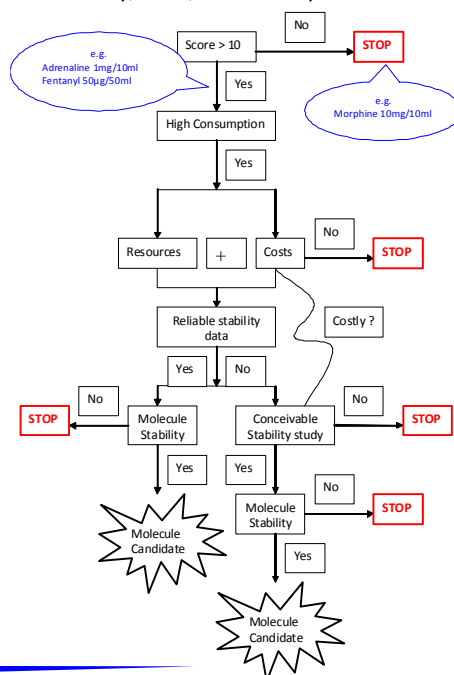


Fig 2. Decision algorithm

CONCLUSIONS

The development of a decision tool, considering the various key elements implied in RTUS development will be helpful to select the most suitable drugs to be produced in priority, in a context of limited resources.