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INFOSTAB

Introduction

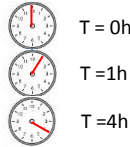
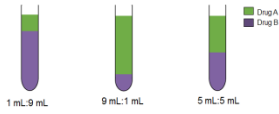
Patients hospitalised in ICUs often require the use of multiple drugs and the intravenous (IV) route is the most commonly way of administration. IV accesses are usually limited, leading to concomitant administration of different drugs in the same infusion line. According to the work of *D'Huart et al**, the most commonly used drugs for which there was no compatibility data have been selected .

Objectives

To evaluate physical compatibility of acetylsalicylic acid and atenolol with others drugs commonly used in ICUs by visual, subvisual tests and pH measurements.

Materials & Method

For each pair tested :



Visual evaluation

- Precipitation
- Colour change
- Gas formation

Subvisual evaluation

- Absorbances are evaluated using UV spectrophotometry at 350, 410 and 550 nm (Safas Monaco UV m²)

pH measurement (Bioblock Scientific pH meter)

Results

17 pairs of drugs tested

- 13 compatible pairs and 4 incompatible pairs.
- For the mixtures with atenolol, 8 pairs were compatible and 2 pairs were incompatible.
- For the mixtures with acetylsalicylic acid, 5 pairs were compatible and 2 pairs were incompatible.

DRUGS	CONC.	SOLVENT	RESULTS	DRUGS	CONC.	SOLVENT	RESULTS
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%	C	Atenolol	0.1 mg/mL	NaCl 0.9%	C
Hydrocortisone sodium succinate	2 mg/mL	NaCl 0.9%		Ciclosporine	10 mg/mL	D5W	C
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%	C	Atenolol	0.1 mg/mL	NaCl 0.9%	C
Insulin	1 UI/mL	NaCl 0.9%		Methylprednisolone sodium succinate	0.2 mg/mL	NaCl 0.9%	C
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%	C	Atenolol	0.05 mg/mL	NaCl 0.9%	C
Isofundine ^{**}	-	-		Metronidazole	5 mg/ml	-	-
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%	C	Atenolol	0.1 mg/mL	NaCl 0.9%	V ³
Magnesium sulfate	6 mg/mL	D5W		Mycophenolate mofetil	10 mg/mL	D5W	Appearance of haze at ratio 5/5
Acetylsalicylic acid	10 mg/LI	NaCl 0.9%	C	Atenolol	0.1 mg/mL	NaCl 0.9%	V ⁴
Nefopam hydrochloride	80 µg/mL	NaCl 0.9%		Nutryelt [®] **	-	NaCl 0.9%	-
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%	V ²	Atenolol	0.1 mg/mL	NaCl 0.9%	C
Nutryelt [®] **	-	NaCl 0.9%	Coloring in pink	Thiamine hydrochloride	1 mg/mL	NaCl 0.9%	
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%	C	Atenolol	0.1 mg/mL	NaCl 0.9%	C
Phytomenadione	0.2 mg/mL	NaCl 0.9%		C	Uradipil	5 mg/mL	-
Acetylsalicylic acid	5 mg/mL	NaCl 0.9%	P ¹				
Potassium canreonate	10 mg/mL	NaCl 0.9%	Precipitate formation at ratios 9/1 and 5/5				
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%		C			
Potassium chloride	100 mg/ml	-	C				
Acetylsalicylic acid	10 mg/mL	NaCl 0.9%		C			
Thiamine hydrochloride	1 mg/mL	NaCl 0.9%	C				

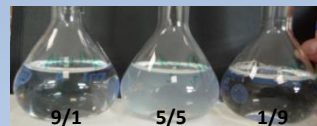
**Isofundine[®] composition

- Sodium chloride
- Potassium chloride
- Magnesium chloride
- Calcium chloride

Nutryelt[®] composition

- Manganese
- Copper
- Iron
- Zinc
- Fluorine
- Iodine
- Selenium
- Chromium
- Molybdenum

pH measurement : no change of more than 0.5 pH unit for all mixtures



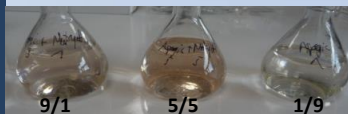
³Atenolol + mycophenolate – T+1h

⁴ Slightly yellow colour at ratios 5/5 and 1/9 due to the color of Nutryelt[®], which disappears with time. In the absence of chemical data and by applying the precautionary principle, this mixture is considered incompatible. Photos cannot show the colour change.

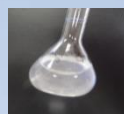
UV spectrophotometry :

For the mixture atenolol and mycophenolate mofetil, at T+1h, for the ratio 5/5, at 350 nm, the absorbance value was multiplied by 2, at 410 nm by 6 and at 550 nm by 11. These values were constant at T+4h.

The absorbance values of other mixtures didn't changed over time.



²Acetylsalicylic acid + Nutryelt[®] – T+1h



¹Acetylsalicylic acid + Potassium canreonate 5/5 – T+1h

Conclusion

After laboratory tests, new incompatibilities were found which gives additional data to the literature. This study demonstrated that all mixtures were compatible except acetylsalicylic acid with potassium canreonate or Nutryelt[®], and atenolol with mycophenolate mofetil or Nutryelt[®]. However, many other mixtures should be still investigated due to missing data.

*D'Huart et al. Physical compatibility of intravenous drugs commonly used in intensive care units : an observational study and physical compatibility laboratory tests on anti-infective drugs. Pharm Technol Hosp Pharm 2019; 4,1: 29-40.

Conc.: concentration ; C : compatible ; P : precipitation ; V : visual change
 NaCl 0,9% : sodium chloride 0,9% ; D5W : Dextrose 5% in water