



EVALUATION OF ADMIXTURE COMPATIBILITY OF INTRAVENOUS INFUSIONS IN PEDIATRIC DEPARTMENT

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ABSTRACT

Incompatibilities became an issue of concern, especially in pediatric units, because of the large fraction of parenteral drug applications as intravenous infusions, the need for constant drug concentrations and the limited number of independent IV lines in pediatric patients. The objective of the study is to identify the most frequent and clinically significant incompatibilities of intravenous admixtures in the pediatric department and to prepare a two dimensional compatibility chart for the most commonly used intravenous infusions in the pediatric department. It is a Prospective observational study conducted in Pediatric department of a 750 bedded multispecialty tertiary care teaching hospital which include the pediatric ward and pediatric ICU for a duration of 8 months. The medication charts of 50 consecutive patients admitted to the pediatric department and treated with continuous intravenous infusions were analyzed. The pH of the formulation, diluents and other physiochemical properties of both drug and infusion fluids were also recorded. Drug concentrations and duration of drug stability after dilution were recorded and carefully evaluated. Compatibility of the selected drugs with the diluent or a second drug when given together was then analyzed. The study reviewed the most frequent and clinically significant incompatibilities of intravenous admixtures in the pediatric department and a two-dimensional compatibility chart was prepared.

KEYWORDS: Admixture, compatibility, intravenous, infusions, pediatric.

INTRODUCTION

Intravenous admixtures are the preparations consisting of one or more sterile drug products added to 50 ml or greater bag or bottle of IV fluid, generally Sodium Chloride Solution (0.9% NaCl) or Dextrose alone or in combination. Drugs intended for continuous infusion and drugs that may cause irritation or toxicity when given as rapid direct IV injection are prepared as IV admixtures. These parental drug solutions are commonly mixed in the same infusion bag, or at the Y-site junction where two or more IV lines meet. Intravenous admixture incompatibilities occur between two drugs, drug and diluents or between drugs and materials of IV containers.^[1] The number of IV medications continues to expand and the need to administer different IV drugs as admixtures are increasing day by day.^[1]

The potential complications of co-administration of incompatible medications include precipitation, central venous catheter occlusion requiring additional venous access, reduced potency of medication, therapeutic failure and local and systemic inflammatory reactions.^[2] The prevalence and outcomes of these types of complications are not well documented. Various factors

such as solvents, diluents, infusion fluids, pH of each drug, duration of stability and concentration of the IV drugs play a major role in determining the compatibility of intravenous drug infusions.^[3] Few studies have reported co-infusion of incompatible medications leading to negative outcomes in humans such as pulmonary embolism due to drug precipitates.^[4] In September 2007, the FDA issued an alert related to the co-administration of calcium-containing products and ceftriaxone due to potential end-organ damage associated with calcium-ceftriaxone precipitates leading to lung and kidney damage. More than 90% of the drugs are organic, weak electrolytes, especially those compounded, manufactured or reconstituted as injections in predominantly ionized or salt forms. Acid-base reactions are most common mechanism of drug incompatibility and they cause precipitation of non-ionized drug forms. Precipitation is likely when oppositely charged, organic drug ions that contain aromatic rings are combined in relatively strong concentrations. When comparing with salts in which both ions are monovalent or in which one ion is monovalent and its opposite ion is polyvalent, salts of polyvalent anions and cations are generally less soluble.^[1]

MATERIALS AND METHODS

Prospective observational study was conducted in a Pediatric department of a 750 bedded multispecialty tertiary care teaching hospital which include ward and ICU. All patients admitted to the Pediatric department, and receiving intravenous drug admixtures were included and those receiving intravenously administered drugs but no admixtures were excluded. The medication charts of 50 consecutive patients admitted to the pediatric ward and ICU and treated with continuous intravenous infusions were analyzed. The pH of the formulations, diluents and other physicochemical properties of both drug and infusion fluids were also recorded. Drug concentrations and duration of drug stability after dilution were recorded and carefully evaluated. Intravenous infusions were chosen because they have longer infusion time and therefore pose the majority of compatibility problems when a drug is added. Compatibility of the selected drugs with the diluent or a second drug when given together was then analyzed. On observing any incompatibility, the possible mechanism

such as acid-base reactions due to pH variations of the co-infused drug solutions/ drug and diluents or drug precipitation due to the presence of polyvalent cations etc. were examined. Two dimensional compatibility charts were then prepared, indicating the compatibility of selected drugs or drug and diluent. *Trissel's Handbook of Injectable Drugs*, *Micromedex Healthcare Series*, *MEDLINE* databases and manufacturer's product information were used as the primary source of information. Other sources like *AHFS* drug information, *King Guide to Parenteral Admixtures* or the *Stabilis* Website were also referred.

RESULTS AND DISCUSSION

Data were obtained from 50 consecutive admissions in Pediatric ICU and ward, of which, 33 were male patients. The mean age of study population was 5.30 ± 3.82 (0 – 12 years), their mean duration of hospitalization was 4.50 ± 2.14 (1 – 10) days. Demographic details of the study population are presented in Table 1.

Table 1: Demographic Details (N=50).

Characteristics of Patients	Number of Patients
Total number of patients	50
Age (years)	5.30 ± 3.82
0-4	22
5-8	16
9-12	12
Gender	
Male	33
Female	17
Duration of Hospitalization (days)	4.50 ± 2.14

Major diagnoses include viral fever (28%), dengue fever (10%), head injury (10%), acute gastroenteritis (8%), seizure (6%), enteric fever (4%) and others.

The common therapeutic category of drugs prescribed were antibiotics (29.16%), NSAIDs (17.70%), gastric acid secretion inhibitors (11.11%) and anticonvulsants

(10.06%). Table 2 summarizes various therapeutic categories of drug prescribed.

Table 2: Therapeutic Category of Drugs Prescribed.

Sr. No.	Therapeutic Category	Percentage (%)
1.	Antacids	1.38
2.	Antibiotics	29.16
3.	Anticoagulants	0.34
4.	Anticonvulsants	10.06
5.	Anti Diarrhoeal	0.69
6.	Antifungal	0.34
7.	Anti Histamines	0.69
8.	Anti Hypertensives	1.04
9.	Anti Malarial	0.34
10.	Antispasmodic	1.04
11.	Anti Viral	1.04
12.	Bronchodilator	0.34
13.	Digestive Enzyme	0.34
14.	Diuretics	1.38
15.	Endocrine Metabolic Agent	0.34
16.	Expectorants	2.08
17.	Gastric Acid Secretion Inhibitors	11.11

18.	Glucocorticoids	4.16
19.	Hepatic Protectant	0.34
20.	Mucolytics	0.69
21.	NSAIDs	17.70
22.	Nutritional Supplements	7.29
23.	Probiotics	1.04
24.	Serotonin Inhibitors	6.94

Two hundred and eighty eight drugs were prescribed to the study subjects of which, 166 (57.6%) were administered intravenously. Seventy three (45.78%) were administered as continuous intravenous infusions, while 65 (39.1%) were administered as IV admixtures. Most frequently administered IV admixtures were pantoprazole (23.07%), piperacillin + tazobactam (18.46%), fosphenytoin (10.76%), amikacin (9.23%), ceftriaxone (7.69%) and methyl prednisolone (6.10%).

Table 3 (a-c) shows the details of admixture compatibility in terms of drug – diluent compatibility and drug – drug compatibility.

Data suggest that there are no incompatibilities between drugs and diluents used in the pediatric department. However, evaluation of drug-drug incompatibilities revealed 3 (5.6%) incompatibilities between two subsequent infusions and 26 (16.04%) incompatibilities between subsequent infusion and bolus when given through the same set. The current study shows that all the drug – diluent combinations were compatible. Compatibility of 53 pairs of IV infusions when administered one after the other within the same infusion line were evaluated. Linezolid + pantoprazole (1.85%) was found to be an incompatible combination. This incompatibility results is supported by Cayo Lisa (2013).^[5,6]

The combination of ganciclovir and imipenem + cilastatin prescribed was found to be incompatible. An

increase in measured haze or turbidity was reported by Trissel.^[7] Metronidazole + paracetamol was another incompatible combination observed.^[8] This problem can be overcome by flushing the infusion set by using D5W or NS.^[9,10] Compatibility between 2 drugs when given as intravenous infusion and bolus using the same IV set one after the other was evaluated for 162 drug pairs. It was observed that 10 combinations were incompatible. Previous studies recommend rinsing of IV line with the compatible IV solution prior to administration of second drug. Pantoprazole + ondansetron constitutes 7.40% usage among the IV drug pairs. This incompatible drug combination was also reported by Trissel.^[11] Pantoprazole was also found to be incompatible with amikacin (2.46%),^[12] metronidazole (1.23%),^[6] ketorolac (1.85%)^[11] and meropenem (1.85%).^[12] The infusion set of pantoprazole should be flushed before and after administration, with either 5% dextrose injection, 0.9% sodium chloride injection or Lactated Ringer's injection to avoid incompatibility.^[6] Paracetamol was physically incompatible with acyclovir (1.23%)^[13] and metronidazole (0.61%).^[8] This incompatibility results is supported by Tramonte (1991) with the help of Y-site administration of glass sample vials.^[14] Other incompatible combinations observed in the study were ciprofloxacin + heparin (0.61%),^[15] and cefoperazone – salbactam + amikacin (0.61%).^[16] The above mentioned incompatibility can be avoided by administering ciprofloxacin separately.^[15]

Table 3: Details of Admixture Compatibility of Intravenous Infusions in Pediatric Department (N=89)
a. Drug – Diluent compatibility.

Sr. No.	Drugs	Diluents/ solvent	Compatibility*	Number	Percentage (%)
1.	Pantoprazole	Normal saline	C	15	16.85
2.	Piperacillin + tazobactam	Water for injection	C	12	13.48
3.	Piperacillin + tazobactam	Normal saline	C	12	13.48
4.	Fosphenytoin	Normal saline	C	7	7.86
5.	Amikacin	Normal saline	C	6	6.74
6.	Ceftriaxone	Water for injection	C	5	5.61
7.	Ceftriaxone	Normal saline	C	5	5.61
8.	Methyl prednisolone	Water for injection	C	4	4.49
9.	Methyl prednisolone	Normal saline	C	4	4.49
10.	Phenobarbitone	Normal saline	C	2	2.24
11.	Valparin sodium	Normal saline	C	2	2.24
12.	Vancomycin	Water for injection	C	2	2.24
13.	Vancomycin	Normal saline	C	2	2.24
14.	Acyclovir	Normal saline	C	1	1.12
15.	Benzyl penicillin	Water for injection	C	1	1.12
16.	Benzyl penicillin	Normal saline	C	1	1.12

Sr. No.	Drugs	Diluents/ solvent	Compatibility*	Number	Percentage (%)
17.	Cefoperazone + salbactam	Water for injection	C	1	1.12
18.	Cefoperazone + salbactam	Normal saline	C	1	1.12
19.	Clindamycin	Normal saline	C	1	1.12
20.	Ganciclovir	Normal saline	C	1	1.12
21.	Imipenem + cilastatin	Normal saline	C	1	1.12
22.	Levetiracetam	Normal saline	C	1	1.12
23.	Meropenem	Normal saline	C	1	1.12
24.	Pethidine	Normal saline	C	1	1.12

*C: compatible

a. Drug – Drug compatibility of IV infusions when administered one after the other using the same infusion line (N=53).

Sr. No.	Infusion 1	Infusion 2	Compatibility*	Number	Percentage (%)
1.	Amikacin	Piperacillin+ Tazobactam	C	5	9.43
2.	Pantoprazole	Paracetamol	NT	3	5.66
3.	Pantoprazole	Piperacillin+ Tazobactam	Caution	3	5.66
4.	Piperacillin+Tazobactam	Paracetamol	C	3	5.66
5.	Acyclovir	Fosphenytoin	C	2	3.77
6.	Acyclovir	Fentanyl	C	1	1.88
7.	Acyclovir	Morphine	NT	1	1.88
8.	Acyclovir	Phenobarbitone	C	1	1.88
9.	Acyclovir	Valparin sodium	NT	1	1.88
10.	Acyclovir	Vancomycin	C	1	1.88
11.	Amikacin	Clarithromycin	NT	1	1.88
12.	Amikacin	Fosphenytoin	C	1	1.88
13.	Ceftriaxone	Paracetamol	C	1	1.88
14.	Fentanyl	Fosphenytoin	C	1	1.88
15.	Fentanyl	Morphine	NT	1	1.88
16.	Fentanyl	Phenobarbitone	C	1	1.88
17.	Fentanyl	Valparin sodium	NT	1	1.88
18.	Fentanyl	Vancomycin	C	1	1.88
19.	Fosphenytoin	Morphine	NT	1	1.88
20.	Fosphenytoin	Paracetamol	NT	1	1.88
21.	Fosphenytoin	Phenobarbitone	C	1	1.88
22.	Fosphenytoin	Piperacillin+ Tazobactam	C	1	1.88
23.	Fosphenytoin	Valparin sodium	NT	1	1.88
24.	Fosphenytoin	Vancomycin	C	1	1.88
25.	Ganciclovir	Ciprofloxacin	NT	1	1.88
26.	Ganciclovir	Imipenem+ cilastatin	IC	1	1.88
27.	Imipenem+cilastatin	Ciprofloxacin	NT	1	1.88
28.	Levetiracetam	Mannitol	NT	1	1.88
29.	Levetiracetam	Methylprednisolone	NT	1	1.88
30.	Mannitol	Methylprednisolone	NT	1	1.88
31.	Methylprednisolone	Pethidine	NT	1	1.88
32.	Methylprednisolone	Piperacillin+ Tazobactam	NT	1	1.88
33.	Metronidazole	Paracetamol	IC	1	1.88
34.	Morphine	Phenobarbitone	NT	1	1.88
35.	Morphine	Valparin sodium	NT	1	1.88
36.	Morphine	Vancomycin	C	1	1.88
37.	Pantoprazole	Linezolid	IC	1	1.88
38.	Phenobarbitone	Valparin sodium	NT	1	1.88
39.	Phenobarbitone	Vancomycin	C	1	1.88
40.	Piperacillin+ Tazobactam	Clindamycin	C	1	1.88
41.	Piperacillin+ Tazobactam	Pethidine	C	1	1.88
42.	Piperacillin+ Tazobactam	Vancomycin	Caution	1	1.88

*C: compatible; IC: incompatible; NT: not tested

c. Drug-drug compatibility of intravenous infusions and bolus when administered one after the other using the same set (N=162).

Sr. No.	Infusion	Bolus	Compatibility*	Number	Percentage (%)
1.	Pantoprazole	Ondansetron	IC	12	7.40
2.	Pantoprazole	Ceftriaxone	C	8	4.93
3.	Piperacillin+tazobactam	Ceftriaxone	NT	7	4.32
4.	Piperacillin+tazobactam	Ondansetron	C	7	4.32
5.	Piperacillin+tazobactam	Amikacin	C	6	3.70
6.	Piperacillin+tazobactam	Pantoprazole	Caution	6	3.70
7.	Amikacin	Pantoprazole	IC	4	2.46
8.	Fentanyl	Ceftriaxone	C	4	2.46
9.	Ceftriaxone	Amikacin	C	3	1.85
10.	Methylprednisolone	Ondansetron	NT	3	1.85
11.	Fosphenytoin	Ondansetron	C	3	1.85
12.	Fosphenytoin	Pantoprazole	C	3	1.85
13.	Paracetamol	Ceftriaxone	C	2	1.23
14.	Amikacin	Ondansetron	C	2	1.23
15.	Amikacin	Paracetamol	NT	2	1.23
16.	Ceftriaxone	Ondansetron	Caution	2	1.23
17.	Fentanyl	Cefotaxime	C	2	1.23
18.	Fentanyl	Dexamethasone	C	2	1.23
19.	Paracetamol	Acyclovir	IC	2	1.23
20.	Pantoprazole	Metronidazole	IC	2	1.23
21.	Piperacillin+tazobactam	Dexamethasone	C	2	1.23
22.	Methylprednisolone	Ceftriaxone	NT	2	1.23
23.	Methylprednisolone	Pantoprazole	NT	2	1.23
24.	Methylprednisolone	Tramadol	NT	2	1.23
25.	Metronidazole	Ketorolac	C	2	1.23
26.	Acyclovir	Furosemide	C	1	0.61
27.	Acyclovir	Gentamycin	Caution	1	0.61
28.	Acyclovir	Ondansetron	IC	1	0.61
29.	Amikacin	Amoxicillin+clavulanate	NT	1	0.61
30.	Amikacin	Dexamethasone	C	1	0.61
31.	Amikacin	Metronidazole	C	1	0.61
32.	Cefepime+tazobactam	Amikacin	C	1	0.61
33.	Cefepime+tazobactam	Clarithromycin	C	1	0.61
34.	Cefoperazone+salbactam	Amikacin	IC	1	0.61
35.	Ceftriaxone	Acyclovir	C	1	0.61
36.	Ceftriaxone	Cefaperazone+sulbactam	C	1	0.61
37.	Ceftriaxone	Gentamycin	C	1	0.61
38.	Ceftriaxone	Midazolam	C	1	0.61
39.	Ceftriaxone	Ranitidine	C	1	0.61
40.	Ciprofloxacin	Heparin	IC	1	0.61
41.	Clindamycin	Pantoprazole	Caution	1	0.61
42.	Dexamethasone	Acyclovir	C	1	0.61
43.	Fentanyl	Furosemide	C	1	0.61
44.	Fentanyl	Gentamycin	C	1	0.61
45.	Fosphenytoin	Levocarnitine	NT	1	0.61
46.	Fosphenytoin	Ranitidine	C	1	0.61
47.	Ganciclovir	Heparin	C	1	0.61
48.	Imipenem+cilastatin	Heparin	C	1	0.61
49.	Levetiracetam	Ceftriaxone	NT	1	0.61
50.	Levetiracetam	Ondansetron	NT	1	0.61
51.	Levetiracetam	Pantoprazole	NT	1	0.61
52.	Linezolid	Amikacin	C	1	0.61
53.	Linezolid	Ceftriaxone	C	1	0.61
54.	Linezolid	Dexamethasone	C	1	0.61
55.	Linezolid	Piperacillin+tazobactam	C	1	0.61

Sr. No.	Infusion	Bolus	Compatibility*	Number	Percentage (%)
56.	Mannitol	Ceftriaxone	C	1	0.61
57.	Mannitol	Ondansetron	C	1	0.61
58.	Mannitol	Pantoprazole	Caution	1	0.61
59.	Meropenem	Pantoprazole	IC	1	0.61
60.	Methylprednisolone	Amikacin	NT	1	0.61
61.	Methylprednisolone	Dexamethasone	NT	1	0.61
62.	Metronidazole	Ceftriaxone	C	1	0.61
63.	Metronidazole	Ondansetron	C	1	0.61
64.	Morphine	Furosemide	NT	1	0.61
65.	Morphine	Gentamycin	NT	1	0.61
66.	Pantoprazole	Acyclovir	Caution	1	0.61
67.	Pantoprazole	Amikacin	Caution	1	0.61
68.	Pantoprazole	Amoxicillin+clavulanic acid	C	1	0.61
69.	Pantoprazole	Dexamethasone	C	1	0.61
70.	Pantoprazole	Hydrocortisone	NT	1	0.61
71.	Pantoprazole	Ketorolac	IC	1	0.61
72.	Pantoprazole	Midazolam	Caution	1	0.61
73.	Pantoprazole	Ofloxacin	C	1	0.61
74.	Pantoprazole	Tramadol	C	1	0.61
75.	Paracetamol	Dexamethasone	C	1	0.61
76.	Paracetamol	Levocarnitine	NT	1	0.61
77.	Paracetamol	Metronidazole	IC	1	0.61
78.	Paracetamol	Ofloxacin	NT	1	0.61
79.	Paracetamol	Ondansetron	C	1	0.61
80.	Paracetamol	Pantoprazole	NT	1	0.61
81.	Pethidine	Dexamethasone	Caution	1	0.61
82.	Pethidine	Ondansetron	C	1	0.61
83.	Pethidine	Tramadol	NT	1	0.61
84.	Phenobarbitone	Furosemide	C	1	0.61
85.	Phenobarbitone	Gentamycin	C	1	0.61
86.	Piperacillin+tazobactam	Metronidazole	C	1	0.61
87.	Piperacillin+tazobactam	Ofloxacin	NT	1	0.61
88.	Piperacillin+tazobactam	Tramadol	NT	1	0.61
89.	Valparin sodium	Ceftriaxone	NT	1	0.61
90.	Valparin sodium	Furosemide	NT	1	0.61
91.	Valparin sodium	Gentamycin	NT	1	0.61
92.	Valparin sodium	Midazolam	NT	1	0.61
93.	Valparin sodium	Pantoprazole	NT	1	0.61
94.	Vancomycin	Furosemide	NT	1	0.61
95.	Vancomycin	Gentamycin	C	1	0.61

*C: Compatible, IC: Incompatible, NT: Not Tested

Sr. No.	Intravenous Medications	Dextrose 10% in water	Dextrose 5% in water	Dextrose 5% in Ringer's injection	Dextrose 5% in 0.9% sodium chloride	Dextrose 5% Ringer's injection, Lactated	Lactated Ringer's injection	0.9% sodium chloride	0.5% sodium chloride	0.45% sodium chloride	Sterile Water for Injection
1	Acyclovir	NT	C		C	NT	C	C	C	NT	C
2	Amikacin	C	C	C	C	C	C	C	C	C	
3	Cefoperazone+salbactam	C	C	C	C	C		C			C
4	Ceftriaxone	C	C		C	NT	IC	C	NT		C
5	Clindamycin	C	C	C	C	NT	C	C	NT		C
6	Fentanyl	NT	C	C	NT	NT	NT	C	NT		C
7	Fosphenytoin	C	C		NT	C	C	C	NT		
8	Ganciclovir	NT	C		NT	NT	C	C	NT	C	C
9	Imipenem+cilastatin	IC	Caution	C	IC	IC	IC	Caution	NT	C	IC
10	Levetiracetam	NT	C		NT	NT	C	C	NT		
11	Meropenem	IC	IC	C	IC	IC	IC	Caution	IC	C	IC
12	Methylprednisolone	NT	NT	C	NT	NT	NT	NT	NT		C
13	Pantoprazole	NT	C		NT	NT	C	C	NT		
14	Phenobarbitone	C	C	C	C	C	C	C	C	C	C
15	Piperacillin+Tazobactam	NT	C		NT	NT	Caution	C	NT		C
16	Valparin sodium		C				C	C			
17	Vancomycin	C	C		C	C	C	C	NT	C	C

The two dimensional compatibility chart prepared is given in figure 1-2 which indicates the compatibility of selected intravenous drugs most frequently used in the Pediatric department.

Figure 1: Drug – Diluent Compatibility Chart *C: compatible; IC:incompatible; NT:not tested.

	Acyclovir	Amikacin	Amoxicillin + Clavulanic acid	Ceftriaxone	Dexamethasone	Fosphenytoin	Gentamycin	Imipenem + Cilastatin	Ketorolac	Linezolid	Methyl prednisolone	Metronidazole	Ondansetron	Pantoprazole	Paracetamol	Phenobarbitone	Piperacillin + tazobactam	Ranitidine	Valparin sodium	Tramadol	Vancomycin
Acyclovir	-	C	NT	C	C	C	V	C	IC	C	NT	C	IC	V	IC	C	IC	C	NT	NT	C
Amikacin	C	-	NT	C	C	C	C	C	C	C	NT	C	C	V	NT	C	C	C	NT	NT	C
Amoxicillin+clavulanic acid	NT	NT	-	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	C	NT	NT	NT	NT	NT	C	C
Ceftriaxone	C	C	NT	-	C	C	C	IC	C	C	NT	C	V	C	C	C	NT	C	NT	NT	V
Dexamethasone	C	C	NT	C	-	C	V	C	C	C	NT	C	C	IC	C	C	C	C	NT	NT	C
Fosphenytoin	C	C	NT	C	C	-	C	C	C	C	NT	C	C	C	NT	C	C	C	NT	NT	C
Gentamycin	V	C	NT	C	V	C	-	C	C	C	NT	C	C	V	C	C	V	C	NT	NT	C
Imipenem +cilastatin	C	C	NT	IC	C	C	C	-	C	C	NT	C	C	C	NT	V	NT	NT	NT	NT	V
ketorolac	IC	C	NT	C	C	C	C	C	-	C	NT	C	C	IC	C	C	C	C	NT	NT	IC
Linezolid	C	C	NT	C	C	C	C	C	C	-	NT	C	C	IC	NT	C	C	C	NT	NT	C
Methyl prednisolone	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	-	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Metronidazole	C	C	NT	C	C	C	C	C	C	C	NT	-	C	IC	IC	C	C	C	NT	NT	C
Ondansetron	IC	C	NT	V	C	C	C	C	C	C	NT	C	-	IC	C	IC	C	C	NT	NT	C
Pantoprazole	V	V	C	C	IC	C	V	C	IC	IC	NT	IC	IC	-	NT	V	V	IC	NT	C	V
Paracetamol	IC	NT	NT	C	C	NT	C	NT	C	NT	NT	IC	C	NT	-	NT	C	C	NT	NT	C
Phenobarbitone	C	C	NT	C	C	C	C	V	C	C	NT	C	IC	V	NT	-	C	C	NT	NT	C
Piperacillin+tazobactam	IC	C	NT	NT	C	C	V	NT	C	C	NT	C	C	V	C	C	-	C	NT	NT	V
Ranitidine	C	C	NT	C	C	C	C	C	C	C	NT	C	C	IC	C	C	C	-	NT	NT	C
Valparin sodium	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	-	NT	IC
Tramadol	NT	NT	C	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	C	NT	NT	NT	NT	-	NT
Vancomycin	C	C	C	V	C	C	C	V	IC	C	NT	C	C	V	C	C	V	C	IC	NT	-

Figure 2: Drug-Drug Compatibility Chart. *C: compatible; IC: incompatible; NT: not tested; V: variable (caution).

CONCLUSION

Intravenous admixtures of drugs intended for continuous infusion in the study site are compatible. However, incompatible combinations were observed when 2 drugs are administered one after the other within the same infusion line. Two dimensional compatibility chart for the most commonly used intravenous infusions in the pediatric department was also prepared. Routine monitoring of compatibility of parenteral drugs administered in the Pediatric department is essential in order to identify and resolve incompatibilities between intravenously administered drugs or drugs and diluents as it would be helpful in avoiding parenteral drug related complications and improve treatment outcomes.

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