Indications of IV Fluids in Medical City

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ABSTRACT:

BACKGROUND:

Intravenous (IV) fluids are the most commonly used drugs in the inpatient wards and the emergency units. They are not usually dealt with as a medication, and are frequently prescribed even by junior doctors and even the nursing staff. Serious side effects and complication may arise from this practice.

OBJECTIVES:

To evaluate the indications of IV fluid prescription in the Medical City.

METHODS:

A cross-sectional study of the use of IV fluids in surgical wards and emergency units in the Medical city in Baghdad during a period of ten weeks. Two hundreds and ninety three patients were collected. Studying the indication for prescription, monitoring of the patients, combinations and role of pharmacists.

RESULTS:

Most common IV fluid used was glucose water (28.3%). The most common indication in the emergency unit was vomiting and diarrhea (19.1%). While in the inpatient wards, routine postoperative hydration was the commonest indication for IV fluid (13.6%). Unnecessary or wrong uses were recorded in number of cases (36.8). Deficient monitoring of patients on IV fluids was noticed in most cases (95%). No apparent role for the clinical pharmacist in this respect was reported.

CONCLUSION:

There was a quiet high ratio of unnecessary or wrong use of IV fluids and also a high ratio of low or deficient monitoring of patients that necessitate more attention by the specialists and more supervision to the practice of IV fluid prescription.

KEY WORDS: intravenous fluid, monitoring, emergency unit.

INTRODUCTION:

Intravenous (IV) fluid administration is an integral component of the clinical care practice. It is commonly used in most inpatient wards and in all emergency units. Although errors in administration can cause detrimental patient outcomes and increase health care costs, little is known about medication administration errors associated with continuous iv infusions [1,2]. As any medication, IV fluid administration should be closely monitored, surgical house staff do not appear to use the available fluid balance information when prescribing and monitoring [3]. Blood pressure remains the most used variable for the initial assessment of hemorrhagic shock and the treatment response to volume loading [4]. The use of IV fluid should not be based on routine practice, and individualized treatment policy based on comprehensive assessment of each patient's need is strongly required [5]. Many reports indicated that routine pre-hospital IV fluid resuscitation is not beneficial, and some evidence that it may be harmful [6]. The dose of iv fluid should be tailored according to the need of patient and the indication of the disease, restricted perioperative iv fluid regimen aiming at unchanged body weight may reduce complications after elective colorectal resection [7], while, iv superhydration may reduce postoperative nausea and vomiting and discomfort [8]. Complication and side effects should be expected and looked for especially in children and elderly patients. These complications involve mainly volume overload, acid-base and electrolyte disturbances [9]. Many elderly patients hospitalized for acute medical illnesses may experience an increase in serum sodium, this occurs because total fluids administrated to these patients are generally insufficient [10]. In contrary, infusion of IV fluid can produce an acidosis particularly in the setting of large volume infusion [9].This study was designed to evaluate the trend of IV uses, indications, monitoring, and prescription guidelines in the Medical City.

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PATIENTS AND METHODS:

A cross-sectional study carried in the Medical City Hospital in Baghdad, during the period from the 29th of December 2008 to the 25th of March 2009. Two hundreds and ninety three adult patients were evaluated; their ages ranged between 13-80 years, 111 were males and 182 were females. The patients were admitted to the emergency unit and the surgical wards (both the general surgery and gynecology wards). For each patient short clinical notes were recorded, these include: diagnosis, type and quantity of iv fluid prescribed, the prescriber who ordered the fluid, other associated diseases, other drugs used, parameters for iv fluid dose calculation. The indication for IV fluid prescription was discussed with the senior or resident house officer for each case studied. Results were collected and tabulated.

RESULTS:

As shown in table 1, the most common indication for iv fluid prescription was diarrhea and vomiting 56 cases out of 293 (19.1%) mainly from the emergency unit, the second cause for IV fluid prescription was as a vehicle for drug administration 40 patients (13.6%). In the inpatient ward, the most common indication for IV fluid prescription was postoperative care 40 patients (13.6%). Preoperative preparation ranked second in the surgical ward as an indication for IV fluid prescription 30 (10.2%) patients. Other indications are listed in table 1. Most common types of IV fluid used were glucose water followed by Ringer's solution 83 and 52 cases, respectively. Whereas the types of IV fluid used postoperatively were mainly glucose water followed by glucose saline 22 and 11 cases, respectively. For drug administration, the IV fluid most commonly used was glucose water followed by normal saline 17 and 5 cases, respectively. Almost all (95%) of patients were monitored for iv fluid administration by measuring blood pressure and pulse rate only, no other clinical beside (e.g. fluid chart, urine collection) or laboratory investigations (e.g. Packed cell volume (PCV), blood urea, and urine specific gravity) were used for neither dose calculation nor fluid monitoring. The IV fluids were prescribed by junior house officer in 90% of patients in the emergency unit while it was prescribed by specialist or senior house officer in the surgical wards in 80% of patients. Through this study, it was evident that there was no role for the clinical pharmacist in modifying the dose, rate or type of IV fluid prescribed to the patient studied, especially when the patient was receiving other drugs that might interact with the fluid.

Table 1: Indications for IV fluid administration and number of patients.

Indication	Number of patients	Percentage of patients
Undiagnosed hypotension	26	8.8
Drug administration	40	13.6
Enhance urination	10	3.4
Preoperative	30	10.2
Postoperative	40	13.6
Vomiting and diarrhea	56	19.1
CVA	24	8.1
Nutrition	29	9.8
Aspiration (ascetis)	5	1.7
Fit	3	1.0
Hematemesis	6	2.0
Anemia	7	2.3
Patient satisfaction	10	3.4
Obstructive jaundice	3	1.0
Pelvic tumor	4	1.3

Table 2: Types of IV fluid in relation to indication

Indication	GW (glucose water)	NS (normal saline)	Ringer's solution	GS (glucose-saline)	Combination (more than one type of fluid)
Undiagnosed hypotension		13	8		5
Drug administration	17	5	4	4	
Enhance urination	6			4	
Preoperative	10			9	11
Postoperative	22			11	7

Diarrhea and vomiting	5	9	22	4	16
CVA	12	6			6
Nutrition	7	8	3	3	8
Ascetis		2			3
Fit			3		
Hematemesis			5		1
Anemia	1			6	
Patient satisfaction	1		7	2	
Obstructive jaundice	1				2
Pelvic tumor	1	1			2
Total	83	44	52	43	61
Percentage of types of iv fluids	28.3	15.0	17.7	14.6	20.8

Table 3: Fluids used as drugs' vehicle.

Type of iv fluid	Drug	No. of patients	Comment [12]
Glucose water	Aminophylline	13	Compatible
Glucose water	Amikacin	3	Compatible
Glucose saline	Insulin	7	Compatible
Glucose saline	Hypertonic glucose	5	---------
Normal saline	Amiodarone	3	Incompatible
Normal saline	Phenobarbitone	3	---------
Ringer's solution	Metochloperamide	6	Compatible

DISCUSSION:

From the results above, some facts appeared regarding the practice of using IV fluid in the surgical wards and the emergency unit. Most of the indications for IV fluid therapy were symptomatic management i.e. there were many cases where diagnosis not settled (e.g. undiagnosed hypotension, fit, anemia), where in these cases IV fluid administration may worsen the condition All of these need to be carefully handled regarding administration of iv fluid. The prescription of IV fluid should be individualized and based on clear indication and accurate diagnosis [3]. In some cases, the IV fluids were prescribed just for satisfaction of the patients; this represents malpracticing and unjustified use of drugs. Other common use is routine postoperative iv fluid administration for every patient regardless his real need or presence of actual indication, this fact was noticed by Kumar N et al in 1997 who concluded that there is no clinical indication to continue iv drip infusion after full recovery from anesthesia in patients operated from minilaparotomy cholecystectomy[11]. Also, Walshs S in 2005 stated that there is marked variation in postoperative fluid prescribing which may contribute to postoperative morbidity [3].

The same applied for preoperative preparation where routine IV fluid drip as a preparation for surgery was used for every patient regardless his actual need, this may have harmful effect on the patient as concluded by Dretzke J et al in 2004: no evidence to suggest that prehospital Iv fluid resuscitation is beneficial, and some evidence that it may be harmful [6]. Other malpracticing or false ideas about IV fluid is their use as nutritional supplements. It is known that the conventional iv fluids (glucose water 5% glucose, normal saline 0.9% NaCl) cannot be used as nutritional supplement since their energy content is very low (25 kcal in 500cc glucose water, the mean daily requirement is 2000kcal). Other special preparations are available for nutrition like hypertonic glucose 10-50%, lipids and amino acids [12]. The total percentage of unnecessary or wrong indication in the current study is 36.8 which is quiet high causing both an increase in complications, and costs. Monitoring of patients receiving iv fluids is important to prevent under or over dose complications, simple bed side clinical tests and methods are usually applied to monitor the fluid therapy these include blood pressure measurement, pulse rate, weighing the patient, fluid chart and central venous pressure in addition laboratory tests which include PCV, blood urea and electrolytes, urine specific gravity are helpful in checking fluid therapy. In the current study, the only bed side clinical monitoring measures were

blood pressure and pulse rate although these are important but they are insufficient. Kramer G, et al stated that although several different physiologic variables have been suggested as an end point to guide fluid therapy, blood pressure remains the most used variable for the initial assessment of hemorrhagic shock and the treatment response to volume loading[5]. Also, monitoring of the dose and rate of administration was poor in the studied cases and this was proved by Rooker J and Gorard D in 2007 who discovered that 75% of infused iv fluid bags were given either too slowly or too rapidly and he suggested a metered pump to be used to decrease the inaccuracy of iv fluid administration. Although the IV fluids are drugs and its abuse may cause serious complications, most of the IV fluid were prescribed by junior house officers in the emergency unit while they were prescribed by the specialist in the surgical wards. This was reflected clearly in the results of this study, where too many unnecessary, unclear or wrong use of IV fluid in the emergency unit. In 13.6% of cases who were ordered IV fluid the indication was as a vehicle for giving other drugs, the choice of the type of IV fluid was according to the availability regardless the compatibility of the administered drugs. As in cases of amiodarone which was administered by using normal saline and this is an incompatible combination since amiodarone is compatible with glucose water [12].

CONCLUSION:

The iv fluids were not dealt with as a medication as appeared in this study; also, poor monitoring of patients using iv fluid, little respect of the indication of iv fluid, absence of the role for the clinical pharmacist in iv fluid selection were apparent. These conclusions call for more attention and more restriction of IV fluid use under supervision of senior doctors with respection of the scientific guidelines.

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