



THE COMPARISON OF ŞALİNE VERSUS HEPARİN FLUSH SOLUTION TO MAINTAIN PERIPHERAL INTERMITTENT İNTRAVENOUS CATHETERS*

PERİFERİK ARALIKLI İNTRAVENÖZ KATETERLERİN AÇIKLIĞININ SAĞLANMASINDA SERUM FİZYOLOJİK VE HEPARİNLI SERUM FİZYOLOJİK SIVILARININ KARŞILAŞTIRILMASI

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Key words: peripheral intermittent intravenous catheters, heparin, şaline, nursing.

Anahtar Kelimeler: periferik aralıklı intravenöz kateterler, heparin, izotonik, hemşirelik

SUMMARY

The purpose of this experimental study was to determine the efficacy of şaline versus heparin flush solution to maintain peripheral intermittent intravenous catheters. The study was performed from March 1996 to March 1998 at Ege University Faculty of Medicine. Sixty patients were selected randomly and divided into two groups. In group I patients, intravenous flushing performed before and after every medication infusion or every 6 hours if no medication were given with 2 millilitres of şaline solution. In-group II patients, this procedure was performed with 2 millilitres of heparin solution, which contains 10-intra unit (iu) heparin in one millilitres of şaline. Data were collected by a questionnaire and observation form. Complication of intravenous therapy were defined as swelling, pain, palpable venous cord, local increased temperatures and resistance to flush. Percentages, chi-square test and Mann Whitney U tests were used to determine if there were statistically significant differences between two groups. The results of the study as follows; there is no difference in patency and duration of the catheter or the incidence of phlebitis when peripheral intermittent intravenous catheters are flushed with heparin or when they are flushed with şaline. We offer that to use şaline flush instead of heparin flush to maintain peripheral intermittent intravenous catheters.

ÖZET

Deneysel tipteki bu çalışmada periferik aralıklı intravenöz kateterlerin açıklığının sağlanmasında izotonik ve heparinli izotonik sıvılarının etkilerinin incelenmesi amaçlanmıştır. Araştırma Mart 1996- Mart 1998 tarihleri arasında Ege Üniversitesi Tıp Fakültesi'nde gerçekleştirilmiştir. Olasılıksız örneklem yöntemiyle seçilen 60 hasta 2 gruba ayrılmıştır. Birinci gruptaki hastalarda her medikasyondan önce ve sonra veya medikasyonu yok ise her 6 saatte bir 2 ml izotonik ile flushlama yapılmıştır. İkinci gruptaki hastalarda bu işlem millilitresinde 10 ünite heparin içeren, 2 ml heparinli izotonik ile gerçekleştirilmiştir. Veriler anket formu ve gözlem formu aracılığı ile toplanmıştır, intravenöz tedavinin komplikasyonu ise; ödem, ağrı, palpe edilebilen venöz kord, lokal ısı artışı ve flusha karşı direnç olarak tanımlanmıştır. Her iki grup arasındaki farkın istatistiksel olarak test edilmesinde yüzde, Ki-kare ve Mann Whitney U testleri kullanılmıştır. Çalışmanın sonucunda; periferik intravenöz kateterler izotonik veya heparinli izotonik ile flushlandığında, kateterin açıklığı, kateterin kalma süresi ve flebit insidansı açısından anlamlı bir fark bulunmamıştır. Periferik aralıklı intravenöz kateterlerin açıklığının sağlanmasında flush sıvısı olarak heparinli izotonik yerine izotonik kullanılması önerilmektedir.

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Received: 25.02.2003; : Accepted for publication: 21.08.2003

INTRODUCTION

Peripheral intravenous catheters are frequently used to give drugs, solutions or blood products. Today the insertion and care of peripheral intravenous catheters is a routine task for nurses in all kinds of care (1-6).

In a rapidly growing number of patients who do not require fluids intravenously, it is desirable to provide an immediately accessible established intravenous (IV) route for intermittent intravenous injections of drugs such as antibiotics and antiarrhythmic drugs (3,5,6).

A common method of providing such IV route, while minimizing the volume of infused fluid, is to keep open intravenous, slow infusion of a solution such as 5% dextrose in water. But this practice is time consuming for the nurse, who must calculate the infusion rate, frequently check the infusion site and adjust the drip rate as needed. This practice also limits the mobility of the patient and has potential adverse side effects if too much fluid is infused. But now, IV lock devices are commonly used for patients requiring intermittent infusions. It has been known that such devices are more cost effective and less time consuming for maintaining venous access (6-8).

The IV lock is maintained by periodic flushing with a heparin-saline solution. Different concentrations of heparin are used to maintain patency of IV lock and to prevent clotting of blood without alteration of systemic clotting factors. However, several recent studies suggest that 0.9% saline solution is as effective as heparin in maintaining catheter patency and reducing phlebitis among peripheral catheters (3,6-11).

Standards for maintaining the patency of IV locks vary depending on the practices of individual institutions. There were lots of differences about maintaining the IV locks, even in the same hospital (6,8-11). In Turkey, the intravenous locks were not available during those days which the study was performed, therefore we used a peripheral short intravenous catheter and a stopcock (three ways) combination for this purpose. The purpose of this experimental study was to determine the efficacy of saline versus heparin flush solutions to maintain peripheral intermittent intravenous catheters. The research hypotheses were: The mean hours of duration of peripheral intermittent intravenous catheters flushed with heparin are not significantly longer than the mean duration of flushed with saline. The incidences of peripheral intermittent intravenous catheter complications are no greater in IVs flushed with saline than in IVs flushed with heparin.

MATERIALS AND METHODS

Type of Research: The research was prepared as an experimental design to determine the efficacy of saline versus heparin flush solution to maintain peripheral intermittent intravenous catheters.

Sampling of the Research: Subjects were conscious patients between 18-65 of age with peripherally placed IVs who were hospitalised in Ege University Faculty of Medicine, Orthopaedics-Traumatology Department and Gastroenterology Department. Patients using anticoagulant, corticosteroid medications, oral contraceptive drugs and receiving chemotherapeutic agents and patients with body temperatures higher than 37.7°C, or who have had mental problems, immobile and/or under intensive care were excluded from the study. Patients having a lesion or arterial/venous catheter in an extremity were perfused on another extremity. Verbal consent was obtained from patients after being informed. The Hospital Management Board approved the study. The study was performed from March 1996 to March 1998.

Collecting Data: Data were collected from March 1996 to March 1998 with a questionnaire and a Patient Observation Form.

Patients were put into study when a physician wrote an order for an IV medication. Sixty patients were selected randomly and divided into two groups. Group 1 (saline; n=30) were patients randomly selected to receive saline flush and Group 2 (heparin; n=30) were patients randomly selected to receive heparin flush which contain 10 iu heparin in one millilitre of saline according to the previously established random allocation list. Both groups were compared on following parameters: age, gender, weight, smoking, additional disease, underlying disease, size of catheter, and Body Mass Index.

Those patients receiving intravenous therapy and participating in the research were informed on the purposes of the study. As soon as the patient felt a complication, researchers were warned. The nurses were informed about the complications of IV therapy and criteria for removing the IV catheter.

Povidone-iodine solution was used to clean the insertion site in all patients. In saline group, intravenous flushing was performed before and after every infusion of medication or every 6 hours (if no medication were given) with 2 ml of saline solution. Group 2 patients received 2 ml of heparin solution which contains 10 iu heparin in one millilitre of saline.

Table 5. The distribution of incidences in complications according to groups

Groups	Complications			
	No		Yes	
	No	%	No	%
Şaline	26	86.7	4	13.3
Heparin	27	90.0	3	10.0
Total	53	88.3	7	15.0

Chi-square = 0.161 SD=1 P=1.00 p>0.05

As outlined in Table 5, the complications occurred in four patients in the şaline group and three patients in heparin group. The complications observed were swelling, haematoma formation and redness. The incidence of complications did not differ between the şaline and heparin groups.

There were no statistically significant differences in the type of infusate, given antibiotic, the number of flushing, the volume of infusate between the groups (p>0.05).

The relationship between gender, additional disease, smoking, size of catheter, anatomic site of catheter and the complications were not statistically significant. But the relationship between the duration of catheter and the complications were found statistically significant which were similar to the literatüre.

DISCUSSION

The relationships between the gender, additional disease, smoking, size of catheter, anatomic site of catheter and the complications were not statistically significant. This may be explained by the number of patients enrolled in the study. It is very difficult to make any evaluation with this number of patients. But the relationship between the duration of catheter and the complications were found statistically significant which is similar to the literatüre (P<0.05).

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In this study, peripheral intermittent IV catheters flushed with heparin did not have a longer duration than those flushed with şaline. The mean duration of catheters was found 66.86 hours for şaline group and 68.16 hours for heparin group (p=1.00). There was no difference in duration of the catheter when peripheral intermittent intravenous catheters were flushed with heparin or şaline (p=0.65).

Studies have compared sites flushed with heparin to those flushed with şaline to determine if there is a difference in the number of hours the catheter remains in place in both paediatric and adult patient groups (3,7-9,11). These studies suggest that şaline is as effective as heparin in maintaining heparin locks.

A meta analysis technique was done by Goode et al to evaluate the effect of heparin flush and şaline flush (5). They concluded that şaline is as effective as heparin regardless of whether 10 or 100 units of heparin are used for duration and complications of IV locks (5).

The incidence of complications did not differ between the şaline and heparin groups. The complications occurred in four patients in the şaline group and in three patients in the heparin group (p= 1.00). There is no difference in the incidence of complications when peripheral intermittent intravenous catheters are flushed with heparin or şaline (p=1.00). Thus our hypothesis of the study is supported.

The result of this evaluation supports previous finding proposing that şaline is efficacious for maintaining the patency of peripheral intermittent IVs in adults (3,7-9,11)

We suggest using şaline flush instead of heparin flush to maintain peripheral intermittent intravenous catheters. The most valuable benefits of changing to şaline, as the flush solution is the elimination of risks related to heparin such as heparin induced thrombocytopenia, thrombus, and haemorrhage. Changing to saline-only flushes will eliminate medication incompatibility and provide a safer therapy for the patients.

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* This research was presented at sixth International Middle East Nursing Conference, May 2-3, 2000, Jordan.