

The Effect of Kiwi Extract on Unclogging of Jejunostomy Tube

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Abstract

Background: Obstruction is one of the most important mechanical complications of jejunostomy tube which in the results, it creates problems on patient's feeding and drug administration. We conducted the study to compare kiwi extract, water, and Cola in managing jejunostomy tube blockage.

Methods: Oral formula clogged 120 tubes, afterward, they were divided into three series on equal conditions. As well as 30 cc of each cleaner agent (Kiwi extract, water, and cola) was administered to the clogging tubes in each series. After four hours, the tubes were washed with 30 cc water. Subsequently, the tubes were connected to a bag containing 200 cc formulas. The flow rate was measured in each tube after one hour (cc/min) and compared correlation between groups.

Results: The mean patency rate (cc/min) of Kiwi extract group was significantly higher than Cola and water groups ($p=0.019$ and 0.009 respectively). Therefore, there were no significant differences between water and Cola group regarding to patency rate.

Conclusion: kiwi extract was more effective than water and cola in unclogging jejunostomy tube. Therefore, kiwi extract could be suggested in preventing and treatment of tube clogging. In addition, further studies will find the significant correlation similar to our findings.

Keywords: Jejunostomy; Water; Cola

Introduction

Feeding Jejunostomy is a common surgical parenteral nutrition in cases that oral nutrition is not possible such as esophageal cancer or in patients suffers aspiration of gastric tube contents is necessary. Compared with other nutritional procedures, this method has proved to be a rather useful and better method^[1]. In this surgical procedure, a fistula is made in the skin of the anterior part of the abdomen and part of the Jejunum wall is drawn out via surgical operation or endoscopy^[2]. Several methods have been proposed of Jejunostomy insertion however, the most common procedure is using the Witzel technique. Also, the Jejunostomy tube can be established percutaneous via guide wire endoscopy^[3,4]. Jejunostomy procedure is different from the jejunostomy tube since in cases that Jejunostomy is contraindicated or it has complications, and it is intended to use parenteral nutrition for a long period, to facilitate works, a tube is placed at the Jejunostomy location. Complications of this procedure include obstruction, ischemia, infection and perforation of the small intestine and the need for repeated nutrition^[5,6].

Obstruction of jejunostomy tube is one of the most important mechanical complications of this method and its prevalence rate is one to 27.6 percent. This obstruction is making problems in receiving nutrition and drugs. There are various reasons for obstruction such as kinking of the tube in the narrow suture, the small internal diameter of the tube, the nonexistence of appropriate nutritional standards and lack of proper education^[7,8]. Various methods are proposed for preventing obstruction contains: washing jejunostomy tube before and after food or drug consumption,

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evolution of intestinal contents every 4 to 6 hours in continuous nutrition, avoiding intermixing food and drug, preventing producing < 5 pH, and prescribing pancreatic enzymes, also using such protein products as Pulmo care, Ensure Plus, Osmolite Enrich, Ensure, causing obstruction^[9,10]. Different substances such as cranberry juice, cola, meat tenderizer and such enzymes as papain, pancrealipase, and chymotrypsin are used for opening the parenteral tube^[11]. Kiwi fruit or Chinese gooseberry (*Actinidia Chinensis*) contains a Cysteine protease - like Pepsine called Actindin. Long - term use of Kiwi due to its Actindin Proteolactic enzyme causes digestion of proteins of foods especially in the stomach. This fruit affects the protein digestion algorithms of foods at various levels. It has been observed which the Kiwi extract in the absence of digestive enzymes leads to digestion of proteins existing in dairy products, fish and egg. Also, Kiwi extract in cases that esophageal obstruction has occurred due to bolus obstruction causes solving of meat stuck from the esophagus^[12,13]. Therefore, opening jejunostomy tube sometimes requires surgical and aggressive treatments and even sometimes it is needed to remove the tube and such operations lead to increased mortality and morbidity in the patients, in this project we propose a conservative, useful and reliable procedure for re-establishing tube patency using three materials of Kiwi extract, Cola and water in the obstructed jejunostomy tube.

Also, the unclogging power of these three materials in unclogging the tube was compared.

Methods

Experimental Setting

This study is an experimental study which was conducted in the laboratory of Al - Zahra Hospital - Isfahan University of Medical Sciences – Isfahan - Iran. At the same time and experimental conditions (Temperature: 34.5, Humidity: 40 % and Latex silicone coated tubes), 120 jejunostomy tubes (9.31 Length, 1.31 Width, 1.31 height (inch) with similar characteristics, were included: A bag containing 200 cc of oral formula (ENSURE powder which ingredient from milk, fresh or frozen fruit, sugar or honey, oat and wheat germ) since a blocking agent was connected to the jejunostomy tube and for preparing 200 cc formula, 165 cc water was mixed with 35g of Ensure powder. The bag was hanged from a serum set and was infused at a flow rate of 25cc/h. another repeated infusion at the same flow rate was done if the tube was not blocked after five hours. The tube was considered blocked if the rate of infusion reached 1/72 (5cc/min) to initial rate. Once the clogs formed, tubes were divided into 3 sets and 30cc of each cleaner agent (Kiwi extract or group 1, cola or group 2 and water or group 3) was administrated by injecting the substance into the clogged tube in each set. After four hours, the tubes were washed with 30cc water. Subsequently, the tubes were connected to a bag containing 200 cc formulas. The rate of infusion was measured in each tube after one hour (cc/min). Finally, the mean infusion flow rate in each group was calculated.

Statistical Analyzing

All statistical analyses were performed by using the Statistical Package of Social Sciences (SPSS) version 19.0 (SPSS, Chicago, IL, USA). To compare the mean flow rate of formula (in cc/min and after an hour) between groups, we used of Mann-Whit-

ney Test for analysis therefore less than 0.05 P-value was considered as a significant threshold.

Results

This study was included 120 jejunostomy tubes which were divided into 3 groups: Kiwi extract or group 1, cola or group 2 and water or group 3 therefore the mean + SD flow rates were 273.675 ± 116.2408, 224.800 ± 132.3622 and 207.950 ± 132.9133cc/min respectively (table 1 and figure 1). The mean flow rate of the tube was significantly higher in Kiwi extract group than Cola and water group (p = 0.019 and p = 0.009 respectively). However there was no significant difference between water and Cola group regarding to tube flow rate (p = 0.61) (Table 2). In addition, tubes patency rate which restoring by kiwi extract were higher than cola and water.

Table 1: Mean of The flow rate in groups

Numbers	Groups	Mean ± SD*
1	kiwi extract	273.67 ± 116.24
2	Cola	224.80 ± 132.36
3	Water	207.95 ± 132.91

*Mean ± SD (cc / min)

Table 2: Comparing Z - score & P - value between groups

Mann-Whitney U	Kiwi extract-Cola	Kiwi extract-water	Cola- water
Z	-2.336	-2.610	-.515
P-value*	.019	.009	.61

*P Values are 2-tailed

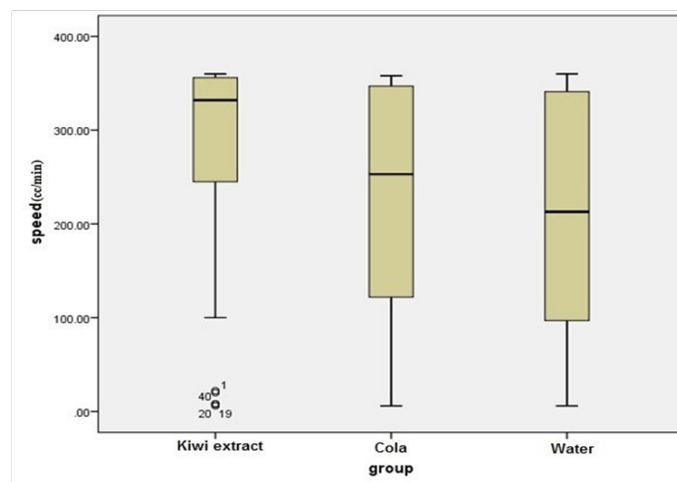


Figure 1: Box plat for comparing speed in three groups.

Discussion

Obstruction is one of the crucial complications of the jejunostomy tube which is made severe malnutrition problems and incomplete drug reception in patients and different factors such as non - observance of health standards are involved in producing such a problems and various procedures such as washing of the jejunostomy tube using to pancreatic enzymes for preventing obstruction play an important role, however in some cases, ob-

struction necessitate repeated operation^[7-10]. The rate of surgical complications also depend on the type of procedure, such that in a conducted study the rate of complications of the jejunostomy tube was more than the Percutaneous endoscopic gastrostomy (PEG) and it was a cause for tube change and its most important complications were obstruction and detachment of the tube^[14]. In our study the rate of patency in the Jejunostomy tubes in the three groups of Kiwi extract, cola and water were compared therefore the rate of tube patency in the Kiwi group was more than cola and water. The effectiveness rate of Kiwi extract in opening jejunostomy tube not has been in other papers but the effect of Cola and water were in other articles. In our study no significant difference was found between cola and water. While in another study conducted by Dandele it was showed that washing of the jejunostomy tube with water compared with Coca - Cola and cranberry juice had the most effectiveness in unclogging the tube^[15]. In another study cranberry juice compared with water and cola was a weaker washer^[11]. The effectiveness rate of pancreatic enzymes in unclogging the jejunostomy tube was good such that in the study conducted by Bourgault it has been said that the pancreatic enzymes as prophylactic may decrease the risk for clog formation^[16]. In a study performed by Sri ram et al., it was suggested that routine prophylactic washing with pancreatic enzyme as enzyme - sodium bicarbonate suspension and water prevents clogging^[9]. In another study using pancreatic enzymes caused removal of obstruction in 23 of 24 cases (96 %) of clogging (all were of the same type) and water and cola had no effect on removal of clogging^[17]. In the Nicholson's study three substances of papain, chymotrypsin and water were introduced as successful washing materials for preventing clogging^[18]. Kiwi fruit contains the protease enzyme called actinidin which causes digestion of foodstuffs especially dairy products and meat in the stomach and the small intestine. It has been said the actinidin causes hydrolyses of the foodstuffs^[19]. In our study, Kiwi extract caused more solving of the clog in the jejunostomy tube. In the study performed by Thomas et al. who studied the effect of the Kiwi fruit, Coca and pineapple on esophageal obstruction with meat bolus, therefore it was concluded that pineapple and Kiwi have enzymes which cause unclogging and solving of clogs however cola causes less movement and solving compared with the other two materials^[12]. The other studies performed by Mohajeri et al. who showed the effect of kiwi fruit on the healing of chronic ulcers such as bedsore, burn wound, and neurological diabetic foot ulcer because there is Natural compounds in the kiwifruit includes protein-dissolving enzymes (Actinidin) and antibacterial agents^[19-21]. The Kiwi fruit contains such substances as vitamins C, E and K, Folate, minerals of K, Mg, and Cu, good food fibers, and phytochemicals^[22]. As a result, the Kiwi extract in addition to being a good solvent for preventing clogging of the Jejunostomy tubes, can be used as a useful nutritional source of types of vitamins and minerals and since patients with parenteral tubes do not enjoy a good diet, the Kiwi extract can be a good part of the diet in such patients. Although it was the first study in this field, it is hoped which in the future and through further studies we can find the significant relation of this substance on unclogging of the Jejunostomy tubes.

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