

Design And Construct Of An Anti hemorrhage Device For The Dialysis Patients Needling After Hemodialysis

Bahador Dejagah^{1*}, Matin Hossinzadeh²

1,2- Department of Electrical Engineering and Information Technology, Iranian Research Organization for Science and Technology (IROST), Tehran, Iran

E-mail:¹ *b.dezhagah@irost.ir* , ² *Matin Hossinzadeh@gmail.com*

Abstract

Needling is one of the challenges that dialysis patients are facing with, for which selection of an appropriate method and speed of work is of high importance. At the end of dialysis process, when nurse begins withdrawal of the needle, she/he has to be careful so that the blood vessel in puncture site may not bleed. The work has to be done with speed and care. Correct performance of the procedure is of great help to patients, and also nurses working in dialysis ward. This may result in feasible stoppage of bleeding, and prevention of probable infections. The study aims at design and manufacture of a device to stop bleeding after withdrawal of needle from hand of dialysis patients, after the end of hemodialysis process. As you may know, after needle removal, the injection site has to be pressed for a certain time period (about 15 minutes) with a pressure more than blood pressure inside the vessel so that bleeding would be stopped, and not continued upon removal of pad. The process is currently done by patients themselves, persons accompanying them, or nurses. To make the process mechanized, we are intended to make a device. This way, time and quality of the procedure will be improved; and, safety against infection probability would be assured. In introduction section, an overview of the research importance and history has been made. In the research method section, an introduction has been made to the method applied, and its advantages. Eventually, analytical results have been discussed in conclusion section, in details.

Keywords: Needling ,Hemodialysis , Dialysis Pateints , Antihemorrhagic

1- Introduction

Hemodialysis is one of the most prevailing treatments for kidney failure of those patients in need of short term dialysis [1]. Hemodialysis involves various types of vascular access made through *arteriovenous grafts*, central venous catheter, *external arteriovenous shunt*, and/or *arteriovenous fistula* [2]. Here, central venous catheters are used; however, as far as they are considered as centers for stenosis, infection or thrombosis, an arteriovenous graft or fistula is better for long term usage [3]. Using various types of vasular access depends on the patients conditions. As shown by a report, permanent vascular access methods are used for 7 and 93% of cases, respectively to start hemodialysis and for temporary methods [4]; and, they are mainly replaced with permanent methods during treatment process. Arteriovenous fistula is one of the most appropriate and prevailing methods of vascular access in these patients; because it may be used for longer periods of time and has less side effects. In those patients with no suitable vessels for usage of aneriovenous fistula, arteriovenous graft or central venous catheter is used [3]. Each of vascular access methods has its own various side effects; so, certain measures have to be taken to increase persistence [5]. Vascular access complications have been the reason for 16 to 25% of hospitalizations in hemodialysis patients [6]. Van loon et al. have reported some complications such as hematoma, thrombosis, infection and aneurysm resulted from repeated injections in the same area of the blood vessel, which in turn increases hospitalization rate, and