



Automated Infusion Drug Warmer System

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ABSTRACT

During the process of infusing a drug to a patient, it may be found that the patient who is under the infusion support, feels uncomfortable at some stage and it may also lead to hypothermia, febrile seizure etc. These infusions may be caused by the type of drug, amount of drug, flow speed of the drug and also the crucial part of the temperature infused into the blood flow of the patient. To control the temperature of the drug it is hard to keep the drug at a high temperature as it may react with the drug and causes some glitches in the properties and it may be harmful for the patients. Hence a system has to be developed which just warm up the drug before it is delivered to the patient as it makes the patient feel comfortable since the blood adapts to the temperature of the drug easily. A system is proposed that the temperature of the infused drug is maintained continuously and delivered to the patient. This may avoid the chances of the seizures, hypothermia in several cases and also alleviate the condition of the patient to a considerable limit.

Keywords: Infusion, Hypothermia, Febrile seizure, Drug, Temperature

I. INTRODUCTION

The practice of injecting the drugs has been increasing day by day in the recent years. This is due to the evolution of the diseases and it depends on various factors such as climatic change, hereditary diseases and physical habit changes. The traditional way of oral medicines has been decreasing day by day and made a rise in the use of latest way of medication. This is due to the way for curing the disease quickly when compared to the traditional way of medication. This type of medication also ensures the right amount of drug to be delivered to the patient with accuracy and also ensures in terms of speedy recovery. It is also considered as one of the basic treating procedure in treatment. The injection of blood or drug is carried out to the blood stream through a hypodermic needle. It is mainly injected via the intravenous, a muscle which is intramuscularly or under the skin that is subcutaneously. The drug injection procedure increased due to the discovery of reusable syringes in olden days. The method is used for various reasons especially when patients are in a state of unconsciousness and also in prolonged cases. This procedure works as an essential part for the hospital treatment.

II. PROBLEM STATEMENT

Even though it is considered as an essential part in the hospital treatment procedure, few drawbacks arise for this system. One of the issues caused when administering the drug is that, the temperature of the drug at which it is administered. The temperature plays a vital role in the components of the drug as it may react according to it. The drug which is delivered to the patients will be maintained at a low temperature less than 25oC (77o F) before the administration process. Few drugs require very low temperature at which it needed to be stored. This arise a problem while administering the drug to the patient. When the low temperature drug is delivered to the bloodstream, it may cause hypothermia to the patient having chances of paralyzing the parts. Adding to this, the temperature of the surrounding i.e. the room temperature also assists to worsen the condition. Since the hospitals are assisted by the centralized air conditioning system at low temperature ranging from 19oC to 23oC (70oF-75oF) compared to the normal room temperature of 25oC (78oF), it is considered as one of the sensitive issues that need to be handled with care as the treatment should not end up in a negative way. The reason for which the hospital is maintained at a low temperature rather than the normal room temperature is that to avoid the chances of infection because the micro organisms may die at low temperature and provides a clean environment which is essential for a hospital.

III. OBJECTIVE

It is clear from the problem statement that the temperature of the drug which is to delivered need to be in a certain range so that it may not worsen or affect the condition of the patient. The main objective of this work is to ensure the temperature of the drug that is administered to the patient must not be in low temperature as it may cause hypothermia. Since the medication to be injected should not be kept in high temperature, the only possible way is to just heat up the drug to a certain range before the process of injecting. This allows to achieve the condition that the temperature should not be in low values and also it should not be heated physically as it may get reacted which in turn changes the physical and chemical properties of the drug.

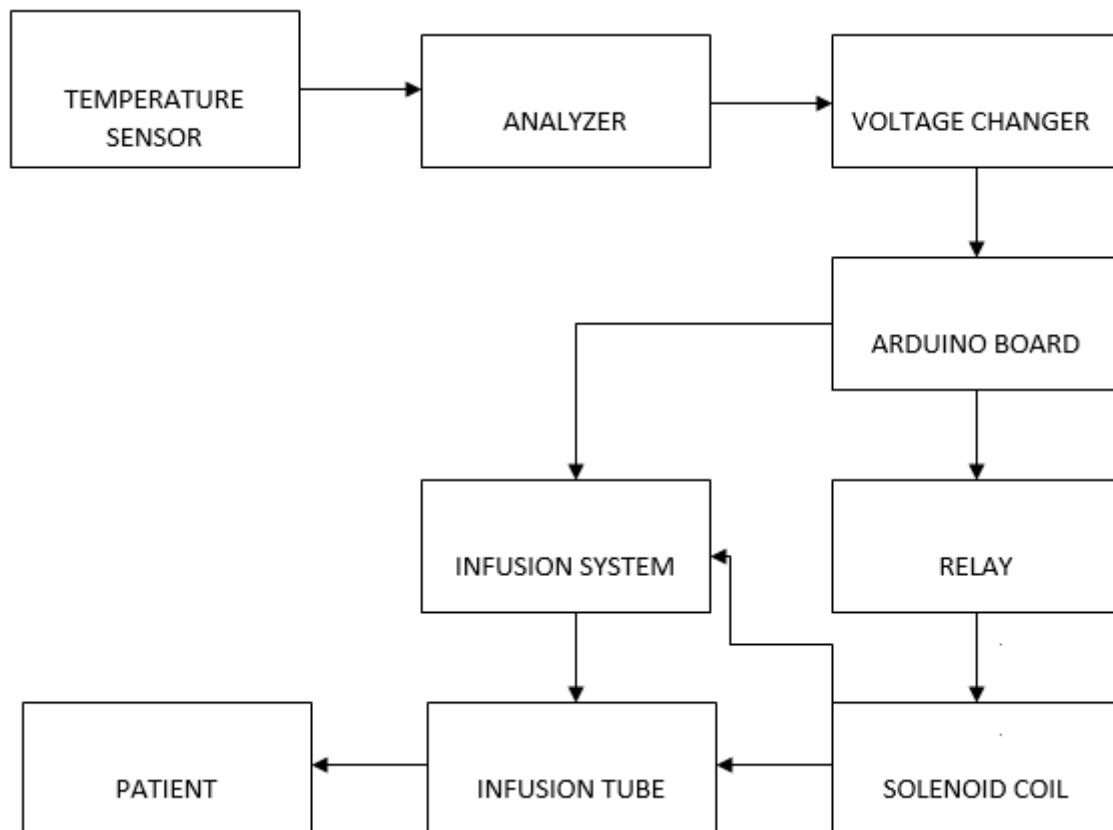
IV. SOLUTION PROPOSED

The objective can be achieved by developing a system which can work on the principle of heating the drug or the blood to be transfused without physical contact. The drug is always passed through the infusion pump or syringe pump which can be attached with this system of the drug warmer so that the transfused drug is maintained at a certain temperature. The temperature of the system is dissipated at the solenoid shaped coil in which the tube passes through without the physical contact. The temperature of the coil can be adjusted by varying the voltage that is given to the system manually. This can be done with the consideration of the room temperature and the temperature at which the patient feels comfortable.

V. SYSTEM WORKING

The liquids were warmed with the help of external heating temperature by the coil which can be controlled by the voltage variation by manual methods. The normal room temperature is monitored by the system and the voltage variation can be also changed according to it. This input value is then carried over by the system which in turn vary the voltage of the system. This process allows the coil to get heated and thus provides the sufficient heat that is to be applied to the liquid. This allows the drug to get heated in a warm condition allowing the patient to feel comfortable during the process of infusion.

VI. BLOCK DIAGRAM



VII. FEATURES

It is licensed auto-line technology. It yields desired temperature. There is no common expense of disposables. The Silicon warming sleeve to embody IV trickle line. It has the exact temperature of the board. It is safe for blood bonding. The liquid or blood warming happens till the place of bonding. The vital highlights of the IV liquid warmers are particular setup, divider mounted, ledge, or shaft mounted choices, lightweight, clinical grade plastic lodging. It holds 0.5-, 1-, 2- or 3-liter clinical arrangement sacks. It has anodized aluminum heat plate. Double temperature sensors are used. It warms to 40°C in a short time or less. Precise to +0% - 2°C.

VIII. APPLICATIONS

It is very well may be applied in neonatal consideration, pediatric consideration, acute consideration, postoperative consideration and home-care. A fluid warmer is a clinical gadget utilized in medical service offices. It is utilized for warming liquids, crystalloid, colloid, or blood item. It is before being regulated (intravenously or by other parenteral courses) to internal heat level levels. It prevent hypothermia in actually damaged or careful patients. The imbue ment hotter assists with warming up the temperature of clinical arrangements, supplement arrangements, dialyses also as flush fluid which can forestall the occurrence of hypothermia in enormous degree. A blood warmer is utilized to warm blood or different liquids, limiting the gamble of hypothermia. Blood is kept refrigerated for safeguarding of the cells. It is vital for warm it to a suitable temperature not exclusively to prevent hypothermia yet additionally to forestall hemolysis, or breakdown of the platelets.

IX. CONCLUSIONS

All things considered, imbue ment of warm intravenous fluids to parturition going through cesarean fragment under neighborhood sedation reduces the degree of hypothermia and is connected with a 0.25°C temperature advantage differentiated and intravenous fluids blended at incorporating temperature of the functioning room. Regardless, it was not fruitful to prevent shivering and to lessen time to set free from recovery room. Warming IV fluids to inward intensity level before implantation was connected with additional created comfort for grown-up emergency department patients appeared differently in relation to standard, room temperature IV fluids in this pilot study. Future investigation is legitimate to furthermore analyze the effect of warmed IV fluids on constant centered results and the credibility of warming IV fluids in the emergency department setting.

X. REFERENCES

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