中文題目：洗腎時導入整合系統減少脫針漏血之發生率以及增進洗腎安全

英文題目：Implementation for Integrated Program of Hemodialysis May Reduce the Incident of Venous Needle Dislodgment and Bleeding and Improving the safety of hemodialysis

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Background: Venous needle dislodgement is a severe complication during hemodialysis. The incidence rate was reported from 5.1% to 6.1%. It may cause acute bleeding and lead to death. Many previous studies reported different methods to detect complications. A survey conducted by Lund University was to detect VND by characterizing the mean venous pressure, the venous cardiac pulse pressure, the time delay, and the correlation between the two pressure signals. One study conducted by National Tsing Hua University was to integrate a flexible sensor and self-organizing algorithm and to design a cloud computing-based warning device for blood leakage detection. Another study proposed a novel wearable device for blood leakage monitoring during HD using an array sensing patch. Though the devices are various, there was still a lack of integrating programs for nursing training and the device. This study aims to conduct a program for an integrated training course and the VND device.

Method: This study was divided into two phases, the control phase and the study phase. In the beginning of control phase, we conduce a training program about hemodialysis care process. During the control phase, the abnormal events of venous needle dislodgement and blood leakage were recorded in the hemodialysis unit room. Before the study period, we imported an integrated program, including the standard process of fistula puncture, medical care during hemodialysis, regular inspections of the venous puncture site and VDN detection devices with an alarm system. In the study phase, we implanted the VND detection devices and alarm system. We also performed the standard care process of dialysis and collected the data of the events of venous dislodgement or bleeding.

Result: The control phase was conducted from July 2019 to September 2019, and the study period was performed from November 2019 to Jan. 2020. A total of 62 patients completed the study. During the control period, there were 2087 dialysis treatments, of which 30 patients had venous needle dislodgement or bleeding. There were 71 events of venous needle dislodgement or bleeding, and the incidence rate was 3.3

events per 100 sessions. In the study phase, there were a total of 682 dialysis sessions and 15 events of venous needle dislodgement or bleeding. The incidence rate was 2.1 events per 100 sessions. The incidence rate of severe or moderate VND bleeding was 1.1 events per 100 sessions in the control period and 0.3 events per 100 sessions in the study period. The incidence rate of moderate and severe cases dropped by 72.7 percentages.

Conclusion: This study imported a new device and a training program. The training program, including the standard process of fistula puncture, care during hemodialysis, an inspection of the venous puncture site, and an alarm system. The incidence rate in the moderate and severe groups dropped by 72.7 percentages. By importing the training program, we can see the significant decreasing incidence of venous needle dislodgement or bleeding. Nevertheless, we still lack large scale research and comparison with other devices.