

Using ultrasound guidance to reduce the rate of venous catheter repositioning

Hsieh Shih Wei¹

1 Department Of Nursing, An Nan Hospital, China Medical University, Tainan, Taiwan

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Background

- The stability and accuracy of venous catheters are critical for the treatment of critically ill patients. However, for patients with fragile veins or severe edema, the traditional catheter insertion process often encounters difficulties. Multiple insertion attempts not only increase patient pain and anxiety but also add to the healthcare workload and costs.
- Literature suggests that the use of ultrasound guidance significantly improves first-attempt success rates in venous catheter insertion.
- This study aims to explore the impact of using ultrasound-guided venous catheter insertion on patients compared to traditional methods.

Objective

- The objective of this study is to evaluate the impact of "ultrasound-guided venous catheter insertion" on the insertion success rate, reinsertion rate, and patient discomfort in critically ill patients compared to traditional insertion methods, aiming to improve treatment outcomes and care.

Methods

- This study employed a quasi-experimental design, involving 125 patients in a surgical ICU in southern Taiwan, all of whom had fragile veins or severe edema.
- The patients were randomly divided into an experimental group (65 patients) receiving ultrasound-guided venous catheter insertion and a control group (60 patients) undergoing traditional catheter insertion.
- Data collection occurred from May to December 2021. The study compared the reinsertion rates, number of insertion attempts, patient discomfort, and staff operation difficulty between the two groups.

RESULTS

- The results showed that the reinsertion rate in the experimental group was significantly lower than in the control group ($p < 0.01$), and the first-attempt success rate was notably higher.
- Additionally, patients in the experimental group experienced reduced anxiety and pain associated with catheter reinsertion. During the COVID-19 pandemic, ultrasound-guided techniques alleviated the difficulty of insertion while wearing level-three protective equipment, reducing patient contact time and improving insertion efficiency.

Steps for Needle Insertion



BEGIN NEEDLE
INSERTION



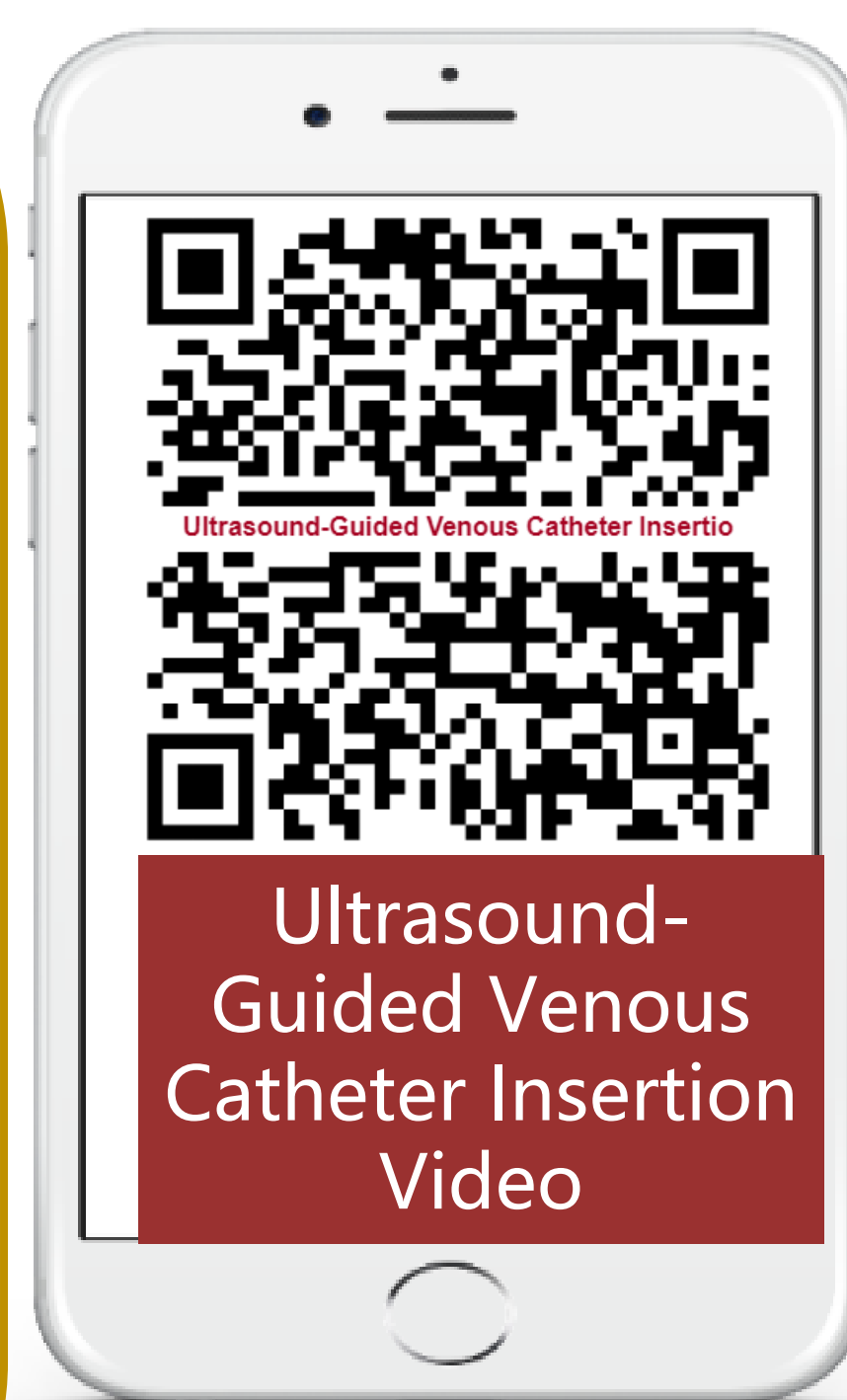
CONFIRM THE
NEEDLE'S
POSITION
AFTER
INSERTION



CHECK FOR
BLOOD
RETURN BY
ASPIRATING



SECURE THE
CATHETER TO
COMPLETE THE
INSERTION



Ultrasound device



Steps for Needle Insertion

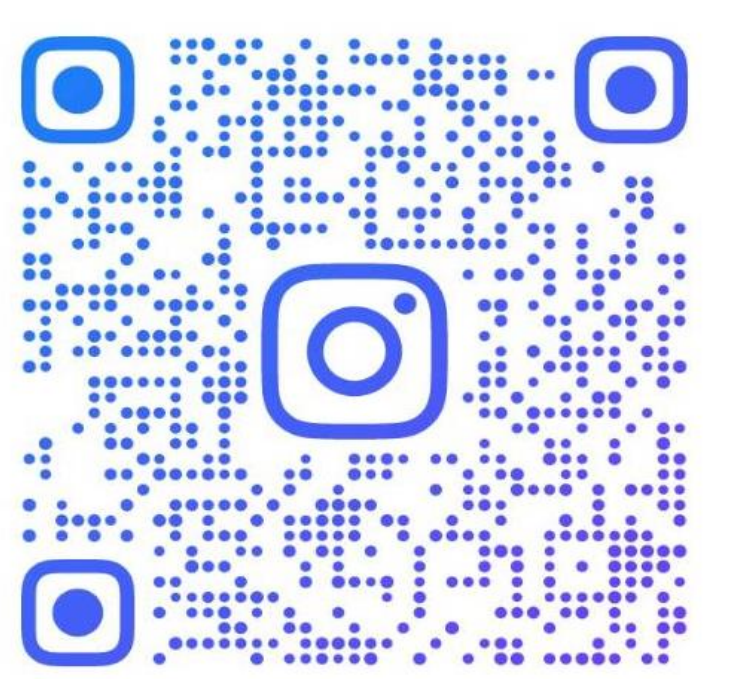


Comparison	Mean Experimental	Mean-Control	t value	p value
Avg Needle Insertion Attempts	1.2	4.0	2.8	<0.01
Reinsertion Rate (%)	10.0	35.0	5.1	<0.01
Avg Insertion Time in Minutes	5.0	15.0	4.3	<0.01

CONCLUSIONS

- This study confirms that the implementation of ultrasound-assisted venous catheter insertion not only significantly increases the first-attempt success rate but also effectively reduces reinsertion rates, alleviates patient discomfort, and enhances the efficiency of the medical team.
- This technique is especially crucial for critically ill patients, particularly those with COVID-19, as it reduces medical risks and improves care quality.
- The technique will be further promoted across other departments, and ongoing training for healthcare personnel will be implemented to maintain the hospital's leading position in venous catheter insertion
- For patients: The average number of needle insertions for difficult venous catheter placement has decreased from five attempts to just one.
- For staff: The time spent on difficult needle insertions has been reduced by 678 hours per year, achieving a 100% satisfaction rate among nursing staff in the department.
- For the hospital: Labor cost savings amount to approximately NT\$138,312 per year, and medical supply costs are reduced by about NT\$227,640 per year, leading to a total savings of NT\$365,952 annually in combined labor and material costs

CONTACT INFORMATION



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