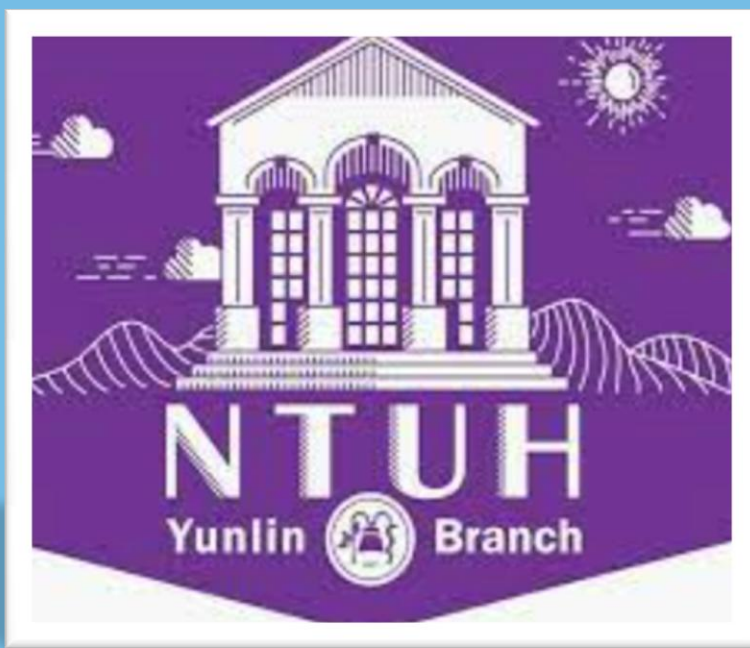




The predictors of unexpected in-hospital cardiac arrest in patients



Yu, Wen-Ying¹, Hung, Chang-Chiao²

Graduate student, School of Nursing, Chang Gung University of Science and Technology, Taiwan¹;
Registered nurse, Department of Nursing, National Taiwan University Hospital Yunlin Branch¹,
Professor, School of Nursing, Chang Gung University of Science and Technology, Taiwan²

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INTRODUCTION

To avoid the occurrence of in-hospital cardiac arrest (IHCA) is a very important patient safety issue in medical institutions. In the UnitedState, approximately 292,000 patients experience IHCA each year,of which 60%-70% have changes in clinical symptoms and vital signs before the events. How to detect the IHCA in advance becomes an important issue.

AIM

To explore the predictors of pre-IHCA in hospitalized patients.

METHOD

A retrospective case-control study design was adopted to collect the medical records of patients in the general ward of a regional teaching hospital in Taiwan. Data from 115 patients who experienced IHCA were obtained, and the other 115 patients in the same ward were matched in a 1:1 manner. Finally, a total of 230 cases were obtained.

Data Collection and Analysis

Data collection included demographiccharacteristics, disease diagnosis, laboratory tests, physiological parameters, and nursing-related information. Disease diagnosis were heart failure, atrial flutter/atrial fibrillation, chronic obstruction pulmonary disease, end stage renal disease, diabetes mellitus, hypertension, and stroke. Laboratory tests included sodium, potassium, calcium, blood sugar, white blood cell account, and neutrophil-lymphocyte ratio (NLR). Physiological parameters were body temperature, respiration, heart rate, systolic blood pressure, and blood oxygen concentration. Nursing-related information were age, education level, nursing ladder level, and shift. Mean, frequency, percentage, t-test, chi-square, and logistic regression were used for analysis.

CONTACT INFORMATION



RESULTS

A total of 230 cases was obtained. The cases were predominantly male (56.5%) with an average age of 70.9 years ($SD = 13.45$). Gender($p < .00$, $OR = 2.20$, 95% $CI = 1.24-3.93$), heart failure($p < .01$, $OR = 2.98$, 95% $CI = 1.29-6.87$), atrial fibrillation($p < .00$, $OR = 6.30$, 95% $CI = 2.02-19.62$),end stage renal disease($p < .04$, $OR = 2.54$, 95% $CI = 1.03-6.24$);potassium($p < .01$, $OR = 1.81$, 95% $CI = 1.11-2.97$), and white blood cell account($p < .04$, $OR = 1.06$, 95% $CI = 1.00-1.12$) were associated with IHCA and were the predictors of IHCA. SpO_2 ($p < .00$, $OR = 0.77$, 95% $CI = 0.65-0.93$) had associations with IHCA and were also the predictors at 8hours prior IHCA. No significant difference was found between nursing-related information and IHCA.

Table 1. The predictability of patient's basic attributes and disease characteristics to the occurrence of IHCA									
	Total (N=230)		IHCA (N = 115)		Non-IHCA (N =115)		Odds ratio	95% C.I.	p-value
	n	%	n	%	n	%			
Gender									
Male	130	56.5	75	65.2	55	47.8	2.20	1.24-3.93	.00
Fmale [†]	100	43.5	40	34.8	60	52.2			
Af							6.30	2.02-19.62	.00
Yes	30	13	26	22.6	4	3.5			
No [†]	200	87	89	77.4	111	96.5			
CHF							2.98	1.29-6.87	.01
Yes	44	19.1	34	29.6	10	8.7			
No [†]	186	80.9	81	70.4	105	91.3			
ESRD							2.54	1.03-6.24	.04
Yes	31	13.5	22	19.1	9	7.8			
No [†]	199	86.5	93	80.9	106	92.2			

note. [†] comparison group

Table 2. Predictability of laboratory data for occurrence of IHCA											
	IHCA (N=115)				Non-IHCA (N=115)				Odds ratio	95% C.I.	p-value
	n	min/max	Mean	SD	n	min/max	Mean	SD			
Before IHCA											
K	112	2.3/7.7	4.0	0.75	111	2.9/5.0	3.85	0.49	1.81	1.11-2.97	.01
WBC	113	0.10/42.95	11.02	6.93	114	1.64/28.13	8.59	4.21	1.06	1.00-1.12	.04
NLR	103	0.1/104.4	13.65	17.03	102	0/79.5	7.74	9.57	1.03	0.99-1.06	.06
note. K : mEq/L ; WBC : k/μL											

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Table 3. The Predictability of Physiological Parameters to the occurrence											
	IHCA組 (N=115)				未IHCA組 (N=115)				Odds ratio	95% C.I.	p-value
	n	min/max	Mean	SD	n	min/max	Mean	SD			
16-24 hours before IHCA											
BT	113	35/40.5	36.7	0.92	115	35/38.8	36.43	0.66	1.46	0.97-2.19	.06
HR	114	62/170	95	19.22	115	56/163	86.62	15.69	1.01	0.99-1.03	.24
RR	114	10/36	21	4.49	115	15/28	18.97	2.25	1.01	0.90-1.14	.78
MEWS	114	0/12	3.96	2.75	115	0/12	2.26	2.37	1.22	1.04-1.42	.01
8-16 hours before IHCA											
BT	114	35/39.9	36.6	0.91	115	35.4/38.8	36.44	.57	1.16	0.72-1.84	.53
HR	114	54/156	95	19.49	115	55/134	85.83	15.23	1.01	0.99-1.04	.11
RR	114	13/40	21	5.13	115	16/28	19.02	2.04	1.04	0.92-1.18	.47
MEWS	112	0/15	4.51	3.06	115	0/12	2.34	2.51	1.21	1.04-1.41	.01
1-8 hours before IHCA											
BT	112	34/39.5	36.7	1.01	115	34.7/38.5	36.46	.66	0.83	0.50-1.37	.47
HR	115	55/222	102	30.26	115	59/150	86.10	14.91	1.01	0.99-1.03	.25
RR	114	12/50	23	7.06	115	13/26	18.58	2.19	1.14	0.98-1.32	.08
SpO2	88	70/100	94	6.62	53	92/100	97.26	1.81	0.77	0.65-0.93	.00
MEWS	115	0/15	5.63	3.53	115	0/12	2.23	2.51	1.06	0.88-1.29	.51

Note. ° BT : °C ; HR : bpm ; RR : bpm ; SpO2 : %

CONCLUSIONS

This study shows that the gender, disease diagnosis, laboratory tests, physiological parameters are specifically in relation of IHCA. The authors suggest that nurses should alert when patients' symptoms and specific physiological indicators change.

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