

Clinical utility of finger probe as ear probe in pulse oxymeter for estimating the oxygen saturation

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Background: The ear probe may be used to obtain the oxygen saturation when the finger probe is unavailable or inaccessible. When the pulse oximetry(Nellcor N-25) used in a finger is attached to the ear, an increased oxygen saturation value is observed in comparison with the oxygen saturation measured in aBGA in most cases. The purpose of this study was to evaluate the accuracy and disparity of the oxygen saturation measured in the finger and ear compared to the aBGA. **Methods:** This study was conducted from November 1, 2016 to January 31, 2017 as an observation study for patients who visited the intensive care unit of Cheonan Soonchunhyang University Hospital. A total of 67 patients were enrolled. One patient with an oxygen saturation of less than 90%, nine patients whose oxygen saturation was not measured due to systemic circulation failure, and two patients whose oxygen saturation was not measured in the ear were excluded. Fifty-five patients were classified as 1)sepsis and septic shock, 2)chronic obstructive pulmonary disease (COPD) acute exacerbation 3)pneumonia. **Results:** In 55 patients, 60% were male and the mean age was 69.2 years. Ventilator was used in 52.7% of patients, nasal high flow and nasal prong were used in 18.2%, 29.1%, respectively. Vasopressor was used in 65.5% of patients. Sepsis and septic shock, COPD acute exacerbation, and pneumonia were 21.8%, 23.6% and 54.6%, respectively. In a total of 55 patients, the mean value of the oxygen saturation measured by aBGA was 95.9 ± 2.39 %. The mean value of pulse oximeter using the fingers and ears were 96.4 ± 2.48 %, 98.2 ± 1.92 % respectively. There was no statistically significant difference in oxygen saturation between the aBGA and finger oximetry ($p = 0.22$). But the oxygen saturation measured by the ear was significantly higher than the oxygen saturation measured by the finger($p < 0.001$). There were no significant difference the oxygen saturation in the aBGA, finger and ear of the 3 groups according to the oxygen supply method. **Conclusion:** Nellcor N-25, a finger probe, can not be used for the ear regardless of the patient's disease (sepsis, COPD, pneumonia) and oxygen supply method in the intensive care unit.

Relationship between dyspnea and depression in the Chronic Obstructive Pulmonary Disease patients

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Introduction: in COPD patients, around 40% are affected by depressive symptoms. We investigated whether depression is correlated with dyspnea measured by COPD Assessment Test (CAT) score. **Methods:** Outpatients (85 persons) with COPD were enrolled. Depression was assessed as measure Hamilton Rating Scale for Depression (HDRS), Patient Health Questionnaire-9 (PHQ-9), Patient Health Questionnaire-2 (PHQ-2), and Geriatric Depression Scale-Short Form-Korea (GDS-SF-K). **Results:** 1) Classified according to the GOLD criteria, The HDRS score of the mild($n = 28$), moderate ($n = 33$), severe ($n = 17$), and very severe COPD patients ($n = 4$) were 4.92 ± 3.80 , 3.70 ± 3.00 , 5.94 ± 4.22 , 10.00 ± 10.92 ($p = 0.027$) (Table 1). 2) Prevalence of depression were 23.5% ($n = 20$, HDRS), 31.0% ($n = 27$, PHQ-9), 8%($n = 7$, PHQ-2), 23.0% ($n = 20$, GDS-SF-K) 3) HDRS-Depression group (mild $n = 7$, moderate $n = 4$, severe $n = 7$, very severe $n = 2$) was not significantly difference compared to HDRS-normal group in FEV1 ($1.53 \pm 0.32L$ vs $1.62 \pm 0.29L$, $p > 0.05$). But mean CAT score was significantly higher (32.4 ± 10.2 vs 24 ± 5.3 , $p = 0.045$) (table 3). 4) 1-year of follow up, reduced FEV1 (ml) in two groups showed no significant difference (8.4 ± 8.2 vs 7.7 ± 7.4 , $p > 0.05$). But mean CAT score was higher in the HDRS-depression group (33.6 ± 11.4 vs 22.4 ± 6.7 , $p = 0.014$). 5) Frequency of acute exacerbation of the HDRS-depression group compared to the HDRS-normal group showed a tendency to increase (1.8 ± 1.1 vs 1.6 ± 0.5 , $p > 0.05$) (table 3). **Conclusions:** In COPD patients, reduction lung function have severe depression and depression worse dyspnea.

Table 1. Distribution of the mean score in HDRS, PHQ-9, PHQ-2 and GDS-SF-K scores stratified by gender, age, educational level and living arrangement of the subjects				
	HDRS	PHQ-9	PHQ-2	GDS-SF-K
Gender				
Male	4.874(32)	3.153(32)	1.971(32)	3.875(32)
Female	5.164(44)	4.284(44)	2.777(44)	4.454(44)
Total	4.874(76)	3.663(76)	2.381(76)	4.165(76)
	(p=0.346, p=0.094)	(p=0.294, p=0.102)	(p=0.135, p=0.011)	(p=0.346, p=0.042)
Age (years)				
40-44	3.403(7)	4.397(9)	1.801(7)	3.304(4)
45-49	4.874(31)	4.154(34)	2.871(31)	3.884(37)
50-54	4.874(35)	3.663(34)	2.111(35)	3.119(38)
55-59	4.273(24)	2.437(35)	1.140(31)	3.219(34)
60+	5.942(40)	5.472(40)	3.801(42)	5.883(47)
	(p=0.357, p=0.344)	(p=0.381, p=0.247)	(p=0.249, p=0.408)	(p=0.381, p=0.022)
Education level				
5	4.924(47)	4.474(53)	2.971(49)	4.624(57)
4	4.384(42)	2.947(47)	1.147(42)	3.833(53)
3	3.403(31)	2.801(30)	0.400(34)	2.800(38)
2	3.174(24)	2.142(28)	1.147(24)	3.173(33)
1	3.383(28)	1.441(15)	0.471(15)	1.888(27)
	(p=0.381, p=0.193)	(p=0.034, p=0.004)	(p=0.294, p=0.079)	(p=0.346, p=0.193)
Living arrangement				
With spouse	4.874(32)	3.873(39)	1.801(40)	3.875(34)
With family without spouse	4.764(34)	3.873(35)	2.971(35)	3.423(37)
Alone	5.942(40)	5.472(40)	3.801(42)	5.883(47)
	(p=0.346, p=0.294)	(p=0.381, p=0.247)	(p=0.249, p=0.408)	(p=0.381, p=0.022)
Number of physical illness				
1	4.404(44)	4.443(52)	1.771(53)	4.144(51)
2	3.873(39)	3.444(39)	1.801(39)	3.875(41)
3	4.163(39)	2.147(40)	0.901(40)	3.801(41)
4	6.804(34)	2.782(30)	1.801(31)	3.782(34)
5	4.874(49)	4.333(55)	2.971(57)	4.244(61)
	(p=0.174, p=0.107)	(p=0.173, p=0.046)	(p=0.054, p=0.024)	(p=0.294, p=0.408)
Severity of COPD				
Mild	4.163(39)	3.873(39)	1.801(39)	3.875(41)
Moderate	3.782(34)	3.002(30)	1.801(31)	3.173(33)
Severe	5.942(40)	4.174(44)	3.801(42)	5.174(42)
Very severe	10.000(4)	10.000(4)	10.000(4)	10.000(4)
	(p=0.221, p=0.027)	(p=0.003, p=0.047)	(p=0.294, p=0.102)	(p=0.294, p=0.042)

Table 2. Prevalence of depression in patients with COPD (total 85 persons)

Severity of COPD	7	30.3	4	38.4	1	14	1	17.1
Mild	4	13.3	10	30.3	3	11	4	16.3
Severe	7	40.2	4	30.3	1	17	4	30.3
Very severe	2	30.3	2	30.3	2	30.3	2	30.3

Table 3. Comparison between HDRS-depression group and HDRS-normal group

	HDRS-depression group (N=20)	HDRS-normal group (N=65)	p-value
FEV1 (L)	1.53±0.32	1.62±0.29	p>0.05
CAT score	32.4±10.2	24±5.3	p=0.045
1-year of follow up, reduced FEV1 (ml)	8.4±8.2	7.7±7.4	p=0.05
The frequency of acute exacerbation	1.8±1.1	1.6±0.5	p=0.05

